Remedial Action Work Plan

For

109-17 to 109-23 72nd Road

QUEENS NEW YORK

Block 3258, Lot(s) 14, 16, 17, and 18

OER Number: 16EHAN123Q

Voluntary Cleanup Number: 16CVCP040Q

E-Designation 222

CEQR Number 09DCP013Q

Special Forest Hills District

Prepared for:

PSRS REALTY

109-17 72ND ROAD, SUITE 6R

QUEENS, NEW YORK 11375

Prepared by:

ASSOCIATED ENVIRONMENTAL SERVICES, LTD.

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DECEMBER 15, 2015

REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
AST	Aboveground Storage Tank
CAMP	Community Air Monitoring Plan
C&D	Construction & Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
CO	Certificate of Occupancy
CPC	City Planning Commission
DSNY	Department of Sanitation
"E"	E-Designation
EAS	Environmental Assessment Statement
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment
EC/IC	Engineering Control and Institutional Control
ELAP	Environmental Laboratory Accreditation Program
FDNY	New York City Fire Department
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IDW	Investigation Derived Waste
Notice - NNO	Notice of No Objection
Notice - NTP	Notice To Proceed
Notice - NOS	Notice Of Satisfaction
Notice - FNOS	Final Notice of Satisfaction
NYC BSA	New York City Board of Standards and Appeals
NYC DCP	New York City Department of City Planning
NYC DEP	New York City Department of Environmental Protection
NYC DOB	New York City Department of Buildings
NYC DOF	New York City Department of Finance
NYC HPD	New York City Housing Preservation and Development
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation

NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DEC PBS	New York State Department of Environmental Conservation Petroleum Bulk Storage
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
OSHA	United States Occupational Health and Safety Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
PM	Particulate Matter
QEP	Qualified Environmental Professional
RA	Register Architect
RAP	Remedial Action Plan
RCA	Recycled Concrete Aggregate
RCR	Remedial Closure Report
RD	Restrictive Declaration
RI	Remedial Investigation
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOCs	Semi-Volatile Organic Compounds
USCS	Unified Soil Classification System
USGS	United States Geological Survey
UST	Underground Storage Tank
TAL	Target Analyte List
TCL	Target Compound List
TCO	Temporary Certificate of Occupancy
VB	Vapor Barrier
VOCs	Volatile Organic Compounds

CERTIFICATION

I, Dale Konad, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the 109-17 through 109-23 72nd Road site, site number 16CVCP040Q. I certify to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

_____

Name

PE Stamp

_____

PE License Number

_____

Signature

_____

Date

I, John Schretzmayer, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 109-17 through 109-23 72nd Road site, site number 16CVCP040Q. I certify to the following:

- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

_____

QEP Name

_____

QEP Signature

_____

Date

EXECUTIVE SUMMARY

PSRS Realty is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 13,000-square foot site located at 109-17 to 109-23 72nd Road, Queens, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Current Usage

The Site is located in the Forest Hills section of Queens, New York and is identified as Block number 3258 and Lot(s) number(s) 14, 16, 17, and 18 on the New York City Tax Map. Figure 1 is a Site location map. The Site is 13,000-square feet and is bounded by a multi-unit residential building to the north, a vacant lot to the south, multi-unit residential buildings to the east, and 72nd Road to the west. Currently, the Site is used for two (2) 2-2½ story buildings with eight (8) commercial tenant spaces and eight (8) residential units on four (4) tax lots. All buildings have full basements.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of the demolition of the existing structures and a new construction consisting of a seven (7) story mixed-use condominium. A 30 foot setback is proposed at the northwestern border of the property. The foundation area for the new building will measure 98.5 feet by 100 feet. The basement area for this portion of the building will be developed to a depth of approximately ten (10) feet below grade. A terrace area will be constructed off the rear of the building on the first floor that measures 33 feet 8 inches by 100 feet. The new building will utilize the basement for storage, refuse, parking garage for 26 cars, utility rooms and an elevator. Excavation will be to 10 feet across 76 percent of the site for the basement of the building and to 10 feet in the area of the terrace. The first floor will be developed for commercial use. The second through seventh floors will be developed for residential. As part of development, the referenced lot(s) are expected to be merged. The water

table was observed at approximately 60 feet below grade surface (bgs). Layout of the proposed site development is presented as Appendix 3.

Summary of Environmental Findings

1. Elevation of the property ranges from 75 to 80 feet above sea level.
2. Depth to groundwater was observed at approximately 60 feet below grade at the Site.
3. Groundwater flow is generally from southwest to northeast beneath the Site.
4. The stratigraphy of the site, from the surface down, consists of approximately 15 feet of silty sand with clay. Depths below 15 feet were not observed.
5. Soil/fill samples collected during the remedial investigations were compared to the 6NYCRR Part 375 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) as well as Track 2 Restricted Commercial Use SCOs. Soil analytical results reported concentrations of VOCs, SVOCs, Pesticides, PCBs, and metals below Unrestricted Use SCOs. Soil/fill samples collected during the RI showed no evidence of impacts.
6. Groundwater samples were compared to NYSDEC Part 375 Groundwater quality Standards (GQSs). Groundwater samples collected during the RI showed no evidence of impacts. Groundwater analytical results reported concentrations of VOCs, SVOCs, Pesticides, PCBs, and metals below their respective GQSs.
7. Soil vapor results collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Data collected during the RI indicated petroleum related VOCs were present at low concentrations. Total maximum concentrations of petroleum-related VOCs (BTEX) was at 305 $\mu g/m^3$. The chlorinated VOC Trichloroethene (TCE) was not detected in any soil gas samples. Tetrachloroethylene (PCE) was detected at maximum concentration of 8.13 $\mu g/m^3$. Soil vapor samples collected during the RI showed that all chlorinated VOCs were detected at trace concentrations and below NYSDOH AGVs.

Summary of the Remedy

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial

action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. This Site already meets Unrestricted Use SCOs. As a part of development, the entire footprint of the building area (about 75% of the property) will be excavated to a depth of approximately 10 feet below grade for development purposes. Approximately 5000 tons of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.
7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
9. Removal of all UST's that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
10. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and

disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.

11. Collection and analysis of post-excavation confirmation samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
13. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.

The Engineering Controls are not required as part of Unrestricted Use cleanup. However, the following construction elements are implemented as part of new development:

1. As part of development, installation of a vapor barrier system beneath the building slab and along foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a minimum of 10-mil Raven Industries VaporBlock® Plus or equivalent below the slab throughout the full building area and a minimum 10-mil Raven Industries VaporBlock® Plus or equivalent outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.

2. As part of development, construction of an engineered composite cover consisting of a six-inch thick concrete building slab with an 8-inch clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, and two feet of clean soil in all open space and landscaped areas.

3. If Track 1 Unrestricted Use SCOs are confirmed through end point samples, E-Designation will be removed for this Site. Otherwise, the property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of

Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The NYC Office of Environmental Remediation (OER) provides governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan ("cleanup plan") describes the findings of prior environmental studies, shows the location of identified contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a very high level of protection for neighboring communities and also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Project Information:

- 109-17 72nd Road, Queens, NY
- NYC Voluntary Cleanup Program Project Number: 16CVCP040Q

Project Contacts:

- OER Project Manager: Katherine Glass, 212-788-8841
- Site Project Manager: John Schretzmayer, 631-234-4280
- Site Safety Officer: John Schretzmayer, 631-234-4280
- Online Document Repository: http://www.nyc.gov/html/oer/html/document-repository/document-repository.shtml

Remedial Investigation and Cleanup Plan: Under the oversight of the NYC OER, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses: Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care

facilities, hospitals and residential areas. The cleanup program was then tailored to address the special conditions of this community.

Qualitative Human Health Exposure Assessment: An important part of the cleanup planning for the Site is a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan: This cleanup plan includes a Construction Health and Safety Plan (CHASP) that is designed to protect community residents and on-Site workers. The elements of this RAWP are in compliance with applicable safety requirements of the United States Occupational Safety and Health Administration (OSHA). This RAWP includes many protective elements including those discussed below.

Site Safety Coordinator: This project has a designated Site safety coordinator to implement the CHASP. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is identified at the beginning of this Community Protection Statement.

Worker Training: Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan: Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a ‘Contingency Plan’).

Odor, Dust and Noise Control: This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with applicable NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager or NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document.

Quality Assurance: This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

Stormwater Management: To limit the potential for soil erosion and discharge, this cleanup plan has provisions for stormwater management. The main elements of the stormwater management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation: The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation will conform to requirements of the NYC Department of Buildings.

Signage: While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program and provides project contact names and numbers, and a link to the document repository where project documents can be viewed.

Complaint Management: The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager or

the NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

Utility Mark-outs: To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and construction work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal: All soil and liquid material removed from the Site as part of the cleanup will be transported and disposed of in accordance with all applicable City, State and Federal regulations, and required permits will be obtained.

Soil Chemical Testing and Screening: All excavations will be supervised by a trained and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Stockpile Management: Soil stockpiles will be kept covered with tarps to prevent dust, odor and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed, to protect storm water catch basins and other discharge points.

Trucks and Covers: Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with applicable laws and regulations.

Imported Material: All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on the Site. Waste materials will not be brought onto the Site. Trucks entering

the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination: All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping: Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing: Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report: The results of all cleanup work will be fully documented in a final report (called the Remedial Action Report) that will be available for public review online. A link to the online document repository and the public library with Internet access nearest the Site are listed on the first page of this Community Protection Statement document

Long-Term Site Management: If long-term protection is needed after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined either in the property's deed or established through a city environmental designation registered with the Department of Buildings. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 SITE BACKGROUND

PSRS Realty is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate 109-17 to 109-23 72nd Road located in the Forest Hills section of Queens, New York (the Site). This project has been assigned project number 16EHAN123Q by OER. This RAWP describes the remediation and/or mitigation activities to be implemented at the Site in coordination with the New York City Office of Environmental Remediation (OER) for the purposes of satisfying the requirements of the Hazardous Materials E-Designation Program and obtaining a Notice To Proceed. An E-Designation for Hazardous Materials (E-222) was placed on the Site by the New York City Department of City Planning (DCP) as part of the March 24, 2009 Special Forest Hills District rezoning action (CEQR number 09DCP013Q). The site-specific CHASP (Appendix 2) addresses site-specific hazards, identified contaminants of concern and safety requirements associated with remediation and mitigation activities in accordance with ASTM and OSHA guidelines.

1.1 Site Location and Current Usage

The Site is located in the Forest Hills section of Queens, New York and is identified as Block number 3258 and Lot(s) number(s) 14, 16, 17, and 18 on the New York City Tax Map. Figure 1 is a Site location map. The Site is 13,000-square feet and is bounded by a multi-unit residential building to the north, a vacant lot to the south, multi-unit residential buildings to the east, and 72nd Road to the west. Currently, the Site is used for two (2) 2-2½ story buildings with eight (8) commercial tenant spaces and eight (8) residential units on four (4) tax lots. All buildings have full basements.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of the demolition of the existing structures and a new construction consisting of a seven (7) story mixed-use condominium. A 30 foot setback is proposed at the northwestern border of the property. The foundation area for the new building will measure 98.5 feet by 100 feet. The basement area for this portion of the building will be developed to a depth of approximately ten (10) feet below grade. A terrace area

will be constructed off the rear of the building on the first floor that measures 33 feet 8 inches by 100 feet. The new building will utilize the basement for storage, refuse, parking garage for 26 cars, utility rooms and an elevator. Excavation will be to 10 feet across 76 percent for the basement of the building and to 10 feet in the area of the terrace. The first floor will be developed for commercial use. The second through seventh floors will be developed for residential. As part of development, the referenced lot(s) are expected to be merged. The water table was observed at approximately 60 feet below grade surface (bgs). Layout of the proposed site development is presented as Appendix 3.

1.3 Description of Surrounding Property

The property is bounded by a multi-unit residential building to the north, a vacant lot to the south (slated for development), multi-unit residential buildings to the east, and 72nd Road to the west with a church with a school beyond 72nd Road. No public schools, hospitals, or day care facilities were identified within a 500-foot radius, as observed on OER's SPEED application.

According to historic Sanborn Maps, the property located to the north is depicted as apartments from the 1930's to the 1990's, the property located to the south is depicted as dwelling from the 1930's to the 1990's, the property located to the west is depicted as apartments from the 1930's to the 1990's, the property located to the east is depicted as a church from the 1930's to the 1990's.

Figure 2 shows the surrounding land usage.

1.4 Summary of Past Site Uses and Areas of Concern

According to NYC Oasis Information, the Property is currently owned by 72nd Forest Hills Ass. On October 22, 2015, Jessica Ferngren, a QEP, inspected the subject site. According to NYC Oasis information, these buildings were built in 1931. According to Certificate of Occupancy dated 2004@109-19 72nd Street: Computer Training Scholl, Two Family Dwelling. According to Property Shark Phone Records the following tenants were located on site: NY General Contracting Corp-2007, Pratima Inc-1998, PSRS Realty-2006, Sarva Ramesh PC-1991, Soft Tech Source-2006, Stern Harold DDS-2006, Stern Harold DDS-2006, Tammy Agency-2007, Universal Family Practice Pc-2010-109-17 72nd Road, Ace Computers-2000, DME Creations-2005-109-19 72nd Road, First Resource-1991, Maison LA Jolie-2014-109-21 72nd Road, Sisco Tek-2012, Sonya European Tailoring-1993-109-23 72nd Road. According to

Sanborn History Maps, the subject property is depicted as dwellings from the 1930's to the 1970's, commercial from the 1960's to the 1990's. No Dry Cleaners is listed on the Sanborn History Maps. A City Directory Abstract Search was conducted for the historical tenants. No evidence of potential or suspect areas or items indicative of generating impacts to the subsurface were observed. As specified in the Phase I the only AOC identified was the potential for groundwater and vapor impacts from an upgradient dry cleaner.

No evidence of potential or suspect areas or items indicative of generating impacts to the subsurface were observed. As specified in the Phase I the only AOC identified was the potential for groundwater and vapor impacts from an upgradient dry cleaner.

1.5 Environmental Investigation Reports

The following environmental work plans and reports were developed for the Site:

Phase I Environmental Site Assessment Report, August 18, 2015, prepared by Singer Environmental Group, LTD.

Phase II Work Plan (Short Form), October 2015, prepared by Associated Environmental Services, LTD.

Remedial Investigation Report, November 2015, prepared by Associated Environmental Services, LTD.

The following work has been performed at the site:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed eight soil borings across the entire project Site, and collected twelve soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed one temporary groundwater sampling point throughout the Site and collected one groundwater sample for chemical analysis to evaluate groundwater quality;
4. Installed five soil vapor probes around the Site and collected fivesamples for chemical analysis.

Digital (PDF) copies of the above referenced environmental work plans and reports are included as Appendix 4.

1.6 Findings of Environmental Investigation

1. Elevation of the property above mean sea level ranges from 75 to 80 feet.
2. Depth to groundwater was observed at approximately 60 feet below grade at the Site.
3. Groundwater flow is generally from southwest to northeast beneath the Site.
4. The stratigraphy of the site, from the surface down, consists of approximately 15 feet of silty sand with clay. Depths below 15 feet were not observed.
5. Soil/fill samples collected during the remedial investigations were compared to the 6NYCRR Part 375 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) as well as Track 2 Restricted Commercial Use SCOs. Soil/fill samples collected during the RI showed no evidence of impacts. Soil analytical results reported concentrations of VOCs, SVOCs, Pesticides, PCBs, and metals below Unrestricted Use SCOs. Overall, soil chemistry is unremarkable and does not indicate any disposal of waste.
6. Groundwater samples were compared to NYSDEC Part 375 Groundwater quality Standards (GQSs). Groundwater samples collected during the RI showed no evidence of impacts. Groundwater analytical results reported concentrations of VOCs, SVOCs, Pesticides, PCBs, and metals below their respective GQSs.
7. Soil vapor results collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Data collected during the RI indicated petroleum related VOCs were present at low concentrations. Total maximum concentrations of petroleum-related VOCs (BTEX) was at 305 $\mu g/m^3$. The chlorinated VOC Trichloroethene (TCE) was not detected in any soil gas samples. Tetrachloroethylene (PCE) was detected at maximum concentration of 8.13 $\mu g/m^3$. Soil vapor samples collected during the RI showed that all chlorinated VOCs were detected at trace concentrations and below NYSDOH AGVs.

For environmental investigation data, consult reports listed in Section 1.4. Based on an evaluation of the environmental data and information, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 DESCRIPTION OF REMEDIATION

2.1 Objectives

The Site remediation and mitigation objectives are:

Soil Vapor

- Prevent migration of potential off-site source soil vapor into dwelling and other occupied structures.

Remedial and mitigation measures described herein will be performed in accordance with applicable laws and regulations. This remedy is protective of public health and/or the environment for the intended use.

3.0 Remedial Alternatives Analysis

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the following ten criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community acceptance;
- Land use; and
- Sustainability.

As required, a Track 1 Unrestricted Use scenario is evaluated for the remedial action.

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is detected at the base of the excavation after removal of all soil required for construction of the new building's cellar level is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering or Institutional Controls are required for a Track 1 cleanup. However, as part of development, a vapor barrier would be installed to prevent potential exposures from soil vapor in the future.

Alternative 2:

The site already meets Track 1 SCOs; the remedial investigation found no impacted soil, soil vapor, or groundwater, so no alternative is proposed. Therefore, alternative 2 is not evaluated.

4.0 Remedial Action

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is Track 1 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. This Site already meets Unrestricted Use SCOs. As a part of development, the entire footprint of the building area (about 75% of the property) will be excavated to a depth of approximately 10 feet below grade for development purposes. Approximately 5000 tons

of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.

7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
9. Removal of all UST's that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
10. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
11. Collection and analysis of post-excavation confirmation samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
13. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.

The Engineering Controls are not required as part of Unrestricted Use cleanup. However, the following construction elements are implemented as part of new development:

16. As part of development, installation of a vapor barrier system beneath the building slab and along foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a minimum of 10-mil Raven Industries VaporBlock® Plus or equivalent below the slab throughout the full building area and a minimum 10-mil Raven Industries VaporBlock® Plus or equivalent outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.

17. As part of development, construction of an engineered composite cover consisting of a six-inch thick concrete building slab with an 8-inch clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, and two feet of clean soil in all open space and landscaped areas.
18. If Track 1 Unrestricted Use SCOs are confirmed through end point samples, E-Designation will be removed for this Site. Otherwise, the property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/ Fill Management

Track 1 SCOs are proposed for this project and SCO's are defined in 6 NYCRR Part 375, Table 6.8(a) Track 1 Unrestricted Use. If Track 1 SCO's are not achieved, the Track 2 Restricted Residential Use SCO's will be utilized.

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 1. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Soil/Fill Excavation and Removal

The foundation area for the new building will measure 98.5 feet by 100 feet. The basement area for this portion of the building will be developed to a depth of approximately ten (10) feet below grade. A terrace area will be constructed off the rear of the building on the first floor that measures 33 feet 8 inches by 100 feet. The location of planned excavations is shown inAppendix 2. . The total quantity of soil/fill expected to be excavated and disposed off-Site is approximately 5000 tons. For each disposal facility to be used in the remedial action, a letter from the developer/QEP to the receiving facility requesting approval for disposal and a letter back to the developer/QEP providing approval for disposal will be submitted to OER prior to any transport and disposal of soil at a facility.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

End-point Sampling

End-point samples will be analyzed for compounds and elements as described below utilizing the following methodology:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs performing end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values.

Confirmation End-point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Two confirmation samples will be collected from the base of the excavation at locations to be determined by OER. Track 1 Unrestricted Use SCOs are pursued, samples will be analyzed for VOCs, SVOCs, pesticides, PCBs and metals according to analytical methods described above.

Import of Soils

Soil import is not planned on this project.

Reuse of Onsite Soils

Soil reuse is not planned on this project.

4.3 Engineering Controls

The remedial action will achieve Track 1 Unrestricted Use SCOs and no Engineering Controls are required. However, the following design elements will be incorporated into the project as part of the development:

(1) Composite Cover System
(2) Soil Vapor Barrier System

If Track 1 is not achieved, these elements will constitute Engineering Controls that will be employed in the remedial action to address residual contamination remaining at the Site.

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system will be comprised of a six-inch thick concrete building slab with an 8-inch clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, and two feet of clean soil in all open space and landscaped areas.

Figure 4shows the typical design for each remedial cover type used on this Site. The composite cover system will be a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the Remedial Action Report.

Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of Raven Industries Vaporblock® Plus or equivalent which is a seven layer co-extruded barrier.

The vapor barrier will extend throughout the area occupied by the footprint of the new building and up the foundation sidewalls and will be installed in accordance with manufacturer specifications.

A plan view showing the location of the proposed vapor barrier system is provided in Figure 4. Product specification sheets are provided in Appendix 5. The Remedial Action Report will include as-built drawings and diagrams; manufacturer documentation; and photographs.

The Remedial Action Report will include a PE-certified letter (on company letterhead) from the primary contractor responsible for installation oversight and field inspections and a copy of the manufacturer's certificate of warranty.

The Vapor Barrier System is a permanent engineering control and will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying vapor barrier system is disturbed after the remedial action is complete. Maintenance of these systems will be described in the Site Management Plan in the Remedial Action Report.

4.4 Institutional Controls

A Track 1 remedial action is proposed and Institutional Controls are not required.

4.5 Site Management Plan

A Track 1 remedial action is proposed and Site Management is not required.

4.6 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the

COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Data and information reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA) for this project. As part of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk under current and future conditions by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Contaminant Sources

Based on the results of the RIR, the contaminants of concern are:

Soil: none

Groundwater: none

Soil Vapor: Slightly elevated levels of the petroleum related (BTEX) compounds.

Nature, Extent, Fate and Transport of Contaminants

Soil: Data from the RI indicates that soil on site already meets Track 1 SCOs.

Groundwater: all compounds detected meets their respective GQSs.

Soil Vapor: Soil vapor samples exhibited low levels of petroleum-related BTEX compounds. The chlorinated VOC were not identified.

Receptor Populations

On-Site Receptors: Currently the Site is used for two (2) 2-2½ story buildings with eight (8) commercial tenant spaces and eight (8) residential units on four (4) tax lots. All buildings have full basements. Onsite receptors are limited to residents, trespassers, site representatives and visitors granted access to the property. During construction, potential on-site receptors include

construction workers, site representatives, and visitors. Under proposed future conditions, potential on-site receptors include adult and child building residents, workers and visitors.

Off-Site Receptors: Potential off-site receptors within a 500 foot radius of the Site include adult and child residents; commercial and construction workers; pedestrians; and trespassers based on the following land uses within 500 feet of the Site:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/ Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – existing and future

Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

- Ingestion of groundwater or fill/ soil;
- Inhalation of vapors or particulates; and
- Dermal absorption of groundwater or fill/ soil.

Potential Exposure Points

Current Conditions: The site is currently capped and there are no potential exposure pathways from ingestion, inhalation, or dermal absorption of soil/ fill. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. The Site is currently developed with eight (8) commercial tenant spaces and eight (8) residential units building with basements.

Construction/ Remediation Conditions: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with exposed impacted soil and fill. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. Due to the depth of groundwater, direct contact with groundwater is not expected. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan,

dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, all soils will meet Unrestricted Use SCOs. The site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and construction elements including vapor barrier and concrete slab will prevent any potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water supply, and groundwater is not used at the site. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

Overall Human Health Exposure Assessment

There are no complete exposure pathways under future conditions after the site is developed. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure, site-wide surface cover, and a subsurface vapor barrier system for the building. . During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. Potential post-construction use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include John Schretmayer of Associated Environmental Services, LTD. The Qualified Environmental Professional (QEP) for this project areJohn Schretmayer of Associated Environmental Services, LTD. The Professional Engineer (PE) will be submitted at a later date.

5.2 Site Security

Site access will be controlled by gated entrances to the fenced property.

5.3 Work Hours

The hours for operation of remedial construction will be from 8am to 3pm. These hours conform to the New York City Department of Buildings construction code requirements.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix5. The Site Safety Coordinator will be John Schretzmayer. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and will comply with all requirements of 29 CFR 1910.120. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use in case of emergency.

5.5 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a

period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review.

5.6 Agency Approvals

All permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction. Approval of this RAWP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

5.7 Site Preparation

Pre-Construction Meeting

OER will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and

utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed incompliance with applicable laws and regulations including NYC Building Code to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-Out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Dewatering

Dewatering is not anticipated during remediation and construction.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete pads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and clean water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions

will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Stormwater control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of site access by the property owner. Impacted offsite areas may require characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362 within statutory defined timelines. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

A site inspection report will be submitted to OER at the completion of site inspection. An inspection report established by OER is available on OER's website (www.nyc.gov/oer) and will be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the OER project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from

the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

5.8 Traffic Control

Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the Site to prevent neighborhood impacts The planned route on local roads for trucks leaving the site is to turn right onto 72nd Road, right onto Austin Street, right onto 72nd Avenue, and right onto Queens Blvd.

5.9 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.10 Reporting and Record Keeping

Daily reports

Daily reports providing a general summary of activities for each day of active remedial work will be emailed to the OER Project Manager by the end of the following business day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP results noting all excursions. CAMP data may be reported;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

Record Keeping and Photo Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.11 Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations From The Remedial Action Work Plan

All changes to the RAWP will be reported to, and approved by, the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination with basis that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 Remedial Action Report

A Remedial Action Report (RAR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- Text description with thorough detail of all engineering and institutional controls (if Track 1 remedial action is not achieved)
- As-built drawings for all constructed remedial elements;
- Manifests for al soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 remedial action is not achieved);
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results (including all soil test results from the remedial investigation for soil that will remain on site) and all soil/fill waste characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;
- Full accounting of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Continue registration of the property with an E-Designation by the NYC Department of Buildings (if Track 1 remedial action is not achieved);

- The RAWP and Remedial Investigation Report will be included as appendices to the RAR;
- Reports and supporting material will be submitted in digital form and final PDF's will include bookmarks for each appendix.

Remedial Action Report Certification

I, [name], am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the [site name (address)] site, site number [VCP site number]. I certify to the following:

- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The OER-approved Remedial Action Work Plan dated [date] and Stipulations in a letter dated [date] were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name

PE Stamp

PE License Number

Signature

Date

I, [name], am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the [site name (address)] site, site number [VCP site number]. I certify to the following:

- The OER-approved Remedial Action Work Plan dated August 15, 2012 and Stipulations in a letter dated September 10, 2014 were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

QEP Name

QEP Signature

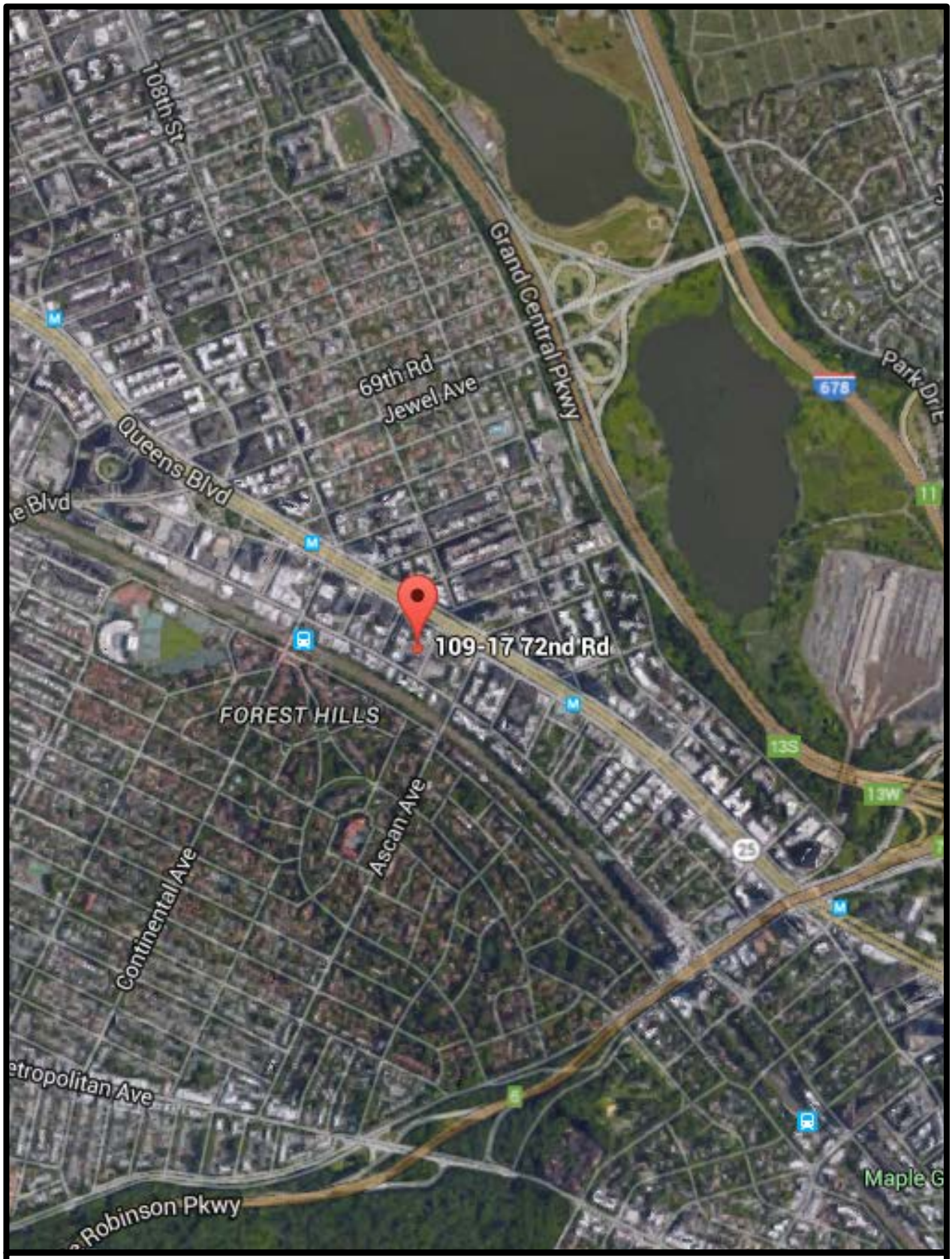
Date

7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a two month remediation period is anticipated.

Schedule Milestone	**Weeks from Remedial Action Start**	**Duration (weeks)**
OER Approval of RAWP	0	1
Fact Sheet 2 announcing start of remedy	1	1
Mobilization	2	1
Remedial Excavation	3	3
Demobilization	6	1
Submit Remedial Action Report	7	3

FIGURES



0 500 1000 1500 2000
(FEET)

FIGURE 1 – VICINITY MAP
109-17 – 109-23 72ND ROAD
QUEENS, NEW YORK

Associated Environmental Services, Ltd.

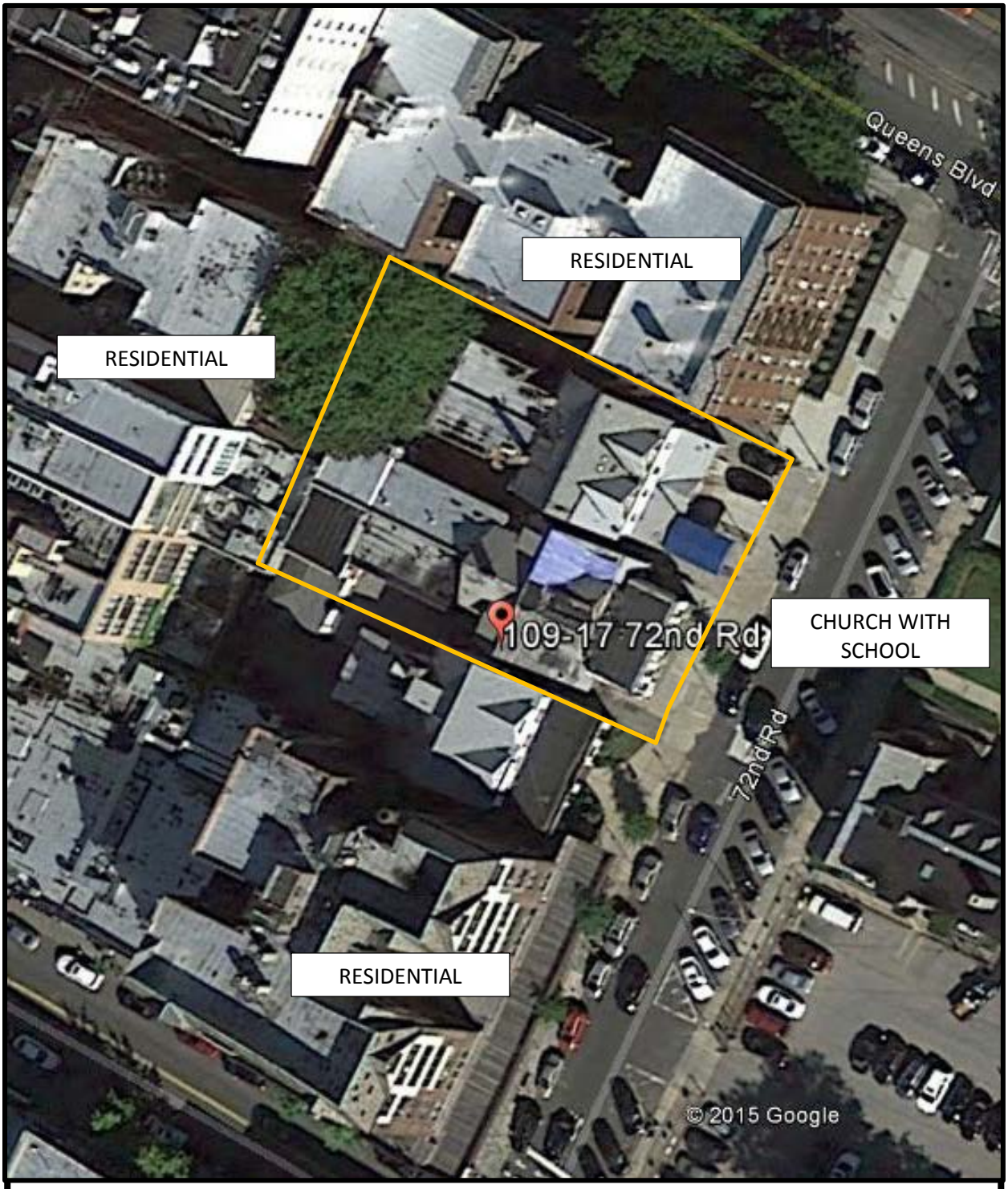
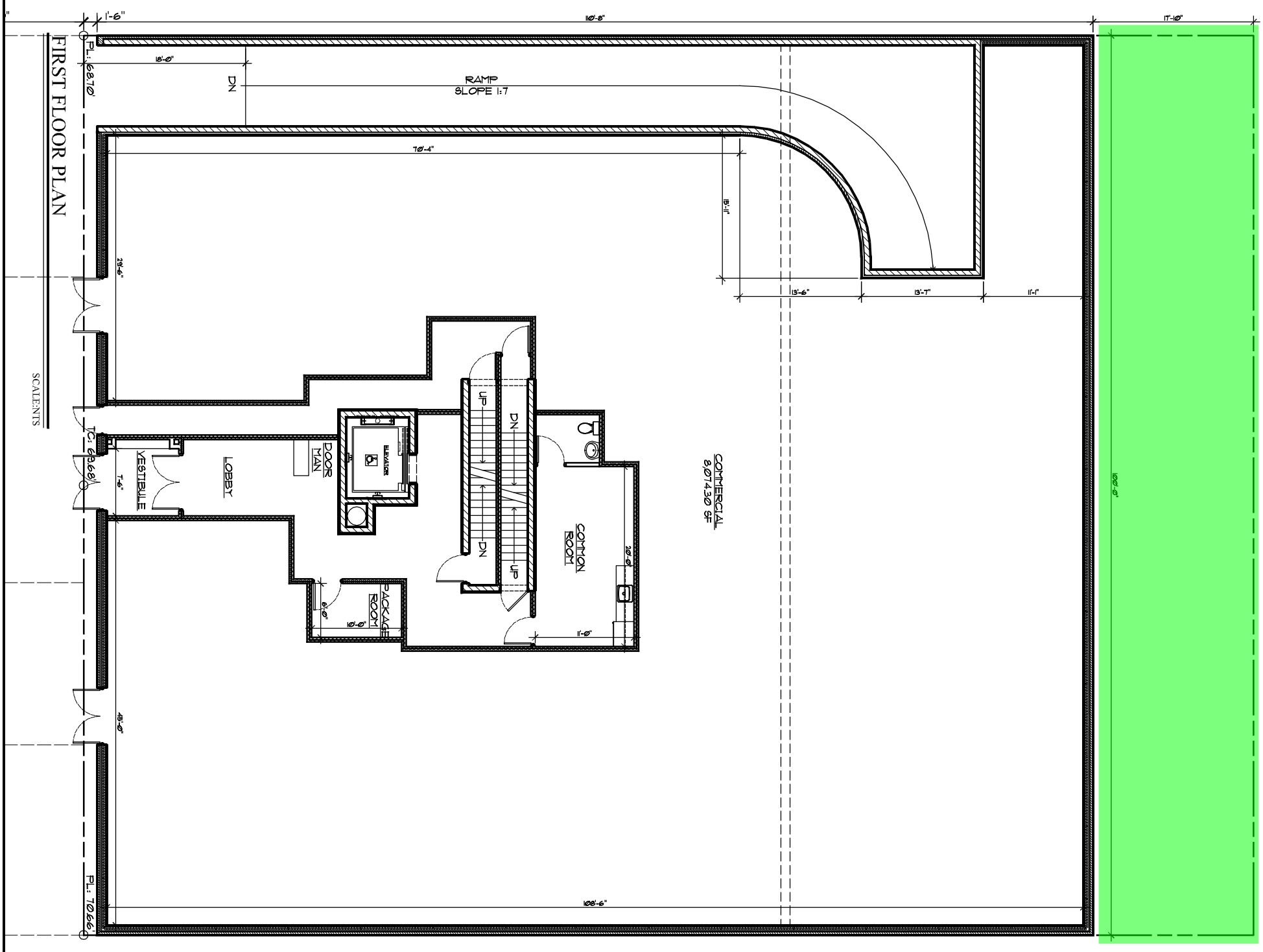


FIGURE 2 – SURROUNDING PROPERTIES USE MAP
109-17 – 109-23 72ND ROAD
QUEENS, NEW YORK

PROPERTY BOUNDARY

Associated Environmental Services, Ltd.



Composite Cover Area

LOT AREA: 13,000.0 SF
FAR: 4.09 = 53,170.0 SF

1ST FL:	9,749.3 SF
2ND FL:	7,412.27 SF
3RD FL:	7,412.27 SF
4TH FL:	7,412.27 SF
5TH FL:	7,412.27 SF
6TH FL:	7,412.27 SF
7TH FL:	6,216.65 SF
ROOF:	142.5 SF
TOTAL FA:	53,169.8 SF

SCALE:AS NOTED | DATE: -

ZONING & SITE
Proposal For:

109-17 7ND RD
QUEENS, NY

DRAWN BY: name

PRELIMINARY
NOT FOR CONSTRUCTION
For Design purposes only

Title - Zoning Study

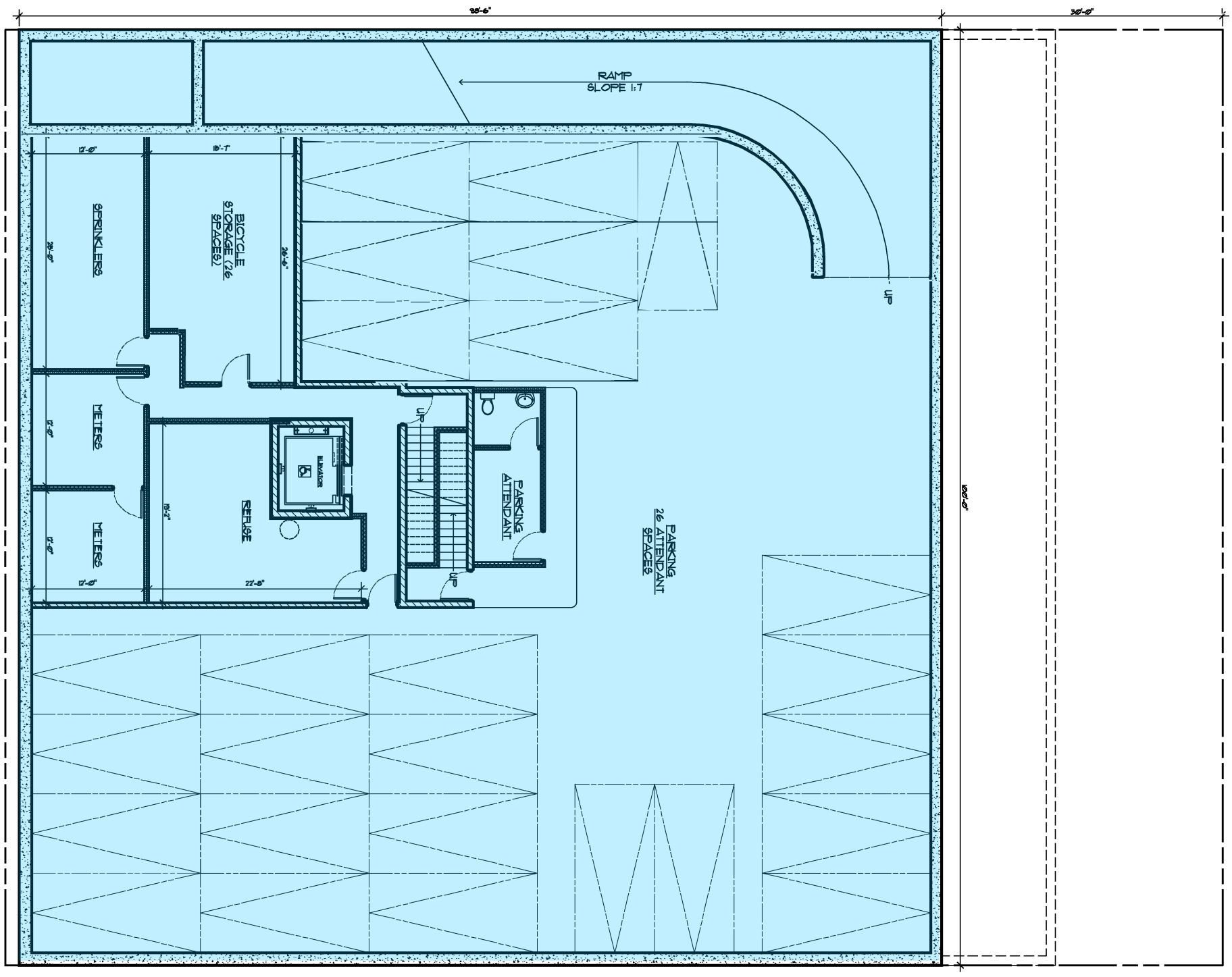
info@dsany.com
ph:718.569.2112
fax:718.360-4571

Design Studio Associates
Design | Zoning | Code Consultants

3
OF

CELLAR FLOOR PLAN

SCALE:3/32" = 1'-0"



10 mil (minimum)Vapor Barrier/ Waterproofing Membrane to be installed beneath the foundation slab

SCALE:AS NOTED DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571 Design Studio Associates Design I Zoning I Code Consultants	2
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study		OF

APPENDIX 1

SOIL/MATERIALS MANAGEMENT PLAN

SOIL/MATERIALS MANAGEMENT PLAN

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the Remedial Closure Report (RCR). Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Satisfaction.

1.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 Materials Excavation, Load-Out and Departure

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior OER approval.

1.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with

applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

Outbound truck transport routes are in Section 3.8 of the RAP. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Applicant to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Applicant. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RCR.

The RCR will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the RCR.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations.

Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the RCR. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the RCR. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

1.7 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives for on-Site reuse are listed in the RAP. “Reuse on-Site” means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to Engineering Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAP are followed. The expected location for placement of reused material is shown in the RAP.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the RCR; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the

remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RCR. This demarcation will constitute the top of the site management horizon.

1.9 Import of Backfill Soil from Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in the RAP.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAP. The RCR will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

Source Screening and Testing

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RCR. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 Storm-water Pollution Prevention

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAP (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 Contingency Plan

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER’s Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for Full List volatiles and semi-volatiles, pesticides/PCBs, and TAL metals, as appropriate.

1.13 Odor, Dust and Nuisance Control

Odor Control

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying the RCR.

Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying the Remedial Closure Report.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided, during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances.

1.14 Import of Clean Cover

Approximately 0tons (0 cubic yards) of soil is anticipated to be imported to the Site for use as clean cover. All imported soil will be uncontaminated, clean soil that meets the lesser of the appropriate NYSDEC 6 NYCRR Part 375-6.8(a) Unrestricted Use SCOs and the NYSDEC 6 NYCRR Part 375-6.8 groundwater protection SCOs.

The imported uncontaminated, clean soil cover will be from an approved source/facility and will be evaluated by the PE/QEP to ensure:

1) That a segregated stockpile for 0 tons (0 cubic yards) is properly maintained at the source and will not be comingled with any other material prior to importing and grading the clean soil material at the Site;
2) That the material does not include any solid waste, including construction and demolition material, as it's prohibited;
3) That screening for evidence of contamination by visual, olfactory and PID soil screening practices prior to testing at the source as well as upon importing to the Site for grading is completed; and
4) That a maximum five-part composite sample will be collected from the segregated stockpile at the source at a minimum frequency of one sample per 250 cubic yards and analyzed for the following Full List parameters:
    - VOCs by EPA Method 8260C (rev. 2006)
    - SVOCs by EPA Method 8270D (rev. 2007)
    - Pesticides by EPA Method 8081B (rev. 2000)
    - PCBs by EPA Method 8082A (rev. 2000)
    - TAL Metals by EPA Method 6010C (rev. 2007)

Upon receipt of the segregated stockpile analytical results collected at the source, a Clean Soil Sampling Report will be submitted to OER for review/approval prior to importing. The report will include the following:

1) Summary of number of samples collected and analyzed, tabulated data and comparison to the selected Site Use SCOs;
2) Analytical data sheets and chain of custody documentation;
3) Summary of 0 tons (0 cubic yards);
4) Photographs from the segregated stockpile at the source with sample point locations identified;
5) An affidavit from the source/facility on company letterhead stating that the segregated stockpile for 0 tons (0 cubic yards) has been properly maintained at the source and complies with the requirements listed above; and
6) A copy of source/facility NYSDEC permit;

A highly visible demarcation barrier (i.e. orange geo-synthetic material or equivalent) will be installed beneath the clean soil/fill surface cover. Upon importing and grading the OER approved clean soil cover for 0 tons (0 cubic yards) on top of a highly visible demarcation barrier, the following documentation will be presented in the Final Remedial Closure Report:

1. Copies of purchase invoices;
2. Truck transportation slips from the source to the Site;
3. Confirmation of 0 tons (0 cubic yards) of OER approved clean soil cover material imported and graded at the site on top of highly visible demarcation barrier;
4. Site plan depicting all areas where the OER approved clean soil cover has been placed; and
5. Photographs documenting the importing and grading of the OER approved clean soil cover across the site with the underlying highly visible demarcation barrier (i.e. orange geo-synthetic material or equivalent).

APPENDIX 2

CONSTRUCTION HEALTH AND SAFETY PLAN

CONSTRUCTION HEALTH AND SAFETY PLAN (CHASP)

109-17 to 109-23 72nd Road
Queens, New York

OER Number: 16EHAN123Q

E-Designation 222

CEQR Number 09DCP013Q

Special Forest Hills District

December 2015

Prepared by:

Associated Environmental Services Ltd.
25 Central Avenue
Hauppauge, New York 11788
631-234-4280

TABLE OF CONTENTS

APPENDICES

INTRODUCTION

Associated Environmental Services Ltd. (AES) conducted a Phase II Environmental Site Assessment (ESA) activities for the collection of soil, soil vapor, and groundwater samples at 109-17 to 109-23 72nd Road, Queens, New York referred to hereafter as "the site". The Site is 13,000-square feet and is bounded by a multi-unit residential building to the north, a vacant lot to the south, multi-unit residential buildings to the east, and 72nd Road to the west. A map of the site boundary is shown in Figure 1. Currently, the Site is used for two (2) 2-2½ story buildings with eight (8) commercial tenant spaces and eight (8) residential units on four (4) tax lots. All buildings have full basements. The subject property has been identified with a Hazardous Materials E-Designation. The proposed future use of the Site will consist of the demolition of the existing structures and a new construction consisting of a seven (7) story mixed-use condominium. A 30 foot setback is proposed at the northwestern border of the property. The foundation area for the new building will measure 98.5 feet by 100 feet. The basement area for this portion of the building will be developed to a depth of approximately ten (10) feet below grade. A terrace area will be constructed off the rear of the building on the first floor that measures 33 feet 8 inches by 100 feet. The new building will utilize the basement for storage, refuse, parking garage for 26 cars, utility rooms and an elevator. The first floor will be developed for commercial use. The second through seventh floors will be developed for residential. As part of development, the referenced lot(s) are expected to be merged. The water table was observed at approximately 60 feet below grade surface (bgs).

Based on the Soil/fill samples collected during the RI showed no evidence of impacts. Soil analytical results reported concentrations of VOCs, SVOCs, Pesticides, PCBs, and metals below Unrestricted Use SCOs. However the potential for hazards encountered during construction activities can include but are not limited to exposure to dust, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, PCBs, and heavy metals from urban fill.

This Construction Health and Safety Plan (CHASP) is written to summarize the health and safety hazards and procedures to help protect field personnel and the surrounding community during the environmental investigation at the site. This plan was designed to reduce the potential for occupational illness or injury while performing general tasks at the site. This plan meets or exceeds the requirements of Occupational Safety and Health Administration (OSHA), 29 CFR 1910.120, for a site-specific health and safety plan and follows AES Corporate Health and Safety Program.

The purpose of the CHASP is to inform workers of the health and safety risks present at the facility, and the proper methods of protecting themselves from those risks. Each worker must be fully aware of the risks associated with the work to be accomplished, and be dedicated to completing that work safely. Accordingly, project staff and approved subcontractors must follow the policies and procedures established in this HASP. All personnel assigned to this project must sign the Agreement and Acknowledgment Affidavit (Appendix B-1) to confirm that they understand and agree to abide by the provisions of the plan. Anyone who cannot, or will not comply with this CHASP will be excluded from on-site activities. Violations of this CHASP or any applicable federal, state, or local health and safety regulations should be reported immediately to the designated Health and Safety Officer (HSO). This HASP will be readily available on-site so workers can reference it when necessary.

JOB HAZARD ANALYSIS

The Job Hazard Analysis identifies potential safety, health, and environmental hazards and provides for the protection of personnel, the community and the environment. Because of the complexity and constant change of field operations, supervisors must continually inspect the work site to identify hazards that may harm site personnel, the community, or the environment. The PM must be aware of these changing conditions and discuss them with the HSO whenever these changes impact the health, safety, or project performance. The HSO will write addendum to change associated hazard controls as necessary. This HASP addresses general safety issues associated with soil and groundwater sampling typically involving the following tasks:

General Tasks	
• Field Survey/Walkover • Excavation of soil	• Excavation/Trenching • Field Soil Screening (PID Meter) • Backfill boreholes with Clean Fill • Repair Concrete or Asphalt Surface, if applicable.

A detailed description of health and safety procedures for individual tasks can be found in the Health and Safety Policy and Procedures Manual. All activities of this project will be carried out under Level D, Modified Level D. This HASP must be modified or amended when circumstances or conditions develop that are beyond the scope of the above operations. Any changes in project work scope and/or site conditions as described must be amended in writing using the Amendment Sheet (Appendix B-2).

Heat Stress

Site employees will be trained to recognize signs of heat stress. The HSO will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as worker monitoring results. Appropriate rest periods will be provided to help site workers accommodate to temperature extremes.

Signs and Symptoms of Heat Stress

Heat rash may result from continuous exposure to heat or humid air.

Heavy sweating with inadequate electrolyte replacement causes heat cramps. Signs and symptoms include:

- Muscle spasms
- Pain in the hands, feet and abdomen

Heat exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms are:

- Pale, cool, moist skin
- Heavy sweating
- Dizziness
- Nausea
- Fainting

Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Signs and symptoms are:

- Red, hot, usually dry skin
- Lack of reduced perspiration
- Nausea
- Dizziness and confusion
- Strong, rapid pulse
- Coma

Measures to Avoid Heat Stress

1. Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
2. Identify a shaded, cool rest area.
3. Rotate personnel, alternate job functions.
4. Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink fewer fluids than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour workday, 50 ounces of fluids should be drunk.
5. Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
6. Save most strenuous tasks for non-peak hours, such as the early morning or at night.
7. Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.

Site personnel should monitor their pulse rate as an indicator of heat strain by the following method: At the beginning of the rest period, count the radial pulse during a 30-second period. If the rate exceeds 110 beats per minute, lengthen the rest period by one-third. If the hear rate still exceeds 110 beats per minute at the end of the rest period, shorten the next work cycle by one-third.

Cold Stress

AES will provide appropriate protective clothing and heated shelters for cold weather exposures. Furthermore, AES will provide appropriate rest periods to help site workers accommodate to temperature extremes. Site employees will be trained to recognize signs of cold stress.

Measures to Avoid Cold Stress

1. Wear multi-layer clothing (the outer-most layer should be of wind-resistant fabric).
2. Drink warm fluids.
3. Work in pairs.
4. Avoid heavy sweating.

The HSO will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as environmental monitoring results.

HAZARD IDENTIFICATION AND CONTROL

Precautions must be taken to prevent injuries and exposures to the following potential hazards. Refer to the following table for details.

Potential Hazards and Control

Hazard	Action and Control
Potential exposure to dust, VOCs, SVOCs, pests/herbs, PCBs and heavy metals from Urban Fill and/or groundwater (Refer to MSDS Appendix I)	• Stand up-wind of impacted material whenever possible. • Utilized dust suppression methods as practicable. • Minimize contact time with impacted products. • Avoid walking through discolored surface areas, puddles, leaning on drums, or contacting anything that is likely to be contaminated. • Do not eat, drink, smoke and or apply cosmetics on-site. • Wear gloves when in contact with contaminated surfaces. • Safety glasses must be worn when work conditions require them. • > A 200-ppm organic vapor in the breathing zone requires upgrade to Level C. • > 750-ppm organic vapors, work will cease until levels subside or engineering controls are implemented. Contact HSO. • If unknown materials are encountered, Contact HSO.
Traffic	• Wear traffic safety vest when vehicular hazard exists. • Use cones, flags, barricades, or caution tape to define work area. • Use vehicle to block work area from on-coming traffic. • PPE Modified Level D.
Vault Entry (Certified personnel only)	• Only certified confined space personnel may enter vault. In addition, vault entry is only allowed if PM and HSO approve. • Follow confined space entry procedures. • Obtain confined space permit. Post sign. • Remove vault cover using proper lifting techniques. • Promote natural ventilation by opening the space to fresh air. • Conduct remote air monitoring prior to entry. • Practice buddy system. • Enter if safe; conduct continuous monitoring.
Inclement Weather	• Stop outdoor work during electrical storms or other extreme weather conditions. • Take cover, indoors or vehicle. • Listen to local forecasts from vehicle radio about weather advisories. • Be aware of hypothermia, frostbite, and heat stress and drink plenty of liquids during hot days.
Noise	• Wear hearing protective equipment (plugs or muffs) when drilling, saw cutting, jack hammering, hammering, sawing or during any activity with extreme noise. • Wear hearing protection anytime you have to raise your voice above normal conversation levels.
Fire Control	• Do not smoke on-site. • Keep flammable liquids in closed containers and away from any possible source of ignition (electric service boxes, remediation enclosures, vehicle exhausts). • Keep site clean of debris. • Ensure fire extinguishers in trucks are fresh and fully charged.
Poisonous Plants (Poison ivy, oak, sumac)	• Avoid areas infested with poisonous plants. • Immediately wash affected areas if exposed.
Ladders	• Make sure ladders are in good working order, look for cracks or corrosion. • Use ladders with secure safety feet. • Pitch ladders at a 4:1 Ratio. Use buddy system. • Secure ladders at top when ever possible. • Do not use ladders for access to air stripper towers. • Use non-conductive ladders near electrical wires.

CHEMICAL HAZARD CONTROL

Chemical Handling Procedures

All personnel must practice the chemical-specific handling procedures outlined below. Refer to the following table for details.

Chemical Handling Procedures

Recovered Product	Fuel oil, diesel fuel or gasoline that has been recovered from the ground-water by pump or manual bailer.	• Store product in sealed containers. • Always wear protective gloves and coveralls or equivalent. • No smoking and keep product away from any ignition sources. • PPE Modified Level D.
Activated Carbon	Granular adsorbent material used to remove residual hydrocarbons from water and/or air.	• Use respiratory protection when there is a dusty environment. • Implement engineering controls to decrease dust or vapor release (such as spraying water or introducing fresh air). • Contact HSO for task specific evaluation. • PPE Modified Level D.
Dust	Equipment for the elimination of dust produced by investigation activities must be installed, maintained and effectively operated to protect property against dust and workmen against inhalation of harmful dust.	

Personal Protective Equipment

Level-D is the minimum acceptable level for sites where petroleum hydrocarbons are the contaminant of concern. Modified Level-D is required for tasks at those sites where possible exposure may exist. Refer to the following table for details.

Personal Protective Equipment

Level	Requirements
Level D	• Work Boots • Protective Gloves • Hard Hat
Modified Level D	• Long Pants and Shirt or Coveralls • Safety Glasses • Orange Safety Vest • Dust Mask • Tyvek Suit • Hard Hat
Level C	• NIOSH Approved Full-Face Respirator With Organic Vapor/Acid Gas Cartridges • Work Boots • Hard Hat • Tyvek Suit

Level-D is the minimum acceptable level for sites where petroleum hydrocarbons are the contaminant of concern. Modified Level-D is required for tasks at those sites where possible exposure may exist.

SITE CONTROLS

Site Health and Safety Meetings

In addition, the HSO will meet daily with all AES employees prior to beginning work on site. The agenda of the meeting will include a review of important elements of this plan, any special safety items, and a discussion of the emergency response procedures. Also, everyone will agree on a schedule for periodic meetings, (for example, before beginning work each day), to review the effectiveness of this plan and make changes as necessary. If significant changes at the site occur, special meetings will be scheduled. (If AES is a subcontractor, all AES employees on-site will participate in the contractor's daily safety meetings.)

Training Records

The HSO will complete a report of the daily safety meetings, using the form in the back section of this plan, and all attending the meeting will sign the Daily Safety Meeting Log.

The training status of contractor and subcontractor employees has been verified, and their training criteria meet the requirements specified in 29 CFR 1910.120(e). A copy of all training certificates will be kept at the job site for each person working at the site. All construction activities will be performed by workers with a minimum 8-hour training course in handling hazardous materials.

Lockout/Tagout Procedures

The purpose of this program is to prevent injuries caused by the accidental start-up of a machine or piece of equipment that is undergoing servicing or routine maintenance. A lockout device renders a switch, valve, or any energy source inoperable. The device may be a padlock, restraining bar, chain, or anything that positively prevents a machine or piece of equipment from becoming energized, or from releasing stored energy.

A tagout device identifies who locked out the machinery; the date and time of day the lockout took place, and where the employee works. Additional information that may be placed on the tag includes employee's beeper number, extension number, and emergency contacts. Tags must be durable, and must be securely fastened to the locking mechanism so as not to fall off. In some cases, they can serve as a lockout device. **Tags are <u>NEVER</u> to be removed by anyone except the employee who initiated the lockout/tagout procedure.**

Responsibilities

All employees must follow Lockout/Tagout (LOTO) procedures during the following conditions:

1. Servicing and maintenance of machines and equipment
2. Removing or bypassing a machine guard or other safety device
3. Placing any part of their body into an area where work is actually performed (point of operation) with respect to a machine's normal operating cycle

It is the responsibility of the site Safety and Health Supervisors to administer this program, and the Director, Health and safety to review it effectiveness at least annually.

Procedures

All employees must use the following sequence whenever they perform maintenance or installation work on equipment or processes that use or store energy. The energy can be electrical, potential (due to gravity and stored in elevated masses), chemical, hydraulic, or pneumatic.

These procedures apply to all operations involving AES employees in the field as well as to maintenance or installation operations conducted at AES facilities. When at field locations, AES employees will abide by the client's requirements, unless they are not in compliance with the OSHA standard. In these situations, the AES procedure will be implemented. In all cases, AES employees will ensure the facilities' procedure is safe, and where appropriate, install their own locks and tags.

Identification

1. Identify the LOTO procedure for the piece of machinery or equipment requiring servicing or maintenance, which can be found in the O&M Manual. (AESs form is included in this HASP.) Note the number and location of energy sources that require locks and/or tags for the piece of equipment or machinery being serviced.
2. Note the hazards identified for the piece of equipment or machinery.

Evaluation

1. Review the surrounding area for other possible sources of energy transmission.
2. Inspect the immediate area where locks or tags will be attached.

Checks

1. Lockout and tagout energy using padlocks, locks, and tags.
2. Recheck all areas for potential sources of energy.
3. Authorized employees shall operate the switch, valve, or other energy-initiating device(s) to confirm that the energy is isolated.
4. Return operating controls to neutral, or the "off" position.
5. Ensure the locks and tags are placed properly.

Group Lockouts

1. When more than one person will be involved with maintenance or repair of a piece of machinery or equipment requiring isolation of energy source, each shall place his/her lock and tag on the energy isolating device.
2. When the machinery or equipment cannot accept more than one lock or tag, an additional hasp, or similar energy-isolating device shall be used, if feasible. Should this technique not be feasible, one lockout device can be used requiring a key and the key shall be placed in a lockout box or cabinet that accommodates multiple employees locks to secure it. As each employee no longer needs to maintain lockout protection, he/she shall remove his/her lock from the box or cabinet.
3. The HSO shall be responsible for knowing when multiple LOTO devices are required.

Restoring Machines and Equipment to Normal Operations

1. When maintenance or servicing has been completed and the machinery or equipment is ready to be placed into normal operation, check out the immediate area to confirm that no one is exposed to any danger.
2. Check that all tools have been removed from the machinery or equipment.
3. Confirm that all guards, pulleys, and safety devices have been reinstalled and are secure.
4. Remove all locks and tags.
5. Operate the energy isolating devices to restore energy to the machine or equipment.

Equipment Connected by Plug and Cord, or Hose

When servicing or installing connected electrical, pneumatic, or hydraulically powered equipment plug connected by cord or hose, the cord or hose must be disconnected from the equipment to be worked on, prior to starting the work. An approved tag warning against reconnecting the plug or hose will be affixed to the end of the plug or hose.

Any stored energy (e.g., capacitor voltage or hydraulic pressure) must be safely released prior to the start of maintenance or installation work.

Electrically Powered Equipment

Electrically powered equipment must be de-energized, and its source of electricity disconnected prior to the removal of protective covers or the start of other maintenance or installation work. It is important to recognize that locking and tagging on/off switches is often not sufficient to prevent accidental startup or to prevent voltage from being present in the equipment. If the equipment is not wired properly (i.e., polarity is reversed), or the switch is of the single-pole type, voltage can be present even if the operating switch is in the off position. For these reasons, manual disconnects must be placed in the off position and/or the equipment's power fuses removed from the motor control center.

In the event that protective covers must be removed to make adjustments on energized equipment, appropriate guards must be constructed and attached in such a manner as to prevent employee contact with live circuitry capable of causing human injury. Such guards must be of durable construction, adequately designed to prevent injurious contact, and remain in place at all times that the equipment is energized.

Chemical and/or Pressurized Lines

Prior to working on any pressurized line or a line containing a toxic, flammable, reactive or corrosive material, the following procedure must be implemented:

1. The line to be serviced should have two block valves upstream of the work area or device to be serviced or installed, placed in the closed position and tagged. The bleed valve (between the two block valves) will be opened and tagged so that leakage of the valve upstream would be readily obvious. The line will be depressurized or drained in a safe manner. Lines will be broken in such a manner as to release pressure away from the employee. All solids or liquids drained will be safely collected. This procedure is called double block and bleed.
2. If it is possible for pressure or line material to enter the work area from more than one direction, the line in each direction of travel will be double blocked and bled as described above.
3. In the event that double block and bleed procedures are infeasible (i.e., the line is not provided with adequate valving), alternative measures will be implemented. One alternate measure is to place a solid blind in a flange located between the available upstream valve and the work area. If

blinds are used, they must be sufficiently corrosion and pressure-resistant to ensure that if the valve leaks, the blind will stop the material or pressure from reaching the work area.

Stored Mechanical Energy

In situations where equipment to be worked on has stored mechanical energy (e.g., in a flywheel or drop hammer), the stored energy must be released or blocked in a safe manner before starting maintenance or installation work. Effective blocking practices may include the installation of safety blocks or adequate supports. Under no circumstances will "bumper jacks" or "scissor jacks" be considered to be adequate blocks.

Monitoring Requirements

Monitoring is to be conducted by the HSO, or his/her designee. The results will be interpreted by the HSO. Copies of monitoring results and calibration logs will be filed with the HASP.

Monitoring is designed to assess exposure to employees during site activities, and to determine if PPE is required and adequate to assure protection. Because investigation and remediation activities at hazardous waste sites are of an inconsistent nature, it is not possible to assign a monitoring protocol that excludes, or is not directly dependent upon, professional judgment in determining when monitoring is required to assess exposure. Thus, the following generic protocol must be followed at a minimum, and should be modified to be more conservative (e.g., require more monitoring) if deemed necessary by the HSO. Under no conditions will the required frequency be decreased.

At a minimum, air monitoring will be conducted before and during each task or activities for which air monitoring has been designated. If airborne concentrations of contaminants reach action levels based on observations with the direct reading instruments, then the appropriate PPE upgrade or work stoppage order will be enforced by the HSO. In case a work stoppage order is given, the area must be cleared of all personnel immediately.

The use of action levels and the basis for the selection of monitoring equipment is explained as follows:

Action levels determine:

1. The PPE to be used by site workers
2. Their ability to remain and work in the exclusion zone

The selection of the specified monitoring equipment is based on

The nature of the contaminants

The likely concentrations of the contaminants

The probable duration of exposure

The relative sensitivity of the monitoring equipment to the specific contaminants

Work Zones

Work zones will be established in order to: 1) delineate high-traffic areas, 2) identify hazardous locations and 3) contain contamination within the smallest area possible. Employees entering the work zone must wear the proper level of PPE based on the task being performed. Work and support areas will be established based on ambient air data, necessary security measures, and site-specific conditions.

Decontamination Procedures

Operations conducted at the site have the potential to contaminate field equipment and personal protective equipment. To prevent the transfer of contaminates to vehicles, administrative offices and personnel, the procedures presented in the following table must be followed.

Decontamination Procedures		
Item	Examples	Procedures
Field Equipment	Bailers, probes, hand tools, augers, sampling equipment	• Soap wash followed by a water rinse.
Disposable PPE	Tyvek suits, gloves, used respirator cartridges	• Dispose in accordance to the requirements of the client, state and federal agencies.
Non-disposable PPE	Respirators	• Wipe out with disinfecting pad prior to donning. • Decontaminate on-site at the close of each day with soap and water.
Decontamination liquids	Rinsate water/soap for De-contamination	• Properly contained and disposed of.

CONTINGENCY PLANS

The table below summarizes some of the situations, which may be encountered during field operations.

Contingency Plans for Site Emergencies	
Situation	Action
Evacuation	Immediately notify all on-site personnel of the emergency requiring evacuation. Leave the dangerous area and report to designated rally point. Notify emergency services, as appropriate. Account for all personnel. Contact HSO and PM. Maintain security for community safety until emergency services take over.
Medical Emergency	Survey the situation. Do not enter an area that will jeopardize your safety. Establish the victim's level of consciousness. Call for help and notify emergency responders 911 of victim's conditions. Do not move victim unless a life-threatening situation occurs. Perform Preliminary Assessment (Arousal, Airway, Breathing, Pulse). CPR/First Aid should only be performed by trained personnel. Check for bleeding: control with direct pressure. Respondent should wear protective gloves if contact with body fluids. Do not move victim unless the location is not secure. Monitor pulse, breathing and consciousness. Provide First Aid to your level of training. Contact PM and HSO. Document in Accident Report. Refer to Appendix A for Hospital Location and Directions from the site.
Fire Emergency	Evacuate the area. Notify emergency services (911). Extinguish small, controllable fires with fire extinguisher. Contact HSO and PM. Document accident.
Spill/Release	Prevent problems by documenting the location of underground and overhead lines (sewer, telephone, electric, gas, etc.) before starting site work. If you puncture a line or tank or another leak occurs, document the spill/release in writing (include dates times, actions taken, conversations of pertinent individuals and people involved). Don appropriate PPE; stay up wind of spill/release. Turn off all electric equipment and other sources of ignition. If possible, mitigate spill by turning off dispenser pump or shutting valves. If possible, attempt to mitigate leak physically by plugging puncture. Place absorbent pads to collect spilled product. If product is on the pavement surface try to mitigate flow to prevent spreading of spill. Document if spill goes into any drainage basins or sewers. Call the fire department if a fire emergency develops. Contact PM and HSO. PM will contact client and state agencies and decide how to handle the problem. If the spill impacts a waterway the PM must inform the client that he must contact the US Coast Guard and National Guard Response Center 1-800-424-8802. Document all conversations, actions, occurrences, date, times and people involved. Immediate photo documentation should be implemented, if possible.

from 109-23 72nd Rd, Flushing, NY 11375
to NewYork-Presbyterian/Queens, 56-45 Main Street, ...

14 min (4.0 miles)

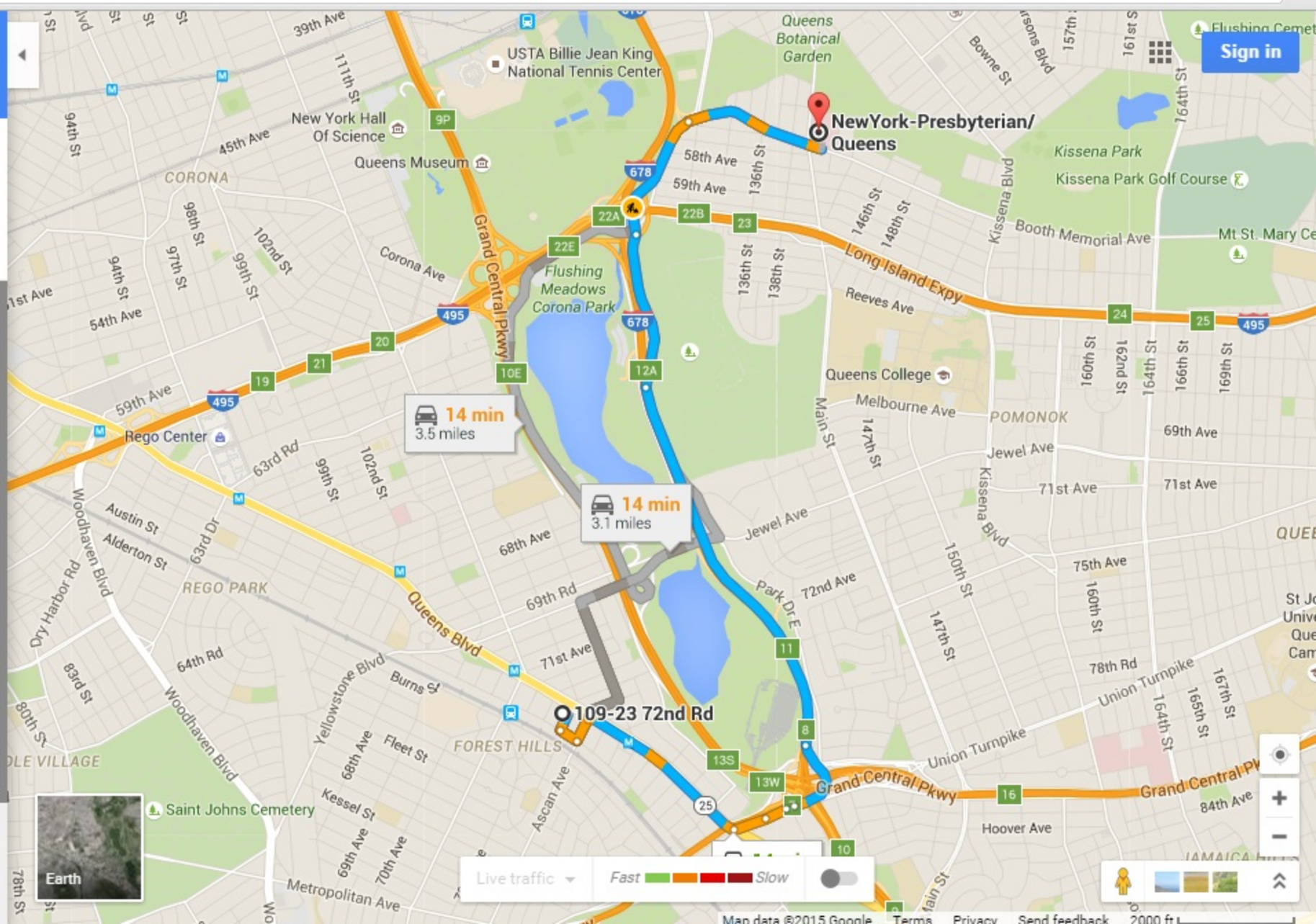
via I-678 N

12 min without traffic

109-23 72nd Rd
Flushing, NY 11375

- Take Ascan Ave to Queens Blvd
  2 min (0.2 mi)
- Turn right onto Queens Blvd
  3 min (0.6 mi)
- Get on I-678 N/Van Wyck Expy
  1 min (0.5 mi)
- Continue on I-678 N/Van Wyck Expy to College Point Blvd. Take exit 12A from I-678 N/Van Wyck Expy
  2 min (1.8 mi)
- Drive to Booth Memorial Ave
  5 min (0.9 mi)

NewYork-Presbyterian/Queens
56-45 Main Street, Flushing, NY 11355



Emergency Response Plan

AES Personnel will reference the following procedures in the event of an accidental release or fire:

1. Keep unnecessary people away; isolate hazard area and deny entry.
2. Stay upwind; keep out of low areas. Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection. Isolate area for 1/2 mile in all directions if tank, rail car, or tank truck is involved in fire.
3. CALL Emergency Response Telephone Number: (800) 962-1253. If water pollution occurs, notify the appropriate authorities.

Spill/Accidental Release

1. Shut off ignition sources; no flares, smoking, or flames in hazard area.
2. Stop leak if you can do it without risk.
3. Water spray may reduce vapor, but it may not prevent ignition in closed spaces.

Small Spills:

1. Take up with sand or other noncombustible absorbent material and place into containers for later disposal.

Large Spills:

1. Dike far ahead of liquid spill for later disposal.
2. Small Fires:
3. Dry Chemical, CO2, water spray or regular foam.

Large Fires:

1. Water spray, fog or regular foam.
2. Move container from fire area if you can do it without risk.
3. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
4. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is not possible, withdraw from area and let fire burn.
5. Withdraw from area immediately in case of rising sound from venting safety devise or any discoloration of tank due to fire.
6. In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
7. Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.

8. Remove and isolate contaminated clothing and shoes at the site.

In the event of a personal injury not requiring immediate medical attention, follow the first aid procedures listed on the product specific MSDS and notify the Health & Safety Officer (HSO). If the HSO is not available, notify any available project manager.

GENERAL SAFETY RULES

1. If an employee must work alone, he/she must call his/her supervisor twice a day. If the supervisor is unavailable, that supervisor's supervisor must be contacted.
2. Workers must wear all personal protective equipment required for the tasks to be performed.
3. Horseplay, scuffling, or practical jokes are forbidden on the job.
4. Compressed air must not be used to blow dirt from clothing, or played with or blown at another person.
5. Drinking of alcoholic beverages or the use drugs on the job is prohibited. Their use will cause immediate dismissal.
6. All areas must be continually cleaned to maintain good housekeeping. Trash is to be piled neatly and removed promptly. All tools and work areas are to be kept in clean and safe condition.
7. Competent workers must do welding and cutting.
8. Ladders are to be of proper design and tied off while in use. Do not go up or down a ladder without the free use of both hands. Use a rope to lift or lower materials or tools. Always face a ladder when climbing or descending.
9. Every work site must have a qualified first aid person and a complete first aid kit.
10. **ALL** accidents must be investigated and reported. Use the Accident Investigation Form in the back section of this plan.
11. Injuries sustained while on duty must be reported to supervisor immediately, or as soon as possible after injury is sustained.
12. Explosives must be handled and transported by licensed people only.
13. All tools and electrical equipment must be in proper working order.
14. Clothing appropriate to the duties performed shall be work by all workers. Large pockets, loose jewelry, cuffed trousers and loose or torn clothing are dangerous and should not be worn around machinery, or when climbing ladders, or working on structures.

Appendices

Appendix A

Hospital Map

Associated Environmental Services, Ltd.

Appendix B

Agreement and Acknowledgment Affidavit

I, _____ (name), of

_____(Company name) have read the Construction Health and Safety Plan (CHASP) for _____(site name).

I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from this site and or termination of employment.

Signed:

_____Date:_____

Appendix C

Amendment Sheet

Site Name:_____

Site Location:_____

Project Manager: _____

HSO: _____

Description of changes of field activities and hazards.

_____
_____
_____
_____
_____
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_____
_____
_____
_____
_____
_____
_____
_____
_____

Requested By: _____

HSO Approval: _____

Date: _____

Associated Environmental Services, Ltd.

Appendix D

Key Project Personnel

The following describes the project position assignments, associated responsibilities, and reporting relationships.

Position	Job Description	Interactions
Project Manager	Responsible for technical and administrative performance of the project. Supports Site Supervisor and is available to him at all times. Will visit the site periodically, or as necessary. Reports progress of project on a regular basis. Assigns key personnel, and identifies, requests, secures, and monitors use of resources for project. Approves program expenditures and invoices.	Reports directly to President. Works closely with Site Supervisor.
Site Supervisor	Acts as point of contact for client and client's representative(s). Supervises all on-site personnel and subcontractors. Coordinates daily site-specific work efforts, and ensures all activities are in strict compliance with site-specific health and safety plan. Has authority to suspend all work that possesses any health and safety risk. Briefs subordinate technical personnel on task requirements. Identifies and resolves technical problems. Provides periodic review of project progress.	Reports directly to Project Manager.
Site Designated Health & Safety Officer (HSO)	Assures compliance with CHASP. Instructs site personnel in health and safety procedures through daily pre-work meetings. Performs any monitoring activities as required. Has authority to discontinue site operations if safety violations exist.	Reports directly to Project Manager. Works closely with Director, Health & Safety, and Site Supervisor.
Corporate Director, Health & Safety (CDHS)	Develops, implements, and enforces the on-site safety program. Oversees all health and safety aspects of project, conducts periodic audits to ensure compliance. Available at all times to discuss project progress and health and safety related issues.	Reports directly to President. Works closely with Project Manager, Site Supervisor, and HSO.

Key project personnel are as follows:

AES Project Manager:	John Schretzmayer	Cell: (516) 658-5304
AES Site Supervisor:	John Veiss	Cell: (516) 263-3360
Site Health and Safety Officer:	Ryan Jensen	Cell: (631) 793-8948

Alternates will be determined prior to start of project.

Appendix E

Emergency Contacts

	Town	Phone
Fire Department		911
Police Department		911
Site Contact		
Site Telephone		
Nearest Telephone		
First Aid/EMS		911
Federal Agency Representative	National Response Center	(800) 424-8802
Local Agency Representative	NYSDEC Spills Hotline	1-800-457-7362
Pesticide Poisoning		(800) 845-7633
Poison Control Center		(800) 764-7661
CHEM TREC		(800) 424-9300
Utility	**Company Name**	**Phone**
Water Supply	NYC DEP	311
Sewer	NYC DEP	311
Telephone		
Power	Con Edison Keyspan	(800) 752-6633 (718) 643-4050
Gas	Con Edison Keyspan	(800) 752-6633 (718) 643-4050

Appendix F

Accident Report Form

Name of Reporter:

_____Date:_____

Name(s) of Victim(s): _____

Date of Accident:_____

Witnesses: _____

Time of Accident:_____

Location on Accident:

_____

Description of Accident:

_____

_____

_____

_____

_____

Cause of Accident:

_____

_____

_____

_____

_____

Associated Environmental Services, Ltd.

Persons/Agencies Notified	Time	Time of Arrival (if Applicable)
_____	____	_____
_____	____	_____
_____	____	_____
_____	____	_____

Corrective Actions:

_____

_____

_____

Duration of Accident:

_____

Comments:

_____

Appendix G

Tailgate Safety Meeting Log
(to be completed on site)

Site Name_____

Location_____

Weather_____

Topics_____

_____

_____

_____

_____

_____

Employee Names:	Signatures
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Signature of SS (or designee) Date

Associated Environmental Services, Ltd.

Appendix H

SUBSURFACE INVESTIGATION SUMMARY ONSITE TAILGATE SAFETY MEETING LOG

Client:

Client Contact:

Site:

Project Manager:

Address:

Date:

Weather Conditions:

Consultant(s):

Onsite Supervisor:

Contractor(s):

SOW Summary:

Weather Conditions:

Utility Markout #(s):	Utility Markout Yes	Company Calling in Markouts No	Comments
Site As-Built Plan(s):			
Other Site Plan(s):			
Subsurface SOP Documentation:			
HASP:			
Air knife/Vac Exc. Done (date):			
Hand Auger 5 feet (tbd):			
Other Documentation indicating utility locations (type):			
Permits (if applicable):			

Summary of Tailgate Discussion:

Attendees:	Company:	Title:	Signature:

Associated Environmental Services, Ltd.

Appendix I

CHEMICAL PROFILES (MSDS)

To date, no subsurface contaminates of concern have been identified on-site. However, the following MSDS sheets have been provided for the volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, and metals which will be evaluated during the Phase II Environmental Assessment.

Material Safety Data Sheet

Version 3.0
Revision Date 03/18/2009
Print Date 10/16/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 1,1,1-Trichloroethane

Product Number : 402877
Brand : Sigma-Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 'Chlorothene'
Methylchloroform

Formula : C2H3Cl3

CAS-No.	EC-No.	Index-No.	Concentration
1,1,1-Trichloroethane			
71-55-6	200-756-3	602-013-00-2	>= 99.8 %
Low alkyl epoxide			
-	-	-	<= 0.05 %

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Irritant, Teratogen, Reproductive hazard, Mutagen

Target Organs

Central nervous system, Cardiovascular system., Liver, Kidney

HMIS Classification

Health Hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 3
Fire: 0

Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	537 °C (999 °F) -

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid inhalation of vapour or mist.
Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
1,1,1-Trichloroethane	71-55-6	TWA	350 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Central Nervous System impairment Liver damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.				
		STEL	450 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Central Nervous System impairment Liver damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.				
		TWA	350 ppm 1,900 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	450 ppm 2,450 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	350 ppm 1,900 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m3 is approximate.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-35.0 °C (-31.0 °F)
Boiling point	72.0 - 75.0 °C (161.6 - 167.0 °F)
Flash point	no data available
Ignition temperature	537 °C (999 °F) -
Lower explosion limit	7.5 %(V)
Upper explosion limit	15 %(V)
Vapour pressure	133.3 hPa (100.0 mmHg) at 20.0 °C (68.0 °F)
Density	1.34 g/cm3
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong oxidizing agents, Potassium, Magnesium, Sodium/sodium oxides, Zinc, Strong bases

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Contains the following stabiliser(s):
Low alkyl epoxide (<=0.05 %)

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 9,600 mg/kg
Remarks: Cardiac:Pulse rate. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

LC50 Inhalation - rat - 4 h - 18000 ppm

Irritation and corrosion

Skin - rabbit - Skin irritation - 24 h

Eyes - rabbit - Severe eye irritation - 24 h

Sensitisation

no data available

Chronic exposure

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (1,1,1-Trichloroethane)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Laboratory experiments have shown mutagenic effects.

Laboratory experiments have shown teratogenic effects.

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Signs and Symptoms of Exposure

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., prolonged or repeated exposure can cause:, narcosis, Liver injury may occur., Kidney injury may occur.

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.
Target Organs	Central nervous system, Cardiovascular system., Liver, Kidney,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Bioaccumulation	Lepomis macrochirus (Bluegill) - 28 d Bioconcentration factor (BCF): 9

Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 53.00 mg/l - 96 h
	Growth inhibition NOEC - Cyprinus carpio (Carp) - 7.7 mg/l - 14 d
	LC50 - Pimephales promelas (fathead minnow) - 42.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 11.2 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Dangerous for the ozone layer.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2831 Class: 6.1 Packing group: III
Proper shipping name: 1,1,1-Trichloroethane
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2831 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: 1,1,1-TRICHLOROETHANE
Marine pollutant: No

IATA
UN-Number: 2831 Class: 6.1 Packing group: III
Proper shipping name: 1,1,1-Trichloroethane

15. REGULATORY INFORMATION

OSHA Hazards
Irritant, Teratogen, Reproductive hazard, Mutagen

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Low alkyl epoxide	-

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloroethane	71-55-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloroethane	71-55-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloroethane	71-55-6	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 05/22/2006
Date Updated: 01/31/2006
Version 1.4

Section 1 - Product and Company Information

Product Name	4,4'-DDE PESTANAL,250 MG (2,2-BIS(4-CHL&
Product Number	35487
Brand	RIEDEL
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
2,2-BIS(4-CHLOROPHENYL)-1,1-DICHLOR O-ETHYLENE	72-55-9	No

Formula	C14H8Cl4
Synonyms	2,2-Bis(4-chlorophenyl)-1,1-dichloroethene * 2,2-Bis(p-chlorophenyl)-1,1-dichloroethylene * p,p'-Dde * DDT dehydrochloride * 1,1-Dichloro-2,2-bis(p-chlorophenyl)ethylene * Dichlorodiphenyldichloroethylene * p,p'-Dichlorodiphenyl dichloroethylene * 1,1'-(Dichloroethenylidene)bis(4-chlorobenzene) * NCI-C00555
RTECS Number:	KV9450000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Harmful. Dangerous for the environment.
Harmful if swallowed. Limited evidence of a carcinogenic effect.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Possible Carcinogen (US). Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 1*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance — Physical State: Solid

Property	Value	At Temperature or Pressure
Molecular Weight	318.03 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	88.0 - 90.0 °C	
Freezing Point	N/A	
Vapor Pressure	< 0.00001 mmHg	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 6.51	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents, Strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: Harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Rat
880 mg/kg
LD50

Oral
Mouse
700 mg/kg
LD50

Oral
Hamster
> 5000 mg/kg
LD50

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Species: Mouse
Route of Application: Oral
Dose: 9700 MG/KG
Exposure Time: 78W
Frequency: C
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

Species: Hamster
Route of Application: Oral
Dose: 36 GM/KG
Exposure Time: 86W
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors. Endocrine:Adrenal cortex tumors.

Species: Mouse
Route of Application: Oral
Dose: 28 GM/KG
Exposure Time: 80W
Frequency: C

Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.

Species: Mouse
Route of Application: Oral
Dose: 17 GM/KG
Exposure Time: 78W
Frequency: C
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

Species: Hamster
Route of Application: Oral
Dose: 57 GM/KG
Exposure Time: 68W
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.
Endocrine:Adrenal cortex tumors.

Species: Hamster
Route of Application: Oral
Dose: 41 GM/KG
Exposure Time: 97W
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.
Endocrine:Adrenal cortex tumors.

Species: Hamster
Route of Application: Oral
Dose: 81 GM/KG
Exposure Time: 97W
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.
Endocrine:Adrenal cortex tumors.

IARC CARCINOGEN LIST

Rating: Group 2B

NTP CARCINOGEN LIST

Rating: Clear evidence.
Species: Mouse
Route: Feed

CHRONIC EXPOSURE - MUTAGEN

Species: Rat
Dose: 300 UMOL/L
Cell Type: liver
Mutation test: DNA damage

Species: Rat
Dose: 10 UG/L
Cell Type: Other cell types
Mutation test: Cytogenetic analysis

Species: Mouse
Dose: 42600 NMOL/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Mouse
Route: Oral

Dose: 200 MG/KG
Mutation test: Other mutation test systems

Species: Mouse
Route: Oral
Dose: 50 MG/KG
Mutation test: DNA inhibition

Species: Mouse
Dose: 25 MG/L
Cell Type: lymphocyte
Mutation test: Mutation in mammalian somatic cells.

Species: Hamster
Dose: 5 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 20 MG/L
Cell Type: ovary
Mutation test: Mutation in mammalian somatic cells.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 12375 UG/KG
Route of Application: Oral
Exposure Time: (8W PRE-21D POST)
Result: Effects on Newborn: Biochemical and metabolic.

Species: Rat
Dose: 3500 UG/KG
Route of Application: Intraperitoneal
Exposure Time: (7D PRE)
Result: Maternal Effects: Uterus, cervix, vagina.

Species: Rat
Dose: 3 GM/KG
Route of Application: Intraperitoneal
Exposure Time: (15D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.
Paternal Effects: Other effects on male.

Section 12 - Ecological Information

ACCUMULATION

Bioaccumulation Potential: Indication of bioaccumulation.

ACUTE ECOTOXICITY TESTS
Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 0.2 - 0.3 mg/l

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96 h
Value: 0.026 - 0.040 mg/l

Test Type: LC50 Fish
Species: Salmon
Time: 96 h
Value: 0.050 - 0.180 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xn-N
Indication of Danger: Harmful. Dangerous for the environment.
R: 22-40-50/53
Risk Statements: Harmful if swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 36/37-60-61
Safety Statements: Wear suitable protective clothing and gloves. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Harmful. Dangerous for the environment.
Risk Statements: Harmful if swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Wear suitable protective clothing and gloves. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Possible Carcinogen (US). Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65

California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 05/22/2006
Date Updated: 01/31/2006
Version 1.5

Section 1 - Product and Company Information

Product Name	4,4'-DDD PESTANAL,250 MG (2,2-BIS(4-CHL&
Product Number	35486
Brand	RIEDEL
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
2,2-BIS(4-CHLOROPHENYL)-1,1-DICHLOR O-ETHANE	72-54-8	No

Formula	C14H10Cl4
Synonyms	Benzene, 1,1'-(2,2-dichloroethylidene)bis(4-chloro- * 1,1-Bis(p-chlorophenyl)-2,2-dichloroethane * 1,1-Bis(4-chlorophenyl)-2,2-dichloroethane * 2,2-Bis(p-chlorophenyl)-1,1-dichloroethane * 2,2-Bis(4-chlorophenyl)-1,1-dichloroethane * DDD * p,p'-Ddd * 1,1-Dichloor-2,2-bis(4-chloor fenyl)-ethaan (Dutch) * 1,1-Dichlor-2,2-bis(4-chlor-phenyl)-aethan (German) * 1,1-Dichloro-2,2-bis(p-chlorophenyl)ethane * 1,1-Dichloro-2,2-bis(4-chlorophenyl)-ethane (French) * 1,1-Dichloro-2,2-bis(parachlorophenyl)ethane * 1,1-Dichloro-2,2-di(4-chlorophenyl)ethane * Dichlorodiphenyl dichloroethane * p,p'-Dichlorodiphenyldichloroethane * 1,1-Dicloro-2,2-bis(4-cloro-fenil)-etano (Italian * Dilene * ENT 4,225 * ME-1700 * NCI-C00475 * OMS 1078 * RCRA waste number U060 * Rhothane * Rhothane D-3 * Rothane * TDE * p,p'-TDE * Tetrachlorodiphenylethane
RTECS Number:	KI0700000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic. Dangerous for the environment.
Harmful in contact with skin. Toxic if swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Calif. Prop. 65 carcinogen. Possible Carcinogen (US).

HMIS RATING
HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING
HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid	
Property	**Value**	**At Temperature or Pressure**
Molecular Weight	320.05 AMU	
pH	N/A	
BP/BP Range	193 °C	1 mmHg
MP/MP Range	94.0 - 96.0 °C	
Freezing Point	N/A	
Vapor Pressure	< 0.00001 mmHg	25 °C
Vapor Density	11 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	1.385 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 6.02	
Decomposition Temp.	N/A	
Flash Point	N/A	

Explosion Limits	N/A
Flammability	N/A
Autoignition Temp	N/A
Refractive Index	N/A
Optical Rotation	N/A
Miscellaneous Data	N/A
Solubility	N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: Harmful if absorbed through skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: Toxic if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Rat
113 mg/kg
LD50

Skin
Rabbit
1200 mg/kg
LD50
Remarks: Behavioral:Convulsions or effect on seizure threshold. Behavioral:Excitement. Skin and Appendages:Skin: After topical exposure:Primary irritation.

Oral
Hamster
> 5000 mg/kg
LD50

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Oral
Dose: 54 GM/KG
Exposure Time: 78W
Frequency: C
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Endocrine:Thyroid tumors.

Species: Mouse
Route of Application: Oral
Dose: 39 GM/KG
Exposure Time: 2Y
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Liver:Tumors.

IARC CARCINOGEN LIST

Rating: Group 2B

NTP CARCINOGEN LIST

Rating: Clear evidence.
Species: Rat
Route: Feed

CHRONIC EXPOSURE - MUTAGEN

Species: Rat
Dose: 10 UG/L
Cell Type: Other cell types
Mutation test: Cytogenetic analysis

Species: Mouse
Dose: 28400 NMOL/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Mouse
Dose: 1500 MG/KG
Cell Type: S. marcescens
Mutation test: Host-mediated assay

Section 12 - Ecological Information

ACCUMULATION

Bioaccumulation Potential: Indication of bioaccumulation.

ACUTE ECOTOXICITY TESTS
Test Type: EC50 Daphnia
Species: Daphnia pulex Daphnia magna
Time: 48 h
Value: 0.009 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 96 h
Value: 1.180 - 9.0 mg/l

Test Type: LC50 Fish

Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 0.040 - 0.050 mg/l

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96 h
Value: 0.060 - 0.090 mg/l

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 3.470 - 5.580 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Organochlorine pesticides, solid toxic
UN#: 2761
Class: 6.1
Packing Group: Packing Group III
Hazard Label: Toxic Substance
PIH: Not PIH

IATA
Proper Shipping Name: Organochlorine pesticide, solid, toxic
IATA UN Number: 2761
Hazard Class: 6.1
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: T-N
Indication of Danger: Toxic. Dangerous for the environment.
R: 21-25-40-50/53
Risk Statements: Harmful in contact with skin. Toxic if swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 36/37-45-60-61
Safety Statements: Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic. Dangerous for the environment.
Risk Statements: Harmful in contact with skin. Toxic if

swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Calif. Prop. 65 carcinogen. Possible Carcinogen (US).

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.1
Revision Date 07/09/2009
Print Date 10/23/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 1,4-Dioxane

Product Number : 42500
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Dioxane
Diethylene oxide

Formula : $C_4H_8O_2$
Molecular Weight : 88.11 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
1,4-Dioxane			
123-91-1	204-661-8	603-024-00-5	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable Liquid, Target Organ Effect, Irritant, Carcinogen

Target Organs

Liver, Kidney, Central nervous system

Other hazards which do not result in classification
May form explosive peroxides.

HMIS Classification
Health Hazard: 2
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

NFPA Rating
Health Hazard: 2

Fire: 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation. Repeated exposure may cause skin dryness or cracking.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	12 °C (54 °F) - closed cup
Ignition temperature	180 °C (356 °F)

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
1,4-Dioxane	123-91-1	TWA	20 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is lilkely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. Danger of cutaneous absorption				
		TWA	25 ppm 90 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Skin notation				
		TWA	100 ppm 360 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Skin designation The value in mg/m3 is approximate.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	6.0 - 8 at 500 g/l at 20 °C (68 °F)
Melting point	10 - 12 °C (50 - 54 °F) - lit.
Boiling point	100 - 102 °C (212 - 216 °F) - lit.
Flash point	12 °C (54 °F) - closed cup
Ignition temperature	180 °C (356 °F)
Lower explosion limit	2 %(V)
Upper explosion limit	22 %(V)
Vapour pressure	36 hPa (27 mmHg) at 20 °C (68 °F) 53 hPa (40 mmHg) at 25.20 °C (77.36 °F)
Density	1.034 g/mL at 25 °C (77 °F)
Water solubility	completely miscible
Partition coefficient: n-octanol/water	log Pow: -0.27
Relative vapour density	3.04 - (Air = 1.0)

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Oxygen, Oxidizing agents, Halogens, Reducing agents, Perchlorates., Trimethylaluminum

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 4,200 mg/kg

LC50 Inhalation - rat - 2 h - 46,000 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Other.

LD50 Dermal - rabbit - 7,858 mg/kg

Irritation and corrosion

Skin - Human -
Remarks: Chronic exposure causes drying effect on the skin and eczema.

Skin - rabbit - No skin irritation

Eyes - rabbit - Eye irritation - 24 h

Sensitisation

no data available

Chronic exposure

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	2B - Group 2B: Possibly carcinogenic to humans (1,4-Dioxane)
NTP:	Reasonably anticipated to be a human carcinogen (1,4-Dioxane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Laboratory experiments have shown mutagenic effects.

Signs and Symptoms of Exposure

Nausea, Vomiting, Weakness, Dizziness, Vertigo, Headache, Sweating, loss of appetite, Kidney injury may occur., Liver injury may occur.

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation. Repeated exposure may cause skin dryness or cracking.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.
Target Organs	Liver, Kidney, Central nervous system,

Additional Information
RTECS: JG8225000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Biodegradability	Result: < 5 % - Not readily biodegradable.

Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 985 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 8,450 mg/l - 24 h
Toxicity to algae	EC50 - Scenedesmus subspicatus - > 500 mg/l - 72 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1165 Class: 3 Packing group: II
Proper shipping name: Dioxane
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1165 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: DIOXANE
Marine pollutant: No

IATA
UN-Number: 1165 Class: 3 Packing group: II
Proper shipping name: Dioxane

15. REGULATORY INFORMATION

OSHA Hazards
Flammable Liquid, Target Organ Effect, Irritant, Carcinogen

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer. 1,4-Dioxane	123-91-1	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 12/28/2008
Print Date 10/29/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 1,4-Dichlorobenzene

Product Number : 35370
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C6H4Cl2
Molecular Weight : 147 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
1,4-Dichlorobenzene			
106-46-7	203-400-5	602-035-00-2	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Toxic by ingestion, Carcinogen

Target Organs

Liver, Kidney, Blood, Nerves.

HMIS Classification

Health Hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 2
Fire: 2
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes May cause eye irritation.
Ingestion Toxic if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	66.0 °C (150.8 °F) - closed cup
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
1,4-	106-46-7	TWA	10 ppm	1994-09-01	US. American Conference

Dichlorobenzene			60 mg/m3		of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
Remarks	Confirmed animal carcinogen with unknown relevance to humans. Refers to Appendix A -- Carcinogens.				
		TWA	75 ppm 450 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		STEL	110 ppm 675 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	75 ppm 450 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	sheets

Colour	colourless

Safety data

pH	no data available
Melting point	52.0 °C (125.6 °F)
Boiling point	172.0 - 173.0 °C (341.6 - 343.4 °F)
Flash point	66.0 °C (150.8 °F) - closed cup
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	8.8 hPa (6.6 mmHg) at 50.0 °C (122.0 °F) 0.5 hPa (0.4 mmHg) at 25.0 °C (77.0 °F)
Density	1.24 g/cm3
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 3.40

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 500.0 mg/kg

LD50 Dermal - rabbit - > 2,000 mg/kg

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	Group 2B - The agent (mixture) is possibly carcinogenic to humans. (1,4-Dichlorobenzene)
NTP:	Reasonably anticipated to be human carcinogens. (1,4-Dichlorobenzene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

Produces:, methemoglobin, Nausea, Vomiting, Increased pulse rate, Headache, Impairment of vision

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Toxic if swallowed.
Target Organs	Liver, Kidney, Blood, Nerves.,

Additional Information
RTECS: CZ4550000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Biodegradability	aerobic Result: 20 % - Not readily biodegradable.
Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 7 d Bioconcentration factor (BCF): 112

Ecotoxicity effects

Toxicity to fish	LC50 - Brachydanio rerio (zebra fish) - 2.10 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 4.20 mg/l - 96 h
	LOEC - other fish - 0.263 mg/l - 10 d
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 5.6 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 0.70 mg/l - 48 h
Toxicity to algae	EC50 - Scenedesmus subspicatus - 28.00 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (1,4-Dichlorobenzene)
Marine pollutant: Marine pollutant

Poison Inhalation Hazard: No

IMDG
UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (1,4-Dichlorobenzene)
Marine pollutant: Marine pollutant

IATA
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid n.o.s. (1,4-Dichlorobenzene)

15. REGULATORY INFORMATION

OSHA Hazards
Toxic by ingestion, Carcinogen

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	1987-01-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	1987-01-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer. 1,4-Dichlorobenzene	106-46-7	1990-06-15

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 12/31/2008
Print Date 10/23/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 1,3-Dichlorobenzene

Product Number : 35350
Brand : Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_6H_4Cl_2$
Molecular Weight : 147.00 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
1,3-Dichlorobenzene			
541-73-1	208-792-1	602-067-00-7	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid

HMIS Classification

Health Hazard: 1
Flammability: 2
Physical hazards: 0

NFPA Rating

Health Hazard: 1
Fire: 2
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	67.0 °C (152.6 °F) - closed cup
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
For prolonged or repeated contact use protective gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	25 °C (77 °F)
Boiling point	172 - 173 °C (342 - 343 °F)
Flash point	67.0 °C (152.6 °F) - closed cup
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	1.288 g/mL at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Intraperitoneal - mouse - 1,062 mg/kg

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

Additional Information
RTECS: CZ4499000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Bioaccumulation	Pimephales promelas (fathead minnow) - 32 d Bioconcentration factor (BCF): 97

Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 7.8 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	LC50 - Daphnia magna (Water flea) - 1.7 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, liquid, n.o.s. (1,3-Dichlorobenzene)
Marine pollutant: Marine pollutant
Poison Inhalation Hazard: No

IMDG
UN-Number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,3-Dichlorobenzene)
Marine pollutant: Marine pollutant

IATA
UN-Number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid n.o.s. (1,3-Dichlorobenzene)

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	1987-01-01

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	1987-01-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 05/24/2006
Date Updated: 02/09/2006
Version 1.4

Section 1 - Product and Company Information

Product Name	1,3,5-TRIMETHYLBENZENE SINGLE COMPONENT
Product Number	41103
Brand	SIGMA
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
1,3,5-TRIMETHYLBENZENE	108-67-8	No

Formula	C9H12
Synonyms	Benzene, 1,3,5-trimethyl- * 3,5-Dimethyltoluene * Fleet-X * sym-Trimethylbenzene * 1,3,5-Trimethylbenzene * Trimethylbenzol
RTECS Number:	OX6825000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Combustible (USA) Flammable (EU). Irritant. Dangerous for the environment.
Irritating to respiratory system and skin. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Target organ(s): Nerves. Blood.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 2
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 2
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLASH POINT
127.4 °F 53 °C Method: closed cup

EXPLOSION LIMITS
Lower: 0.88 %

AUTOIGNITION TEMP
550 °C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Keep away from heat and open flame.
Store at 2-8°C

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
New Zealand	OEL		

Remarks: check ACGIH TLV

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	100 mg/m3
Poland		NDSCh	170 mg/m3
Poland		NDSP	

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear liquid Color: Colorless

Property	Value	At Temperature or Pressure
Molecular Weight	120.2 AMU	
pH	N/A	
BP/BP Range	165 °C	
MP/MP Range	- 45.0 °C	
Freezing Point	N/A	
Vapor Pressure	2.49 mmHg	25 °C
Vapor Density	4.1 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.865 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	

Flash Point	127.4 °F 53 °C	Method: closed cup
Explosion Limits	Lower: 0.88 %	
Flammability	N/A	
Autoignition Temp	550 °C	
Refractive Index	1.498	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: May be harmful if inhaled. Vapor or mist is irritating to the mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Blood. Central nervous system. Peripheral nervous system.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Inhalation
Rat
24,000 mg/m3
LC50

IRRITATION DATA

Skin
Rabbit
20 mg
24H
Remarks: Moderate irritation effect

Eyes
Rabbit
500 mg
24H
Remarks: Mild irritation effect

CHRONIC EXPOSURE - MUTAGEN

Species: Mouse
Route: Intraperitoneal
Dose: 1800 MG/KG
Mutation test: Sister chromatid exchange

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: 1,3,5-Trimethylbenzene
UN#: 2325
Class: 3
Packing Group: Packing Group III
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: 1,3,5-Trimethylbenzene
IATA UN Number: 2325
Hazard Class: 3
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xi-N
Indication of Danger: Irritant. Dangerous for the environment.
R: 10-37-51/53
Risk Statements: Flammable. Irritating to respiratory system. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 61
Safety Statements: Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Combustible (USA) Flammable (EU). Irritant. Dangerous for the environment.
Risk Statements: Irritating to respiratory system and skin. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Target organ(s): Nerves. Blood.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet
1,2-Dichloroethane

ACC# 09390

Section 1 - Chemical Product and Company Identification

MSDS Name: 1,2-Dichloroethane
Catalog Numbers: AC113360000, AC113360010, AC113360025, AC113360250, AC113361000, AC326840000, AC326840010, AC326841000, AC326842500, AC327860000, AC327860010, AC406800000, AC406800010, AC406800040, AC406800200, AC406810000, AC406810010, AC406810030, AC406810500, AC406815000, AC406820000, AC406820040, AC406820250, AC406825000, AC406830000, AC406835000, S79997, BP1100-500, E175-20, E175-4, E175-500, E175J4, E175RS19, E175RS50, E190-4
Synonyms: Ethylene dichloride; 1,2-Ethylene dichloride; Glycol dichloride; EDC; sym-Dichloroethane; 1,2-Dichloroethane; Ethylene chloride.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
107-06-2	1,2-Dichloroethane	>99	203-458-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: 56 deg F.
Warning! Flammable liquid and vapor. Causes eye, skin, and respiratory tract irritation. May be harmful if swallowed. May cause central nervous system depression. May cause cancer based on animal studies. May cause liver damage.
Target Organs: Central nervous system, liver, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation. Vapors may cause eye irritation.
Skin: Causes skin irritation. May be absorbed through the skin.
Ingestion: May cause central nervous system depression, kidney damage, and liver damage. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause effects similar to those for inhalation exposure.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory

tract irritation. May cause liver and kidney damage. Vapors may cause dizziness or suffocation. Can produce delayed pulmonary edema. Exposure to high concentrations may produce narcosis, nausea and loss of consciousness.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis. May cause liver and kidney damage. Effects may be delayed.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Water may be ineffective. Do NOT use straight streams of water.
Flash Point: 56e deg F (13.33 deg C)
Autoignition Temperature: 775 deg F (412.78 deg C)
Explosion Limits, Lower:6.2%
Upper: 15.9%
NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor or mist.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Storage under a nitrogen blanket has been recommended.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2-Dichloroethane	10 ppm TWA	1 ppm TWA; 4 mg/m3 TWA 50 ppm IDLH	50 ppm TWA; 100 ppm Ceiling

OSHA Vacated PELs: 1,2-Dichloroethane: 1 ppm TWA; 4 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: colorless
Odor: chloroform-like
pH: Not available.
Vapor Pressure: 100 mm Hg @29 deg C
Vapor Density: 3.4 (Air=1)
Evaporation Rate:6.5 (Butyl acetate=1)
Viscosity: Not available.
Boiling Point: 81 - 85 deg C
Freezing/Melting Point:-35 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:1.25 (Water=1)
Molecular Formula:C2H4Cl2

Molecular Weight:98.96

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Light, ignition sources, excess heat, electrical sparks.
Incompatibilities with Other Materials: Aluminum, bases, alkali metals, ketones, organic peroxides, nitric acid, strong oxidizing agents, strong reducing agents, liquid ammonia, amines.
Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 107-06-2: KI0525000
LD50/LC50:
CAS# 107-06-2:

Draize test, rabbit, eye: 63 mg Severe;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 1060 mg/m3/6H;
Inhalation, rat: LC50 = 1000 ppm/7H;
Inhalation, rat: LC50 = 5100 mg/m3/6H;
Oral, mouse: LD50 = 413 mg/kg;
Oral, mouse: LD50 = 413 mg/kg;
Oral, rabbit: LD50 = 860 mg/kg;
Oral, rabbit: LD50 = 0.7 mL/kg;
Oral, rat: LD50 = 500 mg/kg;
Skin, rabbit: LD50 = 2800 mg/kg;

.

Carcinogenicity:
CAS# 107-06-2:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 10/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

Epidemiology: See actual RTECS.
Teratogenicity: See actual entry in RTECS for complete information.
Reproductive Effects: See actual entry in RTECS for complete information.
Mutagenicity: See actual entry in RTECS for complete information.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea Daphnia: 218mg/L; 48H; Fish: Bluegill/Sunfish: 430mg/L; 96H; StaticFish: Fathead Minnow: 136mg/L; 96H; Static No data available.
Environmental: Terrestrial: Smaller releases on land will evaporate fairly rapidly. Larger releases may leach rapidly through sandy soil into groundwater. Aquatic: If released to surface water, its primary loss will be by evaporation. The half-life for evaporation will depend on wind and mixing conditions and was of the order of hours in the laboratory. However a modeling study using the EXAMS model for a eutrophic lake gave a half-life of 10 days. Atmospheric: Will degrade by reaction with hydroxyl radicals formed photochemically in the atmosphere. Half-life over one month.
Physical: Not expected to biodegrade or bioconcentrate.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 107-06-2: waste number U077.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	ETHYLENE DICHLORIDE	ETHYLENE DICHLORIDE
Hazard Class:	3	3(6.1)
UN Number:	UN1184	UN1184
Packing Group:	II	II
Additional Info:		FLASHPOINT 13 C

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 107-06-2 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 107-06-2: Effective 6/1/87, Sunset 6/1/97
Chemical Test Rules
CAS# 107-06-2: 40 CFR 799.5115
Section 12b
CAS# 107-06-2: Section 4
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 107-06-2: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 107-06-2: immediate, delayed, fire.

Section 313

This material contains 1,2-Dichloroethane (CAS# 107-06-2, >99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

CAS# 107-06-2 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 107-06-2 is listed as a Hazardous Substance under the CWA. CAS# 107-06-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 107-06-2 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 107-06-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains 1,2-Dichloroethane, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 107-06-2: 10 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T F

Risk Phrases:

R 11 Highly flammable.
R 22 Harmful if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 45 May cause cancer.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 107-06-2: 3

Canada - DSL/NDSL

CAS# 107-06-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D1B, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 107-06-2 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997
Revision #10 Date: 6/07/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Version 4.0
Revision Date 03/13/2010
Print Date 10/18/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	1,2-Dichlorobenzene
Product Number	:	240664
Brand	:	Sigma-Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+18003255832
Fax	:	+18003255052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Combustible Liquid, Target Organ Effect, Toxic by ingestion, Irritant

Target Organs

Liver, Kidney, Central nervous system

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H227	Combustible liquid
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H371	May cause damage to organs.
H400	Very toxic to aquatic life.

Precautionary statement(s)

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	2
Physical hazards:	1

NFPA Rating

Health hazard:	2
Fire:	2
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_6H_4Cl_2$

Molecular Weight : 147.00 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
1,2-Dichlorobenzene			
95-50-1	202-425-9	602-034-00-7	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
1,2-Dichlorobenzene	95-50-1	TWA	25 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye & Upper Respiratory Tract irritation Liver damage Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.				
		STEL	50 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Liver damage Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.				
		C	50 ppm 300 mg/m3	2006-02-28	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples.				
		C	50 ppm 300 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-18 - -17 °C (0 - 1 °F) - lit.

Boiling point	178 - 180 °C (352 - 356 °F) - lit.
Flash point	66.0 °C (150.8 °F) - closed cup
Ignition temperature	648 °C (1,198 °F)
Lower explosion limit	2.2 %(V)
Upper explosion limit	9.2 %(V)
Vapour pressure	2.1 hPa (1.6 mmHg) at 35.0 °C (95.0 °F) 1.6 hPa (1.2 mmHg) at 20.0 °C (68.0 °F)
Density	1.306 g/cm3 at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - 500.0 mg/kg

LD50 Dermal - rabbit - > 10,000 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (1,2-Dichlorobenzene)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (GHS)
May cause damage to organs.

Specific target organ toxicity - repeated exposure (GHS)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	Toxic if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Additional Information
RTECS: CZ4500000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 1.58 mg/l - 96.0 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 9.7 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 0.74 mg/l - 48 h
Toxicity to algae	Growth inhibition LOEC - Desmodesmus subspicatus (green algae) - 50 mg/l - 72 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 14 d Bioconcentration factor (BCF): 89

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1591 Class: 6.1 Packing group: III
Proper shipping name: o-Dichlorobenzene
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1591 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: ortho-DICHLOROBENZENE
Marine pollutant: No

IATA
UN-Number: 1591 Class: 6.1 Packing group: III
Proper shipping name: o-Dichlorobenzene

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid, Target Organ Effect, Toxic by ingestion, Irritant

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 08/22/2009
Print Date 10/20/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 1,2,4-Trimethylbenzene

Product Number : P3394
Brand : Sigma

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Pseudocumene

Formula : C_9H_{12}
Molecular Weight : 120.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
1,2,4-Trimethylbenzene			
95-63-6	202-436-9	601-043-00-3	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid

Target Organs

Central nervous system

HMIS Classification

Health Hazard: 1
Chronic Health Hazard: *
Flammability: 2
Physical hazards: 0

NFPA Rating

Health Hazard: 2
Fire: 2
Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	48.0 °C (118.4 °F) - closed cup
Ignition temperature	515 °C (959 °F)

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
1,2,4-Trimethylbenzene	95-63-6	TWA	25 ppm 125 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	25 ppm 123 mg/m3	1994-09-01	USA. ACGIH Threshold Limit Values (TLV)

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
For prolonged or repeated contact use protective gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	light blue colourless

Safety data

pH	no data available
Melting point	-44 °C (-47 °F) - lit.
Boiling point	168 °C (334 °F) - lit.
Flash point	48.0 °C (118.4 °F) - closed cup
Ignition temperature	515 °C (959 °F)
Lower explosion limit	0.9 %(V)
Upper explosion limit	6.4 %(V)

Vapour pressure	2.3 hPa (1.7 mmHg) at 20.0 °C (68.0 °F) 6.0 hPa (4.5 mmHg) at 37.7 °C (99.9 °F) 9.3 hPa (7.0 mmHg) at 44.4 °C (111.9 °F)
Density	0.876 g/mL at 20 °C (68 °F)
Water solubility	insoluble

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 5,000 mg/kg

LC50 Inhalation - rat - 4 h - 18,000 mg/m3

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

prolonged or repeated exposure can cause:, narcosis, Bronchitis., Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.

Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.
Target Organs	Central nervous system,

Additional Information
RTECS: DC3325000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 7.72 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 3.6 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3295 Class: 3 Packing group: III
Proper shipping name: Hydrocarbons, liquid, n.o.s.
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 3295 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: HYDROCARBONS, LIQUID, N.O.S.
Marine pollutant: No

IATA
UN-Number: 3295 Class: 3 Packing group: III
Proper shipping name: Hydrocarbons, liquid n.o.s.

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
1,2,4-Trimethylbenzene	95-63-6	2007-07-01

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trimethylbenzene	95-63-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trimethylbenzene	95-63-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trimethylbenzene	95-63-6	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 04/05/2011
Print Date 06/29/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	1,1-Dichloroethene
Product Number	:	48526
Brand	:	Supelco
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Target Organ Effect, Toxic by ingestion, Irritant

Target Organs

Liver, Kidney, Central nervous system

GHS Classification
Flammable liquids (Category 1)
Acute toxicity, Oral (Category 3)
Skin irritation (Category 2)
Eye irritation (Category 2A)
Carcinogenicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H224	Extremely flammable liquid and vapour.
H301	Toxic if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P281	Use personal protective equipment as required.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	4
Physical hazards:	2

NFPA Rating

Health hazard:	2
Fire:	4
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1,1-Dichloroethylene
Vinylidene chloride

Formula : $C_2H_2Cl_2$

Molecular Weight : 96.94 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Vinylidene chloride			
75-35-4	200-864-0	602-025-00-8	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature: 2 - 8 °C

Air and moisture sensitive. Store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Remarks	Potential Occupational Carcinogen See Appendix A			
Vinylidene chloride	75-35-4	TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Liver & kidney damage Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.			
		TWA	1 ppm 4 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific

workplace.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -122 °C (-188 °F) - lit.
Boiling point	30 - 32 °C (86 - 90 °F) - lit.
Flash point	-25.0 °C (-13.0 °F) - closed cup
Ignition temperature	520 °C (968 °F)
Autoignition temperature	520.0 °C (968.0 °F) 580.0 °C (1,076.0 °F)
Lower explosion limit	6.5 %(V)
Upper explosion limit	15.5 %(V)
Vapour pressure	658.6 hPa (494.0 mmHg) 667.3 hPa (500.5 mmHg) at 20.0 °C (68.0 °F) 2,137.4 hPa (1,603.2 mmHg) at 55.0 °C (131.0 °F)
Density	1.213 g/cm3 at 20 °C (68 °F)
Water solubility	0.2 g/l at 20 °C (68 °F)
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
Oxidizing agents, Copper, Aluminum, and its alloys, Peroxides, Strong bases, Oxygen

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 200.0 mg/kg

Inhalation LC50
Lung irritation

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Vinylidene chloride)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	Toxic if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
Nausea, Headache, Vomiting, Dizziness, Drowsiness, Confusion., Incoordination., Central nervous system depression, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: KV9275000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Daphnia magna (Water flea) - 11.60 - 11.79 mg/l
	LC50 - Pimephales promelas (fathead minnow) - 108.00 - 169.00 mg/l
	LC50 - Lepomis macrochirus (Bluegill) - 74.00 - 220.00 mg/l
	LC50 - Cyprinodon variegatus (sheepshead minnow) - 249.00 mg/l
	LC50 - other fish - 250.00 mg/l
	LC50 - other fish - 224.00 mg/l
	LC50 - Pimephales promelas (fathead minnow) - 108 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 80 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	LC50 - Daphnia magna (Water flea) - 11.6 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1303 Class: 3 Packing group: I
Proper shipping name: Vinylidene chloride, stabilized
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1303 Class: 3 Packing group: I EMS-No: F-E, S-D
Proper shipping name: VINYLIDENE CHLORIDE, STABILIZED
Marine pollutant: No

IATA
UN number: 1303 Class: 3 Packing group: I
Proper shipping name: Vinylidene chloride, stabilized

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Target Organ Effect, Toxic by ingestion, Irritant

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vinylidene chloride	75-35-4	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Avocado Research Chemicals Ltd - Material Safety Data Sheet 19318

1. IDENTIFICATION OF SUBSTANCE AND SUPPLIER

Name On Label	1,1-Dichloroethane
Product Number	19318
Supplier	Johnson Matthey Catalog Company Inc. 30 Bond Street, Ward Hill, Massachusetts, 01835-8099 Emergency Telephone Number: (978) 521-6300; CHEMTREC: (800) 424-9300
Alternative Names	None in common use.

2. COMPOSITION AND INFORMATION ON COMPONENTS

Name	1,1-Dichloroethane		
Minor Impurities	Not determined		
CAS No.	75-34-3	**EINECS No.** 2008635	**EEC No.**

3. HAZARDS IDENTIFICATION

Designation HIGHLY FLAMMABLE ~ POSSIBLE CARCINOGEN ~ IRRITANT

Risk Phrases

R45	May cause cancer.
R11	Highly flammable.
R36/37/38	Irritating to eyes, respiratory system and skin.

4. FIRST AID MEASURES

Inhalation	Remove to fresh air. If breathing is difficult give oxygen and seek medical attention.
Eye Contact	Flush with copious amounts of water for at least 15 minutes. If irritation persists, seek medical attention.
Skin Contact	Remove contaminated clothing. Wash affected area with soap and water. Rinse thoroughly. If irritation persists or other symptoms are observed, seek medical advice.
Ingestion	Rinse out mouth and drink lots of water. In case of irritation or other symptoms, seek medical attention.

5. FIRE FIGHTING MEASURES

Extinguishing Medium	Use fire fighting measures which suit the environment and take into account other materials which may be involved. In general, water-based extinguishers should not be used for fires involving organic materials. Use carbon dioxide or dry powder.
Protective Equipment	Wear self-contained breathing apparatus and protective clothing.

Hazardous Products of Combustion may include: carbon monoxide, carbon dioxide, hydrogen chloride (hydrochloric acid).

6. ACCIDENTAL RELEASE MEASURES

Personal Protection	Keep away from ignition sources. Avoid inhalation of vapour. Wear protective equipment including rubber gloves, eye protection and breathing equipment. Keep unprotected persons away.
Environmental Protection	Take precautions to ensure product does not contaminate the ground or enter the drainage system.
Collection	Absorb in vermiculite or proprietary absorbent material and transfer to sealed containers for disposal.

7. HANDLING AND STORAGE

Handling	Chemicals should be used only by those trained in handling potentially hazardous materials. Rubber gloves, eye protection and protective clothing should be worn. Operations should be carried out in an efficient fume hood or equivalent system.
Storage	Store in tightly sealed containers in a cool place. Protect from moisture.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Respiratory	Volatile product. Avoid inhalation of vapour. Handle in an efficient fume hood or equivalent system.
Eye	Avoid eye contact. Wear safety spectacles, goggles or, for larger quantities, a full face mask.
Hands and Body	Irritant product. Avoid skin contact. Wear rubber gloves, protective clothing and, for larger quantities, full arm, body and face protection. Wash hands thoroughly after handling.

Continued on next page...

19318 continued.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless to faint-yellow liquid		
Physical Constants	b.p. 56-58˚		
Molecular formula	$C_2H_4Cl_2$	**Formula Wt.**	98.96
Water solubility	Sl sol	**Density**	1.17
Flash Point	Not available		

10. STABILITY AND REACTIVITY

Specific Hazard

Incompatibilities	Strong oxidising agents.
Decomposition	Hazardous products of decomposition may include: carbon monoxide, carbon dioxide, hydrogen chloride (hydrochloric acid).

11. TOXICOLOGICAL INFORMATION

RTECS No.	KI0175000
Acute Toxicity	LD_{50}: ORL-RAT 725mg/kg May cause cancer. Irritating to eyes, respiratory system and skin.
Special Note	Exposure can give rise to dermatitis and hypersensitivity.
Chronic Toxicity	Carcinogen. Possible teratogen.

12. ECOLOGICAL EFFECTS

General	Take care to prevent chemicals from entering the ground, water courses or drainage systems.

13. DISPOSAL CONSIDERATIONS

Disposal	Disposal should be via an approved contractor and should take full account of local regulations.

14. TRANSPORT INFORMATION

UN Number	2362		
Land Transport	ADR/RIC Code/Class	3.2	Packing Group II
Maritime Transport	IMDG Code/Class	3.2	Packing Group II
Air Transport	IATA Code/Class	3.2	Packing Group II

15. REGULATORY INFORMATION

CAS No. 75-34-3 **EINECS No.** 2008635 **EEC No.** **UN No.** 2362 **RTECS No.** KI0175000

Hazard Indication	HIGHLY FLAMMABLE ~ POSSIBLE CARCINOGEN ~ IRRITANT
Risk & Safety Phrases	May cause cancer. Highly flammable. Irritating to eyes, respiratory system and skin. Avoid exposure - obtain special instructions before use. Keep away from sources of ignition - No Smoking. Wear suitable protective clothing, gloves and eye/face protection.
TSCA	Listed substance.

16. OTHER INFORMATION

It must be recognised that the physical and chemical properties of any product may not be fully understood and that new, possibly hazardous products may arise from reactions between chemicals. The information given in this data sheet is based on our present knowledge and shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Date of Last Review: 3rd August 1998 **Date Printed:** 18th September 1998

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 10/23/2010
Date Updated: 01/30/2006
Version 1.7

Section 1 - Product and Company Information

Product Name	4,4'-DDT PESTANAL (1,1,1-TRICHLORO-2,2-&
Product Number	35491
Brand	RIEDEL
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
1,1-BIS(4-CHLOROPHENYL)-2,2,2-TRICHLORO-ETHANE	50-29-3	No

Formula	C14H9Cl5
Synonyms	Aavero-extra * Agritan * Arkotine * Azotox * Benzene, 1,1'-(2,2,2-trichloroethylidene)bis(4-chloro- * Benzochloryl * alpha,alpha-Bis(p-chlorophenyl)-beta,beta,beta-trichlorethane * 1,1-Bis-(p-chlorophenyl)-2,2,2-trichloroethane * 2,2-Bis(p-chlorophenyl)-1,1,1-trichloroethane * Bosan Supra * Bovidermol * Chlorophenothan * Chlorophenothane * Chlorophenotoxum * Citox * Clofenotane * DDT * DDT (ACGIH:OSHA) * Azotox M 33 * Deoval * Detox * Detoxan * Dibovin * Dichlorodiphenyltrichloroethane * Dichlorodiphenyltrichloroethane (ACGIH:OSHA) * p,p'-Dichlorodiphenyltrichloroethane * 4,4'-Dichlorodiphenyltrichloroethane * Dicophane * Dodat * Dykol * ENT 1,506 * Estonate * Gesafid * Gesarol * Hildit * Ivoran * Mutoxan * NCI-C00464 * Neocid * Neocidol (solid) * OMS 16 * Parachlorocidum * PEB1 * Pentachlorin * RCRA waste number U061 * Santobane * Tafidex * 1,1,1-Trichloor-2,2-bis(4-chloor fenyl)-ethaan (Dutch) * 1,1,1-Trichlor-2,2-bis(4-chlor-phenyl)-aethan (German) * Trichlorobis(4-chlorophenyl)ethane * 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane * 1,1,1-Trichloro-2,2-di(4-chlorophenyl)-ethane * 1,1,1-Tricloro-2,2-bis(4-cloro-fenil)-etano (Italian) * Zerdane
RTECS Number:	KJ3325000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic. Dangerous for the environment.
Harmful in contact with skin. Toxic if swallowed. Limited evidence of a carcinogenic effect. Toxic: danger of serious damage to health by prolonged exposure if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Readily absorbed through skin. Target organ(s): Liver. Pancreas. Possible Carcinogen (US). Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 2
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 2
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT

162.0 - 171.0 °F 72.0 - 77.0 °C

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	1 MG/M3
USA	MSHA Standard-air	TWA	(1 MG/M3) (SKIN)
USA	OSHA.	PEL	8H TWA 1 MG/M3 (SKIN)
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	0.5 MG/M3 (0.1 MG/M3 LOQ)

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	0.1 MG/M3
Poland		NDSCh	0.8 MG/M3
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
Molecular Weight	354.49 AMU	
pH	N/A	
BP/BP Range	260 °C	
MP/MP Range	107.0 - 109.0 °C	
Freezing Point	N/A	
Vapor Pressure	0.0000016 mmHg	20 °C
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	0.99 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 6.91	
Decomposition Temp.	N/A	
Flash Point	162.0 - 171.0 °F 72.0 - 77.0 °C	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Other Solvents: ACETONE, CHLOROBENZENE BENZENE, CYCLOHEXANONE	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Oxidizing agents Iron and iron salts.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: Toxic if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Pancreas. Liver.

SIGNS AND SYMPTOMS OF EXPOSURE

CNS stimulation.

CONDITIONS AGGRAVATED BY EXPOSURE

May cause nervous system disturbances.

TOXICITY DATA

Oral
Infant
150 mg/kg
LDLO
Remarks: Lungs, Thorax, or Respiration:Acute pulmonary edema.

Oral
Human
500 mg/kg
LDLO
Remarks: Lungs, Thorax, or Respiration:Other changes.
Behavioral:Convulsions or effect on seizure threshold.
Cardiac:Arrythmias (including changes it conduction).

Oral
Rat
87 mg/kg
LD50

Skin
Rat
1931 mg/kg
LD50

Intraperitoneal
Rat
9100 UG/KG
LD50

Subcutaneous
Rat
1500 MG/KG
LD50
Remarks: Behavioral:Ataxia. Behavioral:Tremor. Behavioral:Muscle weakness.

Oral
Mouse
135 mg/kg
LD50

Intraperitoneal
Mouse
32 MG/KG
LD50

Oral
Dog
150 mg/kg
LD50

Oral

Monkey
200 mg/kg
LD50

Oral
Rabbit
250 mg/kg
LD50

Skin
Rabbit
300 mg/kg
LD50
Remarks: Behavioral:Ataxia. Behavioral:Tremor. Behavioral:Muscle weakness.

Subcutaneous
Rabbit
250 MG/KG
LD50
Remarks: Behavioral:Ataxia. Behavioral:Tremor. Behavioral:Muscle weakness.

Oral
Guinea pig
150 mg/kg
LD50

Skin
Guinea pig
1000 mg/kg
LD50
Remarks: Behavioral:Ataxia. Behavioral:Tremor. Behavioral:Muscle weakness.

Subcutaneous
Guinea pig
900 MG/KG
LD50
Remarks: Behavioral:Ataxia. Behavioral:Tremor. Behavioral:Muscle weakness.

Oral
Hamster
> 5000 mg/kg
LD50

Oral
Frog
7.6 mg/kg
LD50

Parenteral
Frog
24100 UG/KG
LD50

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Oral
Dose: 1225 MG/KG
Exposure Time: 7W
Frequency: C
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

Species: Mouse
Route of Application: Oral
Result: Tumorigenic:Neoplastic by RTECS criteria. Tumorigenic Effects: Uterine tumors. Liver:Tumors.

Species: Mouse
Route of Application: Oral
Dose: 73 MG/KG
Exposure Time: 26W
Frequency: C
Result: Lungs, Thorax, or Respiration:Tumors. Blood:Lymphomas including Hodgkin's disease. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse
Route of Application: Subcutaneous
Dose: 370 MG/KG
Exposure Time: 80W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Blood:Lymphomas including Hodgkin's disease.

Species: Hamster
Route of Application: Oral
Dose: 21280 MG/KG
Exposure Time: 38W
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Endocrine:Thyroid tumors. Tumorigenic Effects: Uterine tumors

Species: Rat
Route of Application: Oral
Dose: 12096 MG/KG
Exposure Time: 3Y
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.

Species: Mouse
Route of Application: Oral
Dose: 7560 MG/KG
Exposure Time: 90W
Frequency: C
Result: Lungs, Thorax, or Respiration:Tumors. Liver:Tumors. Tumorigenic:Neoplastic by RTECS criteria.

Species: Mouse
Route of Application: Oral
Dose: 5600 MG/KG
Exposure Time: 80W
Frequency: I
Result: Blood:Lymphomas including Hodgkin's disease. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Neoplastic by RTECS criteria.

Species: Rat
Route of Application: Oral
Dose: 8100 MG/KG
Exposure Time: 2Y
Frequency: C
Result: Kidney, Ureter, Bladder:Changes in tubules (including acute renal failure, acute tubular necrosis). Liver:Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Mouse
Route of Application: Oral
Dose: 3150 MG/KG
Exposure Time: 15W
Frequency: C
Result: Liver:Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Mouse
Route of Application: Oral
Result: Lungs, Thorax, or Respiration:Tumors. Tumorigenic Effects: Uterine tumors. Tumorigenic:Neoplastic by RTECS criteria.

Species: Rat
Route of Application: Oral
Dose: 19 GM/KG
Exposure Time: 2Y
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors. Blood:Lymphomas including Hodgkin's disease.

Species: Rat
Route of Application: Oral
Dose: 438 MG/KG
Exposure Time: 2Y
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors. Blood:Lymphomas including Hodgkin's disease.

Species: Rat
Route of Application: Oral
Dose: 17976 MG/KG
Exposure Time: 2Y
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.

Species: Rat
Route of Application: Oral
Dose: 24192 MG/KG
Exposure Time: 3Y
Frequency: C
Result: Liver:Tumors. Tumorigenic:Neoplastic by RTECS criteria.

IARC CARCINOGEN LIST

Rating: Group 2B

NTP CARCINOGEN LIST

Rating: No evidence.
Species: Mouse/rat

Route: Feed

ACGIH CARCINOGEN LIST

Rating: A3

IRIS/EPA CARCINOGEN LIST
Rating: Group B2
Species: Mouse
Route: Feed

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 250 MG/KG
Route of Application: Oral
Exposure Time: (15-19D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Mouse
Dose: 418 MG/KG
Route of Application: Subcutaneous
Exposure Time: (6-14D PREG)
Result: Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord).

Species: Mouse
Dose: 3 MG/KG
Route of Application: Unreported
Exposure Time: (10-17D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.
Effects on Newborn: Delayed effects.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 500 MG/L
Cell Type: lymphocyte
Mutation test: DNA inhibition

Species: Human
Dose: 100 MG/KG
Cell Type: fibroblast
Mutation test: Other mutation test systems

Species: Human
Dose: 40 MG/L
Cell Type: leukocyte
Mutation test: Cytogenetic analysis

Species: Human
Dose: 200 UG/L
Exposure Time: 72H
Cell Type: lymphocyte
Mutation test: Cytogenetic analysis

Species: Rat
Route: Oral
Dose: 4620 MG/KG
Exposure Time: 77D
Mutation test: Morphological transformation.

Species: Rat
Dose: 100 PMOL/L
Cell Type: liver
Mutation test: Unscheduled DNA synthesis

Species: Rat
Route: Oral
Dose: 50 UMOL/KG
Mutation test: Unscheduled DNA synthesis

Species: Rat
Dose: 100 MG/L
Cell Type: Other cell types
Mutation test: DNA inhibition

Species: Rat
Route: Intraperitoneal
Dose: 100 MG/KG
Mutation test: Cytogenetic analysis

Species: Rat
Dose: 10 UG/L
Cell Type: Other cell types
Mutation test: Cytogenetic analysis

Species: Rat
Route: Oral
Dose: 100 MG/KG
Mutation test: Dominant lethal test

Species: Rat
Route: Oral
Dose: 1 GM/KG
Exposure Time: 2D
Mutation test: sperm

Species: Mouse
Dose: 42600 NMOL/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Mouse
Dose: 15 UMOL/L
Cell Type: Ascites tumor
Mutation test: DNA

Species: Mouse
Route: Oral
Dose: 18 MG/KG
Mutation test: Other mutation test systems

Species: Mouse
Route: Intraperitoneal
Dose: 20 GM/KG
Mutation test: DNA inhibition

Species: Mouse
Route: Intraperitoneal
Dose: 50 PPM
Mutation test: Cytogenetic analysis

Species: Mouse

Route: Unreported
Dose: 50 MG/KG
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Oral
Dose: 300 MG/KG
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Oral
Dose: 100 MG/KG
Mutation test: Dominant lethal test

Species: Mouse
Route: Unreported
Dose: 200 MG/KG
Exposure Time: 10W
Mutation test: Dominant lethal test

Species: Mammal
Dose: 50 MG/L
Cell Type: fibroblast
Mutation test: Other mutation test systems

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 112 MG/KG
Route of Application: Oral
Exposure Time: (56D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count). Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat
Dose: 100 MG/KG
Route of Application: Oral
Exposure Time: (1D MALE)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Rat
Dose: 430 MG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG/21D POST)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Rat
Dose: 1890 MG/KG
Route of Application: Oral
Exposure Time: (36W PRE)
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated).

Species: Rat
Dose: 50 MG/KG
Route of Application: Oral
Exposure Time: (1D MALE)

Result: Effects on Fertility: Other measures of fertility

Species: Rat
Dose: 60 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (3D PRE)
Result: Maternal Effects: Uterus, cervix, vagina.

Species: Rat
Dose: 21 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (21D POST)
Result: Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4). Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Mouse
Dose: 504 MG/KG
Route of Application: Oral
Exposure Time: (21D POST)
Result: Effects on Newborn: Behavioral.

Species: Mouse
Dose: 81 MG/KG
Route of Application: Oral
Exposure Time: (4W MALE/4W PRE-2W POST)
Result: Effects on Fertility: Other measures of fertility

Species: Mouse
Dose: 124 MG/KG
Route of Application: Oral
Exposure Time: (62D PRE)
Result: Maternal Effects: Menstrual cycle changes or disorders.

Species: Mouse
Dose: 148 MG/KG
Route of Application: Oral
Exposure Time: (66D PRE/1-8D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Mouse
Dose: 40 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (1-3D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Mouse
Dose: 40 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (1D PRE)
Result: Maternal Effects: Menstrual cycle changes or disorders.

Species: Mouse
Dose: 143 MG/KG
Route of Application: Subcutaneous
Exposure Time: (21D POST)
Result: Effects on Newborn: Delayed effects.

Species: Mouse
Dose: 40 MG/KG
Route of Application: Subcutaneous
Exposure Time: (3D PRE)
Result: Maternal Effects: Menstrual cycle changes or disorders. Maternal Effects: Ovaries, fallopian tubes. Maternal Effects: Uterus, cervix, vagina.

Species: Mouse
Dose: 17500 UG/KG
Route of Application: Unreported
Exposure Time: (8-14D PREG)
Result: Effects on Newborn: Behavioral.

Species: Dog
Dose: 3540 MG/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATIONS)
Result: Maternal Effects: Parturition. Effects on Newborn: Delayed effects.

Species: Rabbit
Dose: 150 MG/KG
Route of Application: Oral
Exposure Time: (7-9D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Maternal Effects: Parturition. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 0.01 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 0.009 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. (DN)Requires special label: "Contains a substance which is regulated by Dannish work environmental law due to the risk of carcinogenic properties."

Section 14 - Transport Information

DOT
Proper Shipping Name: Toxic solids, organic, n.o.s.
UN#: 2811
Class: 6.1
Packing Group: Packing Group III

Hazard Label: Toxic substances.
PIH: Not PIH

IATA
Proper Shipping Name: Toxic solid, organic, n.o.s.
IATA UN Number: 2811
Hazard Class: 6.1
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T-N
Indication of Danger: Toxic. Dangerous for the environment.
R: 25-40-48/25-50/53
Risk Statements: Toxic if swallowed. Limited evidence of a carcinogenic effect. Toxic: danger of serious damage to health by prolonged exposure if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 22-36/37-45-60-61
Safety Statements: Do not breathe dust. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic. Dangerous for the environment.
Risk Statements: Harmful in contact with skin. Toxic if swallowed. Limited evidence of a carcinogenic effect. Toxic: danger of serious damage to health by prolonged exposure if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Do not breathe dust. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Readily absorbed through skin. Target organ(s): Liver. Pancreas. Possible Carcinogen (US). Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 10/18/2010
Date Updated: 09/03/2009
Version 1.7

Section 1 - Product and Company Information

Product Name	BENZO(G,H,I)PERYLENE, 98%
Product Number	B9009
Brand	ALDRICH
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
1-12-BENZOPERYLENE	191-24-2	Yes

Formula	C22H12
Synonyms	1,12-Benzoperylene * 1,12-Benzperylene
RTECS Number:	DI6200500

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Dangerous for the environment.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

HMIS RATING

HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious

amounts of water.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of dust.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks.
Hand: Protective gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance: Physical State: Solid

Property	Value	At Temperature or Pressure
Molecular Weight	276.34 AMU	
pH	N/A	
BP/BP Range	500 °C	760 mmHg
MP/MP Range	278 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 6.63	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:Insoluble.	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and

toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC CARCINOGEN LIST

Rating: Group 3

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 80 UG/L
Cell Type: lymphocyte
Mutation test: Mutation in mammalian somatic cells.

Species: Mouse
Route: Skin
Dose: 40 UMOL/KG
Mutation test: DNA damage

Mutation test: Histidine reversion (Ames)

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: N
Indication of Danger: Dangerous for the environment.
R: 50/53

Risk Statements: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 60-61
Safety Statements: This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Dangerous for the environment.
Risk Statements: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
NOTES: This product is subject to SARA section 313 reporting requirements.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MSDS Safety Information

TOP

FSC:	MSDS Date:	MSDS Num:
6810	03/10/1988	BHGVP

Submitter:	LIIN:	Tech Review:	Status CD:
N EN	00N010747	03/01/1989	C

Product ID:	MFN:
BENZO(B)FLUORANTHENE 50MG,CATALOG NO,48490	01

Article:	Kit Part:
N	N

Cage:

Responsible Party HO582

Name:

SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:
BELLEFONTE	PA	16823−0048

Country:

NK

Info Phone Number:

814−359−3441

Emergency Phone Number:

814−359−3441

Preparer's Name:

N/P

Proprietary Ind:

N Review Ind: Y

Published: Y Special Project CD: N

Contractor Summary

TOP

Cage:	Name:
54968	SIGMA−ALDRICH INC.

Address:	Box:
3050 SPRUCE STREET	14508

City:	State:	Zip:
ST. LOUIS	MO	63103

Country:	Phone:
US	314−771−5765/414−273−3850X5996

Cage:	Name:
HO582	SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:

BELLEFONTE PA 16823−0048

Country: **Phone:**

NK 814−359−3441

Ingredients

TOP

Cas: 205−99−2 M CU1400000 M

Code: RTECS #: Code:

Name: **BENZO[B]FLUORANTHANE (SARA III)**

% Text: N/K FPN Environmental Wt:

Other REC Limits: N/A MFR

OSHA PEL:

A2; 9293 Code: M OSHA STEL: Code:

ACGIH TLV: NOT ESTABLISHED Code: M ACGIH STEL: N/P Code:

EPA Rpt Qty: 1 LB DOT Rpt Qty: 1 LB

Ozone Depleting Chemical:

N

Health Hazards Data

TOP

LD50 LC50 Mixture

LD50 N/A MFR

Route Of Entry Inds − Inhalation:YES Skin:NO Ingestion:YES

Carcinogenicity Inds − NTP:YES IARC:YES OSHA:NO

Health Hazards Acute And Chronic

SEE SIGN & SYMPTOMS OF OVEREXPOSURE.

Explanation Of Carcinogenicity

BENZO(B)FLUORANTHENE:NTP,MAY REASONABLY BE ANTICIPATED TO BE CARC.IARC,ANIMAL CARCINOGEN(FPN).RPTD ANIMAL (MFR).

Signs And Symptions Of Overexposure

REPORTED ANIMAL CARCINOGEN.

Medical Cond Aggravated By Exposure

N/K FPN

First Aid

EYES:FLUSH WITH PLENTY OF POTABLE WATER FOR AT LEAST 15 MINUTES,THEN OBTAIN PROMPT MEDICAL ATTENTION (FPN).SKIN:PROMPTLY WASH SKIN WITH MILD SOAP & LARGE VOLUMES OF WATER REMOVE CONTAMINATED CLOTHING. CONTACT PHYSICIAN.INHAL:IMMEDIATELY MOVE TO FRESH AIR.CONTACT PHYSICIAN.INGEST:NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON,NEVER TRY TO MAKE AN UNCONSCIOUS PERSON VOMIT.IMMED CONTACT PHYS.

Spill Release Procedures

SWEEP UP MATERIAL.AVOID GENERATING DUST.

Neutralizing Agent

N/K FPN

Waste Disposal Methods

COMPLY WITH ALL APPLICABLE FEDERAL,STATE,OR LOCAL REGULATIONS.

Handling And Storage Precautions

REFRIGERATE IN SEALED CONTAINER.AVOID GENERATING DUST.PROTECT FROM EXPOSURE TO LIGHT.

Other Precautions

REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

========== Fire and Explosion Hazard Information ==========

TOP

Flash Point Method:

N/P

Flash Point:

Flash Point Text: N/K FPN

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: N/K FPN

Upper Limits: N/K FPN

Extinguishing Media

CO*2,DRY CHEMICAL

Fire Fighting Procedures

WEAR SELF CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE(MFR).USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT(FPN).

Unusual Fire/Explosion Hazard

N/A MFR

========== **Control Measures** ========== TOP

Respiratory Protection

WEAR SELF CONTAINED BREATHING APPARATUS.NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FPN).

Ventilation

USE ONLY IN EXHAUST HOOD.

Protective Gloves

WEAR GLOVES

Eye Protection

SAFETY GLASSES WITH SIDESHIELDS(FPN)

Other Protective Equipment

N/A

Work Hygienic Practices

OBSERVE GOOD WORK HYGIENIC PRACTICES(FPN).

Supplemental Safety and Health

N/P

========== **Physical/Chemical Properties** ========== TOP

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point: B.P. Text: N/A MFR

Melt/Freeze Pt:		M.P/F.P Text:	334 F;168 C
Decomp Temp:		Decomp Text:	N/F FPN
Vapor Pres:	N/A MFR	Vapor Density:	N/A MFR
Volatile Org Content %:		Spec Gravity:	N/A MFR
VOC Pounds/Gallon:			
		PH:	N/KFPN
VOC Grams/Liter:		Viscosity:	N/P
Evaporation Rate & Reference:	N/A MFR		
Solubility in Water:	N/A MFR		
Appearance and Odor:	LIGHT YELLOW CRYSTALLINE SOLID.		
Percent Volatiles by Volume:	N/AMFR	Corrosion Rate:	N/K FPN

========== **Reactivity Data** ========== TOP

Stability Indicator:

YES

Stability Condition To Avoid: N/A MFR

Materials To Avoid: N/A MFR

Hazardous Decomposition Products: N/A MFR

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization WILL NOT OCCUR.

:

========== **Toxicological Information** ========== TOP

Toxicological Information:

N/P

========== **Ecological Information** ========== TOP

Ecological:

N/P

========== **MSDS Transport Information** ========== TOP

Transport Information:

N/P

========== **Regulatory Information** ========== TOP

Sara Title III Information:

N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

========== **Other Information** ========== TOP

Other Information:

N/P

==========

Material Safety Data Sheet

Catalog Number: 159069
Revision date: 24-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 159069

Product name: BENZO(a)PYRENE

Synonyms: 3,4-Benzpyrene; 3,4-Benzopyrene; 6,7-Benzopyrene; BAP; B(a)P
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
BENZO(a)PYRENE	50-32-8	90 - 100%	0.2 mg/m³ (as benzene solubles)	benzene soluble fraction: 0.2 mg/m³ TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene)

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Combustible material, Harmful to flora, fauna, soil organisms and aquatic organisms., Toxic: danger of very serious irreversible effects if swallowed. May also have serious irreversible effects through skin contact or inhalation.

Category of Danger:
Toxic , Dangerous for the environment , Repr. cat. 2 , Muta. cat. 2, Carc. cat. 2

Principle routes of exposure: Skin
Inhalation: Harmful: possible risk of irreversible effects through inhalation.
Ingestion: Toxic: danger of very serious irreversible effects if swallowed.
Skin contact: Harmful: danger of serious damage to health by prolonged skin contact.
Eye contact: Risk of serious damage to eyes

Statements of hazard COMBUSTIBLE MATERIAL AND VAPOR.
Toxic if swallowed
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Precautions - ANSI Label Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not breathe vapors or spray mist

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes
Ingestion: Drink 1 or 2 glasses of water. Induce vomiting, but only if victim is fully conscious. Induce vomiting if person is conscious.
Eye contact: Flush eye(s) immediately with plenty of water. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Foam, Water spray
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	> 200 °C (Cleveland open cup ASTM D 92)
Autoignition temperature:	> 500 °C at 1013.25 hPa

NFPA rating:

NFPA Health:	2
NFPA Flammability:	0
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
+4°C

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep container tightly closed in a dry and well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing

Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Pale yellow crystals; yellow-green fluorescence in ultraviolet light; faint aromatic odor reported, but this may be due to contaminants.
Physical state:	Powder
Formula:	C20H12
Molecular weight:	252.32
Melting point/range:	179-179.3 °C (354-355 °F)
Boiling point/range:	310-312 °C (590-594 °F) at 10 mmHg; 495 °C (923 °F) at 760 mmHg
Density:	1.351 (water = 1)
Vapor pressure:	5.6 x 10-9 mm Hg at 25 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Practically not soluble
Flash point:	> 200 °C (Cleveland open cup ASTM D 92)
Autoignition temperature:	> 500 °C at 1013.25 hPa

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Strong oxidizers may cause fires and explosions.

Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	**RTECS Number:**	**Selected LD50s and LC50s**
BENZO(a)PYRENE	DJ3675000	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	Possible carcinogen
Mutagenic effects:	Substances which should be regarded as being mutagenic to man.
Reproductive toxicity:	Experiments have shown reproductive toxicity effects on laboratory animals.

Components	**NIOSH - Health Effects**	**NIOSH - Target Organs**
BENZO(a)PYRENE		respiratory system, bladder, kidneys, skin and lung, kidney and skin cancer

12. ECOLOGICAL INFORMATION

Mobility: No data available
Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
BENZO(a)PYRENE	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
BENZO(a)PYRENE	Not Listed	0.7 ug/L	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
BENZO(a)PYRENE	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
BENZO(a)PYRENE	Rank (of 275): 008	indicator 2; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
BENZO(a)PYRENE	Water and organisms = 0.0044 ug/L; organisms only = 0.049 ug/L	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: 2811

DOT:

Proper shipping name: Toxic solid, organic, n.o.s.
IATA Hazard Label(s): Toxic
Hazard Class 6.1 **-**
Toxic substances - oral
Packing group: III

Emergency Response Guide Number (ERG): 154

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
BENZO(a)PYRENE	RQ = 1 pound (0.454 kg); also listed as 3,4-Benzopyrene

TDG (Canada):

WHMIS hazard class: D2a very toxic materials

IMDG/IMO

Proper shipping name: Toxic solid, organic, n.o.s.

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
BENZO(a)PYRENE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
BENZO(a)PYRENE	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	200-028-5; C20H12
Inventory - Japan:	9-1736
Korean KECL:	KE-06059
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
BENZO(a)PYRENE	carcinogen; initial date 7/1/87	carcinogen; extraordinarily hazardous	sn 0207	environmental hazard; special hazardous substance

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
BENZO(a)PYRENE	[present]	Toxic	B2 Carcinogen, Present on Great Waters or Great Lakes list	No hazard limiting value has been established; see Polycyclic aromatic compounds

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
BENZO(a)PYRENE	Reporting Threshold = 100 pounds; (Listed under "Polycyclic aromatic compounds")	Not Listed	Suspect Carcinogen; (under Polycyclic Aromatic Hydrocarbons) Suspect Carcinogen	Supplement 7, 1987; Monograph 35, 1985 Supplement 7, 1987; Monograph 32, 1983; (Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of ca

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

!! This is an ARCHIVE Record !!

MSDS Safety Information

TOP

FSC:	MSDS Date:	MSDS Num:
6810	05/16/1985	BHYRL

Submitter:	LIIN:	Tech Review:	Status CD:
N EN	00N010656	07/15/1989	C

Product ID: BENZO(A)ANTHRACENE 0.1G,48563

MFN: 01

Article: N

Kit Part: N

Cage: HO582

Responsible Party

Name: SUPELCO,INC.

Address: SUPELCO PARK

City:	State:	Zip:
BELLEFONTE	PA	16823−0048

Country: NK

Info Phone Number: 814−359−3441

Emergency Phone Number: 814−359−3441

Preparer's Name: N/P

Proprietary Ind: N

Review Ind: Y

Published: Y

Special Project CD: N

Contractor Summary

TOP

Cage:	Name:
54968	SIGMA−ALDRICH INC.

Address: 3050 SPRUCE STREET

Box: 14508

City:	State:	Zip:
ST. LOUIS	MO	63103

Country:	Phone:
US	314−771−5765/414−273−3850X5996

Cage:	Name:
HO582	SUPELCO,INC.

Address:

SUPELCO PARK

City: **State:** **Zip:**

BELLEFONTE PA 16823−0048

Country: **Phone:**

NK 814−359−3441

Ingredients

TOP

Cas: 56−55−3 M CV9275000 M

Code: RTECS #: Code:

Name: **BENZ A ANTHRACENE (SARA III)**

% Text: N/K

Environmental Wt:

Other REC Limits: N/K (FP N/ORNL)

OSHA PEL:

NOT ESTABLISHED

Code: M OSHA STEL: Code:

ACGIH TLV: A2 ; 9394

Code: M ACGIH STEL: N/P Code:

EPA Rpt Qty: 10 LBS

DOT Rpt Qty: 10 LBS

Ozone Depleting Chemical:

N

Health Hazards Data

TOP

LD50 LC50 Mixture

N/A

Route Of Entry Inds − Inhalation:NO Skin:NO Ingestion:NO

Carcinogenicity Inds − NTP:YES IARC:YES OSHA:NO

Health Hazards Acute And Chronic

SEE SIGNS AND SYMPTOMS OF OVEREXPOSURE.

Explanation Of Carcinogenicity

SUSPECTED HUM CARCIN/KNOWN ANIM CARCIN (NTP 1985).INADEQ EVID FOR CARC IN HUM,SUFF EVID FOR CARC IN ANIMALS (IARC 1987).

Signs And Symptions Of Overexposure

EYES/SKIN/INGESTION/INHALATION:N/K (FP N/ORNL).

Medical Cond Aggravated By Exposure

N/K (FP N/ORNL)

First Aid

EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES.SKIN:FLUSH WITH LARGE VOLUMES OF WATER.REMOVE CONTAMINATED CLOTHING.INGESTION:CONTACT PHYSICIAN.INHALATION:IMMEDIAATELY MOVE TO FRESH AIR.GIVE OXYGEN IF B REATHING IS LABORED.IF BREATHING STOPS,GIVE ARTIFICIAL RESPIRATION.CONTACT PHYSICIAN.

Spill Release Procedures

SWEEP UP MATERIAL.VENTILATE AREA.AVOID GENERATING DUST.

Neutralizing Agent

N/K (FP N/ORNL)

Waste Disposal Methods

DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS (FP N).

Handling And Storage Precautions

STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.KEEP AWAY FROM OXIDIZERS.AVOID GENERATING DUST.

Other Precautions

REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

========== Fire and Explosion Hazard Information ==========

TOP

Flash Point Method:

N/P

Flash Point:

Flash Point Text: N/K (FP N/ORNL)

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: N/K (FP N)

Upper Limits: N/K (FP N)

Extinguishing Media

CO*2,FOAM,DRY CHEMICAL.

Fire Fighting Procedures

USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire/Explosion Hazard

N/A

========== **Control Measures** ========== TOP

Respiratory Protection

NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation

LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN (FP N/ORNL).

Protective Gloves

RUBBER

Eye Protection

CHEMICAL WORKERS GOGGLES (FP N).

Other Protective Equipment

N/A

Work Hygienic Practices

N/K (FP N/ORNL)

Supplemental Safety and Health

ROUTES OF ENTRY:INHALATION/SKIN/INGESTION (FP N).

========== **Physical/Chemical Properties** ========== TOP

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point:		B.P. Text:	438C,820F
Melt/Freeze Pt:		M.P/F.P Text:	157C,315F
Decomp Temp:		Decomp Text:	N/K (FP N)
Vapor Pres:	N/A	Vapor Density:	N/A
Volatile Org Content %:		Spec Gravity:	N/A
VOC Pounds/Gallon:			
		PH:	N/K
VOC Grams/Liter:		Viscosity:	N/P
Evaporation Rate & Reference:	N/A		
Solubility in Water:	N/A		
Appearance and Odor:	PALE YELLOW CRYSTAL.		
Percent Volatiles by Volume:	N/A	Corrosion Rate:	N/K

========== **Reactivity Data** ========== TOP

Stability Indicator:

YES

Stability Condition To Avoid: N/A

Materials To Avoid: OXIDIZING AGENTS.

Hazardous Decomposition Products: N/A

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization N/A

:

========== **Toxicological Information** ========== TOP

Toxicological Information:

N/P

========== **Ecological Information** ========== TOP

Ecological:

N/P

========== **MSDS Transport Information** ========== TOP

Transport Information:

N/P

========== **Regulatory Information** ========== TOP

Sara Title III Information:

N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

========== **Other Information** ========== TOP

Other Information:

N/P

==========

Material Safety Data Sheet

Version 3.5
Revision Date 04/05/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Benzene
Product Number	:	12540
Brand	:	Fluka
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Carcinogen, Target Organ Effect, Irritant

Target Organs

Blood, Eyes, Female reproductive system., Bone marrowBlood, Eyes, Female reproductive system., Bone marrow

GHS Classification
Flammable liquids (Category 2)
Acute toxicity, Oral (Category 5)
Skin irritation (Category 2)
Eye irritation (Category 2A)
Germ cell mutagenicity (Category 1B)
Carcinogenicity (Category 1A)
Aspiration hazard (Category 1)
Acute aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H303	May be harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H401	Toxic to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	3
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C_6H_6

Molecular Weight : 78.11 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Benzene			
71-43-2	200-753-7	601-020-00-8	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Specific hazards arising from the chemical
Flash back possible over considerable distance. Container explosion may occur under fire conditions.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Benzene	71-43-2	TWA	0.5 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Leukemia Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed human carcinogen: The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies. Danger of cutaneous absorption			
		STEL	2.5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Leukemia Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed human carcinogen: The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies. Danger of cutaneous absorption			
		TWA	10 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.40-1969			
		CEIL	25 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.40-1969			
		Peak	50 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z2

	Z37.40-1969			
	See 1910.1028. See Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028 The final benzene standard in 1910.1028 applies to all occupational exposures to benzene except some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply.			
		TWA	0.1 ppm	USA. NIOSH Recommended Exposure Limits
	Potential Occupational Carcinogen See Appendix A			
		ST	1 ppm	USA. NIOSH Recommended Exposure Limits
	Potential Occupational Carcinogen See Appendix A			

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 5.5 °C (41.9 °F)
Boiling point	80 °C (176 °F)
Flash point	-11.0 °C (12.2 °F) - closed cup
Ignition temperature	562 °C (1,044 °F)
Autoignition temperature	562.0 °C (1,043.6 °F)
Lower explosion limit	1.3 %(V)

Upper explosion limit	8 %(V)
Vapour pressure	221.3 hPa (166.0 mmHg) at 37.7 °C (99.9 °F) 99.5 hPa (74.6 mmHg) at 20.0 °C (68.0 °F)
Density	0.874 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
acids, Bases, Halogens, Strong oxidizing agents, Metallic salts

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 2,990 mg/kg

Inhalation LC50
LC50 Inhalation - rat - female - 4 h - 44,700 mg/m3

Dermal LD50
LD50 Dermal - rabbit - 8,263 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Skin irritation

Serious eye damage/eye irritation
Eyes - rabbit - Eye irritation

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vivo tests showed mutagenic effects

Genotoxicity in vitro - Human - lymphocyte
Sister chromatid exchange

Genotoxicity in vitro - mouse - lymphocyte
Mutation in mammalian somatic cells.

Genotoxicity in vivo - mouse - Inhalation
Sister chromatid exchange

Carcinogenicity

Carcinogenicity - Human - male - Inhalation
Tumorigenic:Carcinogenic by RTECS criteria. Leukaemia Blood:Thrombocytopenia.

Carcinogenicity - rat - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Endocrine:Tumors. Leukaemia

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Human carcinogen.

IARC: 1 - Group 1: Carcinogenic to humans (Benzene)

NTP: Known to be human carcinogen (Benzene)

Reproductive toxicity
Reproductive toxicity - mouse - Intraperitoneal
Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetal death.

Teratogenicity

Developmental Toxicity - rat - Inhalation
Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Developmental Toxicity - mouse - Inhalation
Effects on Embryo or Fetus: Cytological changes (including somatic cell genetic material). Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
Nausea, Dizziness, Headache, narcosis, Inhalation of high concentrations of benzene may have an initial stimulatory effect on the central nervous system characterized by exhilaration, nervous excitation and/or giddiness, depression, drowsiness, or fatigue. The victim may experience tightness in the chest, breathlessness, and loss of consciousness. Tremors, convulsions, and death due to respiratory paralysis or circulatory collapse can occur in a few minutes to several hours following severe exposures. Aspiration of small amounts of liquid immediately causes pulmonary edema and hemorrhage of pulmonary tissue. Direct skin contact may cause erythema. Repeated or prolonged skin contact may result in drying, scaling dermatitis, or development of secondary skin infections. The chief target organ is the hematopoietic system. Bleeding from the nose, gums, or mucous membranes and the development of purpuric spots, pancytopenia, leukopenia, thrombocytopenia, aplastic anemia, and leukemia may occur as the condition progresses. The bone marrow may appear normal, aplastic or hyperplastic, and may not correlate with peripheral blood-forming tissues. The onset of effects of prolonged benzene exposure may be delayed for many months or years after the actual exposure has ceased., Blood disorders

Synergistic effects
no data available

Additional Information
RTECS: CY1400000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 5.90 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 15.00 - 32.00 mg/l - 96 h
	LC50 - Lepomis macrochirus (Bluegill) - 230.00 mg/l - 96 h
	NOEC - Pimephales promelas (fathead minnow) - 10.2 mg/l - 7 d
	LOEC - Pimephales promelas (fathead minnow) - 17.2 mg/l - 7 d
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 22.00 mg/l - 48 h
	EC50 - Daphnia magna (Water flea) - 9.20 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 29.00 mg/l - 72 h

Persistence and degradability

Biodegradability	Result: - Readily biodegradable.

Bioaccumulative potential

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d Bioconcentration factor (BCF): 10

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1114 Class: 3 Packing group: II
Proper shipping name: Benzene
Reportable Quantity (RQ): 10 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1114 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: BENZENE
Marine pollutant: No

IATA
UN number: 1114 Class: 3 Packing group: II
Proper shipping name: Benzene

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Carcinogen, Target Organ Effect, Irritant

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Benzene	71-43-2	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzene	71-43-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzene	71-43-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzene	71-43-2	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Benzene	71-43-2	2009-02-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Benzene	71-43-2	2009-02-01

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 01/02/2009
Print Date 10/29/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Barium

Product Number : 11720
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Ba
Molecular Weight : 137.34 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Barium			
7440-39-3	231-149-1	-	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Water Reactive, Irritant

HMIS Classification
Health Hazard: 2
Flammability: 3
Physical hazards: 3

NFPA Rating
Health Hazard: 2
Fire: 0
Reactivity Hazard: 1
Special hazard.: W

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	not applicable
Ignition temperature	no data available

Suitable extinguishing media
Carbon dioxide (CO2) Dry powder

Extinguishing media which shall not be used for safety reasons
Water

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up
Pick up and arrange disposal without creating dust. Do not flush with water. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage
Keep container tightly closed in a dry and well-ventilated place. Store in cool place.
Never allow product to get in contact with water during storage.

Store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	grey

Safety data

pH	no data available
Melting point	725 °C (1,337 °F)
Boiling point	1,640 °C (2,984 °F) at 1,013 hPa (760 mmHg)
Flash point	not applicable
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	3.600 g/cm3 at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks. Exposure to moisture.

Materials to avoid
Oxidizing agents, Water, acids, Oxygen, Chlorinated solvents, Carbon dioxide (CO2), Halogens, Halogenated hydrocarbon, Alcohols, Sulphur compounds, Hydrogen sulfide gas

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Barium oxide

Hazardous reactions
Reacts violently with water.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

no data available

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

Stomach/intestinal disorders, Nausea, Vomiting, Drowsiness, Dizziness, Gastrointestinal disturbance, Weakness, Tremors, Seizures.

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

Additional Information
RTECS: CQ8370000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 500 mg/l - 96 h
	LC50 - Cyprinodon variegatus (sheepshead minnow) - > 500 mg/l - 96 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1400 Class: 4.3 Packing group: II EMS-No: F-G, S-O
Proper shipping name: BARIUM
Marine pollutant: No

IATA
UN-Number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium

15. REGULATORY INFORMATION

OSHA Hazards
Water Reactive, Irritant

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Barium	7440-39-3	1991-07-01

SARA 311/312 Hazards
Reactivity Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	1991-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	1991-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	1991-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

FLINN SCIENTIFIC INC.

"Your Safer Source for Science Supplies"

Material Safety Data Sheet (MSDS)

MSDS #: 80.10
Revision Date: November 25, 2002

Section 1 — Chemical Product and Company Identification

Arsenic

Flinn Scientific, Inc. P.O. Box 219 Batavia, IL 60510 (800) 452-1261

CHEMTREC Emergency Phone Number: (800) 424-9300

Section 2 — Composition, Information on Ingredients

Arsenic

CAS#: 7440-38-2

Section 3 — Hazards Identification

Silver-grey crystalline, brittle solid, or grey powder.
Darkens upon exposure to moist air.
Moderately toxic; known Carcinogen. Avoid all body contact. May be fatal if ingested, inhaled or absorbed through the skin. Practice strict hygiene.

FLINN AT-A-GLANCE
Health-2
Flammability-1
Reactivity-1
Exposure-3
Storage-3

0 is low hazard, 3 is high hazard

Section 4 — First Aid Measures

Call a physician, seek medical attention for further treatment, observation and support after first aid.
Inhalation: Remove to fresh air at once. If breathing has stopped give artificial respiration immediately.
Eye: Immediately flush with fresh water for 15 minutes.
External: Wash continuously with fresh water for 15 minutes.
Internal: Give no more than 1-2 cups of water for dilution. Do not induce vomiting. Call a physician or poison control at once.

Section 5 — Fire Fighting Measures

Non-flammable, non-combustible solid.
Releases toxic fumes at high temperature.
Flammable in the form of dust when exposed to heat or flame or by chemical reactions.
Fire Fighting Instructions: Use triclass, dry chemical fire extinguisher. Firefighters should wear PPE and SCBA with full facepiece operated in positive pressure mode.

NFPA CODE
None Established

Section 6 — Accidental Release Measures

Restrict unprotected personnel from area. Remove all ignition sources and water . Sweep up, place in sealed bag or container and dispose. Ventilate area and wash spill site after material pickup is complete. See Sections 8 and 13 for further information.

Section 7 — Handling and Storage

Flinn Suggested Chemical Storage Pattern: Inorganic #10. Store with sulfur and phosphorus.
Store in a Flinn Chem-Saf Bag or in a Flinn Chem-Saf Cube. Store in a poison cabinet. Use and dispense in a hood.

Section 8 — Exposure Controls , Personal Protection

Avoid contact with eyes, skin and clothing. Wear chemical splash goggles, chemical-resistant gloves and chemical-resistant apron. Use ventilation to keep airborne concentrations below exposure limits. Always wear a NIOSH-approved respirator with proper cartridges or a positive pressure, air-supplied respirator when handling this material in emergency situations (spill or fire).
Exposure guidelines: TWA 0.01 mg/m3 (OSHA)

Section 9 — Physical and Chemical Properties

Silver-grey crystalline, brittle solid
Solubility: Insoluble in water. Soluble in HNO3
Formula: As
Formula Weight: 74.92

Specific Gravity: 5.72.
Melting Point: 814 C.
Sublimes at 613 C.

Section 10 — Stability and Reactivity

When heated or on contact with acid or acid fumes, it emits highly toxic fumes; can react vigorously on contact with oxidizing materials. Hydrogen gas can react with inorganic arsenic to form the highly toxic gas arsine.
Shelf life: Indefinite.

Section 11 — Toxicological Information

Acute effects: Moderately toxic
Chronic effects: OSHA regulated carcinogen
Target organs: Skin, lungs

ORL-RAT LD50: 763 mg/kg
IHL-RAT LC50: N.A.
SKN-RBT LD50: N.A.

N.A. = Not available, not all health aspects of this substance have been fully investigated.

Section 12 — Ecological Information

Data not yet available.

Section 13 — Disposal Considerations

Please consult with state and local regulations.
Flinn Suggested Disposal Method #27d is one option.

Section 14 — Transport Information

Shipping Name: Arsenic
Hazard Class: 6.1, Poison
UN Number: UN1558

N/A = Not applicable

Section 15 — Regulatory Information

TSCA-listed, EINECS-listed (231-148-6), RCRA code D004.

Section 16 — Other Information

Consult your copy of the Flinn Scientific Catalog/Reference Manual for additional information about laboratory chemicals. This Material Safety Data Sheet (MSDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. Flinn Scientific Inc. assumes no legal responsibility for use or reliance upon this data.

FLINN SCIENTIFIC INC.
"Your Safer Source for Science Supplies"

Flinn--"Your Safer Source for Chemicals"

flinn@flinnsci.com www.flinnsci.com
P.O. Box 219 Batavia IL 60510
(800) 452-1261 Fax (866) 452-1436

Material Safety Data Sheet

Version 4.1
Revision Date 10/19/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Anthracene
Product Number	:	31581
Brand	:	Fluka
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen

Target Organs

Lungs, Kidney, Bladder, Blood

Other hazards which do not result in classification
Photosensitizer., Lachrymator.

GHS Classification
Skin irritation (Category 2)
Eye irritation (Category 2A)
Specific target organ toxicity - single exposure (Category 3)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 4)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if

present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical hazards:	0

NFPA Rating

Health hazard:	0
Fire:	1
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{14}H_{10}$

Molecular Weight : 178.23 g/mol

Component		Concentration
Anthracene		
CAS-No.	120-12-7	-
EC-No.	204-371-1	

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Anthracene	120-12-7	TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	crystalline
Colour	beige

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 210 - 215 °C (410 - 419 °F) - lit.

Boiling point	340 °C (644 °F) - lit.
Flash point	121.0 °C (249.8 °F) - closed cup
Ignition temperature	540 °C (1,004 °F)
Autoignition temperature	540.0 °C (1,004.0 °F)
Lower explosion limit	0.6 %(V)
Vapour pressure	1.3 hPa (1.0 mmHg) at 145.0 °C (293.0 °F)
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 4.45
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents, Hypochlorites

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
LD50 Intraperitoneal - mouse - 430 mg/kg

Skin corrosion/irritation
Skin - mouse - Mild skin irritation

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Anthracene)
	2B - Group 2B: Possibly carcinogenic to humans (Anthracene)
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Anthracene)
	2B - Group 2B: Possibly carcinogenic to humans (Anthracene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Known to be human carcinogen (Anthracene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Possible tumor promoter., Headache, Nausea, Weakness

Synergistic effects
no data available

Additional Information
RTECS: CA9350000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 0.001 mg/l - 96.0 h
Toxicity to daphnia	EC50 - Daphnia magna (Water flea) - 0.10 mg/l - 48 h

and other aquatic
invertebrates.

Persistence and degradability

Bioaccumulative potential
Indication of bioaccumulation.

Bioaccumulation	Pimephales promelas (fathead minnow) - 42 d Bioconcentration factor (BCF): 649

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Anthracene)
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Anthracene)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Anthracene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Anthracene	120-12-7	1990-01-01

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MSDS Safety Information

TOP

FSC:	MSDS Date:	MSDS Num:
6810	03/10/1988	BHVJC

Submitter:	LIIN:	Tech Review:	Status CD:
N EN	00N010773	07/15/1989	C

Product ID:	MFN:
ALPHA−BHC,50 MG,R431020	01

Article:	Kit Part:
N	N

Cage:

Responsible Party HO582

Name:

SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:
BELLEFONTE	PA	16823−0048

Country:

NK

Info Phone Number:

814−359−3441

Emergency Phone Number:

814−359−3441

Preparer's Name:

N/P

Proprietary Ind:

N Review Ind: Y

Published: Y Special Project CD: N

Contractor Summary

TOP

Cage:	Name:
54968	SIGMA−ALDRICH INC.

Address:	Box:
3050 SPRUCE STREET	14508

City:	State:	Zip:
ST. LOUIS	MO	63103

Country:	Phone:
US	314−771−5765/414−273−3850X5996

Cage:	Name:
HO582	SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:

BELLEFONTE PA 16823−0048

Country: **Phone:**

NK 814−359−3441

Ingredients

TOP

Cas: 319−84−6 M GV3500000 M

Code: RTECS #: Code:

Name: **ALPHA−BHC (SARA III)**

% Text: N/K Environmental Wt:

Other REC Limits: N/K (FP N/ORNL)

OSHA PEL:

NOT ESTABLISHED Code: M OSHA STEL: Code:

ACGIH TLV: NOT ESTABLISHED Code: M ACGIH STEL: N/P Code:

EPA Rpt Qty: 10 LBS DOT Rpt Qty: 10 LBS

Ozone Depleting Chemical:

N

Health Hazards Data

TOP

LD50 LC50 Mixture

LD50 RAT ORAL 500 MG/KG

Route Of Entry Inds − Inhalation:YES Skin:N/P Ingestion:YES

Carcinogenicity Inds − NTP:NO IARC:YES OSHA:NO

Health Hazards Acute And Chronic

HARMFUL IF INHALED OR SWALLOWED.

Explanation Of Carcinogenicity

ALPHA−HEXACHLOROCYCLOHEXANE (BENZENE HEXACHLORIDE):SUFFICIENT EVIDENCE FOR CARCINOGENICITY IN ANIMALS (IARC 1987).

Signs And Symptions Of Overexposure

EYES/SKIN:N/K (FP N/ORNL).INGESTION:HARMFUL IF SWALLOWED.INHALATION:HARMFUL IF INHALED.

Medical Cond Aggravated By Exposure

N/K (FP N/ORNL)

First Aid

EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES.SKIN:FLUSH WITH LARGE VOLUMES OF WATER.INGESTION:NEVER GIVE ANYTHING BY MOUTH TO UNCONSCIOUS PERSON.NEVER TRY TO MAKE UNCONSCIOUS PERSON VOMIT.INHALATION: IMMEDIATELY MOVE TO FRESH AIR.GIVE OXYGEN IF BREATHING IS LABORED.CONTACT PHYSICIAN.

Spill Release Procedures

TAKE UP WITH ABSORBENT MATERIAL.AVOID GENERATING DUST.

Neutralizing Agent

N/K (FP N/ORNL)

Waste Disposal Methods

DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS (FP N).

Handling And Storage Precautions

STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.

Other Precautions

REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

========== Fire and Explosion Hazard Information ==========

TOP

Flash Point Method:

N/P

Flash Point:

Flash Point Text: N/K (FP N/ORNL)

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: N/K (FP N)

Upper Limits: N/K (FP N)

Extinguishing Media

WATER,CO*2,DRY CHEMICAL.

Fire Fighting Procedures

USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire/Explosion Hazard

TOXIC CHLORIDE VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

========== **Control Measures** ========== TOP

Respiratory Protection

NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation

LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN (FP N/ORNL).

Protective Gloves

RECOMMENDED

Eye Protection

CHEMICAL WORKERS GOGGLES (FP N).

Other Protective Equipment

N/A

Work Hygienic Practices

N/K (FP N/ORNL)

Supplemental Safety and Health

ROUTES OF ENTRY:INHALATION/INGESTION (FP N).

========== **Physical/Chemical Properties** ========== TOP

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point: B.P. Text: N/A

Melt/Freeze Pt:		M.P/F.P Text:	159C,318F
Decomp Temp:		Decomp Text:	N/K (FP N)
Vapor Pres:	N/A	Vapor Density:	N/A
Volatile Org Content %:		Spec Gravity:	N/A
VOC Pounds/Gallon:		PH:	N/K
VOC Grams/Liter:		Viscosity:	N/P
Evaporation Rate & Reference:	N/A		
Solubility in Water:	N/A		
Appearance and Odor:	WHITE SOLID.		
Percent Volatiles by Volume:	N/A	Corrosion Rate:	N/K

========== **Reactivity Data** ========== TOP

Stability Indicator:

YES

Stability Condition To Avoid: N/A

Materials To Avoid: N/A

Hazardous Decomposition Products: CHLORIDES

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization N/A

:

========== **Toxicological Information** ========== TOP

Toxicological Information:

N/P

========== **Ecological Information** ========== TOP

Ecological:

N/P

========== **MSDS Transport Information** ========== TOP

Transport Information:

N/P

========== Regulatory Information ==========

TOP

Sara Title III Information:

N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

========== Other Information ==========

TOP

Other Information:

N/P

==========

Material Safety Data Sheet

Version 4.0
Revision Date 03/14/2010
Print Date 10/23/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Aldrin
Product Number	:	36666
Brand	:	Fluka
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+18003255832
Fax	:	+18003255052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Highly toxic by ingestion, Highly toxic by skin absorption, Carcinogen

Target Organs

Central nervous system, Reproductive system., Liver, Kidney

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H300 + H310	Fatal if swallowed or in contact with skin.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P264	Wash hands thoroughly after handling.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing.
P302 + P350	IF ON SKIN: Gently wash with plenty of soap and water.
P310	Immediately call a POISON CENTER or doctor/physician.

HMIS Classification

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	4
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May cause skin irritation. May be fatal if absorbed through skin.
Eyes	May cause eye irritation.
Ingestion	May be fatal if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{12}H_8Cl_6$
Molecular Weight : 364.91 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Aldrin			
309-00-2	206-215-8	602-048-00-3	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Aldrin	309-00-2	TWA	0.25 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
Remarks	Skin notation				
		TWA	0.25 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Skin designation				
		TWA	0.05 mg/m3	2006-11-17	USA. ACGIH Threshold Limit Values (TLV)
	Skin contact does contribute to exposure. Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is lilkely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	colourless

Safety data

pH	no data available
Melting point	96.0 - 98.0 °C (204.8 - 208.4 °F)
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	1.60 g/cm3 at 20.00 °C (68.00 °F)
Water solubility	insoluble
Partition coefficient:	log Pow: 6.50

n-octanol/water

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - 39.0 mg/kg

LD50 Dermal - rabbit - 15.0 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Olfaction:Other changes. Behavioral:Convulsions or effect on seizure threshold. Behavioral:Excitement.

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Aldrin)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (GHS)
no data available

Specific target organ toxicity - repeated exposure (GHS)
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be fatal if swallowed.
Skin	May cause skin irritation. May be fatal if absorbed through skin.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Nausea, Vomiting, Headache, Tremors, Incoordination., Dizziness, Cyanosis, Seizures., Unconsciousness

Additional Information
RTECS: IO2100000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.01 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 0.03 mg/l - 48 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d Bioconcentration factor (BCF): 3,700

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s.
Reportable Quantity (RQ): 1 lbs
Marine pollutant: Severe marine pollutant
Poison Inhalation Hazard: No

IMDG
UN-Number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S.
Marine pollutant: Severe marine pollutant

IATA
UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic, n.o.s.

15. REGULATORY INFORMATION

OSHA Hazards
Highly toxic by ingestion, Highly toxic by skin absorption, Carcinogen

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Aldrin	309-00-2

SARA 302 Components

	CAS-No.	Revision Date
Aldrin	309-00-2	1987-01-01

SARA 313 Components

	CAS-No.	Revision Date
Aldrin	309-00-2	1987-01-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Aldrin	309-00-2	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Aldrin	309-00-2	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Aldrin	309-00-2	1987-01-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Aldrin	309-00-2	1990-06-15

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Section 1: Manufacturer or Supplier

Identity: "Acetone" Precision Cleaning Solvent
Date: October 12, 1999
Manufacturer: DGR Industrial Products
4435 North First Street, Suite #184
Livermore, CA 94550

Emergency Phone: (408) 221-7122

Section 2: Hazardous Ingredients/Identity Information
Hazardous Components:
2-Propanone (Dimethylketone) CAS #: 67-64-1 (99.99%)

Section 3: Physical Data

Appearance	Clear Liquid
Odor	Sweet
Physical State at STP:	Liquid
Boiling Point:	190 F
Spec. Grav. (H20 = 1.00):	.94
Vapor Density (Air = 1)	> 1
Evap Rate (Butyl Acetate = 1)	< 1
Vapor Pressure (mm Hg):	33 @ 77 F
Solubility in Water:	Complete, miscible

Section 4: Fire & Explosion Hazard Data

Class:	Class IB Flammable Liquid
Flash Point:	53 F (Tag Closed Cup)
Autoignition Temp:	n/a
Explosive Limits in Air (% by Volume at 200 F):	
Upper (UEL) =	12.7%
Lower (LEL) =	2.0%

Extinguishing Media to be Used: Dry chemical or "Alcohol" Foam

Special Fire Fighting Procedures: Wear self-contained breathing apparatus approved by NIOSH and full protective clothing. Cool containers with water spray.

Unusual Fire and Explosion Hazards: None identified

Section 5: Health Hazard Data

Primary Route of Entry: Inhalation
IDLH Level: 12,000 ppm

NIOSH/OSHA: 400 ppm

Effects of Overexposure:

- * Inhalation: Irritation of upper respiratory tract.
- * Ingestion: May cause throat irritation, dizziness, drowsiness
- * Skin Contact: May cause skin irritation.
- * Eye Contact: May cause eye irritation.

Health Effects or Risks from Exposure: No information available.

Emergency and First Aid:

Remove to fresh air. If not breathing apply artificial respiration and oxygen. Remove contaminated clothing and wash skin with water. Flush eyes with copious amounts of water for at least 15 minutes. If swallowed, induce vomiting as directed by physician. Consult physician in all cases.

Section 6: Reactivity Data

Stability: Stable
Incompatibility (Materials to Avoid): Strong oxidizing agents, strong acids, chlorine, ethylene oxide, isocyanates.
Hazardous Decomposition: None
Hazardous Polymerization: Will not occur

Section 7: Spill or Leak Procedures

Steps to be taken if spill occurs:

Evacuate area and keep personnel from fumes. Cut off any source of ignition and ventilate the spill area. Contain spill with absorbent material. Transfer absorbent and other contaminated materials to a covered metal container for disposal. Consult with Federal, State and local regulatory agencies to determine acceptable clean-up levels. Comply with Federal, State and local regulations on reporting releases.

Waste Disposal Method:

Dispose of all waste in accordance with Federal, State and local agencies.

Section 8: Special Protection Information

Respiratory Protection: Use a NIOSH approved half-mask respirator with canisters or cartridges approved for organic vapors.

Protective Gloves: Rubber

Eye Protection: Safety Goggles or Face Shield

Other Protective Equipment: Rubber apron or more comprehensive impervious clothing where gross contact is probable. Wear rubber boots when handling large volumes.

Section 9: Special Precautions

- Storage & Handling: Store in well-ventilated area away from acids or oxidizing agents.
- This material is for industrial use and should only be used under the supervision of a technically qualified individual.

Material Safety Data Sheet

Version 4.0
Revision Date 07/24/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Acenaphthylene
Product Number	:	416703
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen

GHS Label elements, including precautionary statements

Pictogram

Signal word: Warning

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	1
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	1
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{12}H_8$
Molecular Weight : 152.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Acenaphthylene			
208-96-8	205-917-1	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

pH	no data available
Melting point	78 - 82 °C (172 - 180 °F) - lit.
Boiling point	280 °C (536 °F) - lit.
Flash point	122.0 °C (251.6 °F) - closed cup
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	0.899 g/mL at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - mouse - 1,760 mg/kg
Remarks: Autonomic Nervous System:Other (direct) parasympathomimetic. Respiratory disorder Blood: Hemorrhage.

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: AB1254000

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Acenaphthylene)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Acenaphthylene	208-96-8

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Acenaphthylene	208-96-8	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Acenaphthylene	208-96-8	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 05/02/2007
Date Updated: 02/01/2006
Version 1.5

Section 1 - Product and Company Information

Product Name	ACENAPHTHENE
Product Number	A9394
Brand	SIGMA
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
ACENAPHTHENE	83-32-9	No

Formula	C12H10
Synonyms	Acenaphthylene, 1,2-dihydro- * 1,2-Dihydroacenaphthylene * peri-Ethylenenaphthalene * 1,8-Ethylenenaphthalene * Naphthyleneethylene
RTECS Number:	AB1000000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Irritant. Dangerous for the environment.
Irritating to eyes, respiratory system and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

HMIS RATING

HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give

artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLASH POINT
257 °F 125 °C Method: closed cup

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
Molecular Weight	154.21 AMU	
pH	N/A	
BP/BP Range	279 °C	760 mmHg
MP/MP Range	92 °C	
Freezing Point	N/A	
Vapor Pressure	10 mmHg	131 °C
Vapor Density	5.32 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 3.387 - 4.1 86	
Decomposition Temp.	N/A	
Flash Point	257 °F 125 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solvent: 0.1 g/ml dioxane Clear	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: May be harmful if inhaled. Material is irritating to

mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Intraperitoneal
Rat
600 MG/KG
LD50

Section 12 - Ecological Information

No data available.

ACUTE ECOTOXICITY TESTS
Test Type: LC50 Fish
Species: Cyprinodon variegatus (Sheepshead minnow)
Time: 96 h
Value: 2.2 - 3.1 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 1.7 mg/l

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96 h
Value: 0.67 mg/l

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 0.6 - 1.730 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: 1.275 - 3.450 mg/l

Test Type: EC50 Algae
Species: Selenastrum capricornutum resp.
Time: 96 h
Value: 0.520 - 0.530 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous

substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xi-N
Indication of Danger: Irritant. Dangerous for the environment.
R: 36/37/38-50/53
Risk Statements: Irritating to eyes, respiratory system and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 26-36/37/39-60-61
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Irritant. Dangerous for the environment.
Risk Statements: Irritating to eyes, respiratory system and skin. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The

MATERIAL SAFETY DATA SHEET

Date Printed: 05/22/2006
Date Updated: 01/29/2006
Version 1.9

Section 1 - Product and Company Information

Product Name	BENZO(K)FLUORANTHENE, 50MG, NEAT
Product Number	48492
Brand	SUPELCO
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
BENZO(K)FLUORANTHENE	207-08-9	Yes

Formula	C20H12
Synonyms	8,9-Benzofluoranthene * 11,12-Benzofluoranthene * 11,12-Benzo(k)fluoranthene * 2,3,1',8'-Binaphthylene * Dibenzo(b,jk)fluorene
RTECS Number:	DF6350000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic.
Irritating to eyes, respiratory system and skin. May cause cancer.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Probable Carcinogen (US). Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.
Store at 2-8°C

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are

appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid Color: Yellow Form: Fine crystals

Property	Value	At Temperature or Pressure
Molecular Weight	252.32 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	215 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Implant
Dose: 5 MG/KG
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Skin
Dose: 2820 MG/KG
Exposure Time: 47W
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Subcutaneous
Dose: 72 MG/KG
Exposure Time: 9W
Frequency: I
Result: Tumorigenic:Tumors at site or application. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

IARC CARCINOGEN LIST

Rating: Group 2B

NTP CARCINOGEN LIST

Rating: Anticipated to be a carcinogen.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 120 UG/L
Cell Type: lymphocyte
Mutation test: Mutation in mammalian somatic cells.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T-N
Indication of Danger: Toxic. Dangerous for the environment.
R: 45-50/53
Risk Statements: May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 53-45-60-61
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic.
Risk Statements: Irritating to eyes, respiratory system and skin. May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Probable Carcinogen (US). Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
NOTES: This product is subject to SARA section 313 reporting requirements.

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65

California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 03/01/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Lead
Product Number	:	391352
Brand	:	Aldrich
Product Use	:	For laboratory research purposes.

Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA	Manufacturer :	Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	:	+1 800-325-5832		
Fax	:	+1 800-325-5052		
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555		
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956		

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Carcinogen, Target Organ Effect, Harmful by ingestion., Teratogen

Target Organs

Nerves., Blood, Kidney, Female reproductive system., Male reproductive system.

GHS Classification

Acute toxicity, Oral (Category 4)
Carcinogenicity (Category 2)
Reproductive toxicity (Category 2)
Specific target organ toxicity - repeated exposure (Category 2)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word: Warning

Hazard statement(s)

H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	1
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Pb
Molecular Weight : 207.2 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Lead			
7439-92-1	231-100-4	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Lead oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Remarks	See 1910.1025			
Lead	7439-92-1	TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.			
		TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Central Nervous System impairment Hematologic effects Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.			
		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
	See Appendix C			

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 327.4 °C (621.3 °F) - lit.
Boiling point	1,740 °C (3,164 °F) - lit.
Flash point	not applicable
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong acids

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Lead oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

Genotoxicity in vivo - rat - Inhalation
Cytogenetic analysis

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Lead)
NTP:	Reasonably anticipated to be a human carcinogen (Lead)
	Reasonably anticipated to be a human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Lead)
OSHA:	1910.1025 (Lead)

Reproductive toxicity
Reproductive toxicity - rat - Inhalation
Effects on Newborn: Biochemical and metabolic.
Reproductive toxicity - rat - Oral
Effects on Newborn: Behavioral.
Reproductive toxicity - mouse - Oral
Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Teratogenicity

Developmental Toxicity - rat - Inhalation
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).

Developmental Toxicity - rat - Oral
Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow). Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Developmental Toxicity - rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Developmental Toxicity - mouse - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Suspected human reproductive toxicant

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
anemia

Synergistic effects
no data available

Additional Information
RTECS: OF7525000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 1.19 mg/l - 96.0 h
	LC50 - Micropterus dolomieui - 2.2 mg/l - 96.0 h
	mortality NOEC - Salvelinus fontinalis - 1.7 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates.	mortality LOEC - Daphnia - 0.17 mg/l - 24 h
	mortality NOEC - Daphnia - 0.099 mg/l - 24 h
Toxicity to algae	mortality EC50 - Skeletonema costatum - 7.94 mg/l - 10 d

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Oncorhynchus kisutch - 2 Weeks Bioconcentration factor (BCF): 12

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Lead)
Reportable Quantity (RQ): 10 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Lead)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen, Target Organ Effect, Harmful by ingestion., Teratogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Lead	7439-92-1	1989-07-10

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Lead	7439-92-1	1989-07-10

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.3
Revision Date 11/22/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Indeno[1,2,3-*cd*]pyrene
Product Number	:	48499
Brand	:	Supelco
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen

GHS Classification
Carcinogenicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H351 Suspected of causing cancer.

Precautionary statement(s)
P281 Use personal protective equipment as required.

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	1
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{22}H_{12}$ $C_{22}H_{12}$
Molecular Weight : 276.33 g/mol

Component		Concentration
Indeno[1,2,3-cd]pyrene		
CAS-No. EC-No.	193-39-5 205-893-2	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	163.6 °C (326.5 °F)
Boiling point	536.0 °C (996.8 °F)
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available

Evaporation rate no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Indeno[1,2,3-cd]pyrene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be human carcinogens. (Indeno[1,2,3-cd]pyrene)
	Reasonably anticipated to be a human carcinogen (Indeno[1,2,3-cd]pyrene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	2007-03-01

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Indeno[1,2,3-cd]pyrene	193-39-5	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 06/12/2009
Print Date 10/23/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Hexachlorobenzene

Product Number : 52100
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C_6Cl_6
Molecular Weight : 284.78 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Hexachlorobenzene			
118-74-1	204-273-9	602-065-00-6	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen

Target Organs

Liver

HMIS Classification

Health Hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 3
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis

			parameters		
Hexachlorobenzene	118-74-1	TWA	0.002 mg/m3	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Central Nervous System impairment Porphyrin effects Skin damage Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is lilkely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. Danger of cutaneous absorption				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	white

Safety data

pH	no data available
Melting point	227 - 229 °C (441 - 444 °F) 227 - 229 °C (441 - 444 °F)
Boiling point	323 - 326 °C (613 - 619 °F)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 10,000 mg/kg

LD50 Oral - mouse - 4,000 mg/kg

LD50 Oral - cat - 1,700 mg/kg

LD50 Oral - rabbit - 2,600 mg/kg

LD50 Oral - guinea pig - > 3,000 mg/kg

LD50 Oral - Quail - > 6,400 mg/kg

LD50 Oral - Mammal - > 5,000 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Change in motor activity (specific assay).

LC50 Inhalation - rat - 3,600 mg/m3

LC50 Inhalation - mouse - 4,000 mg/m3

LC50 Inhalation - cat - 1,600 mg/m3

LC50 Inhalation - rabbit - 1,800 mg/m3

Irritation and corrosion

no data available

Sensitisation

Skin sensitization

Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Chronic exposure

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Hexachlorobenzene)

NTP: Reasonably anticipated to be a human carcinogen (Hexachlorobenzene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.
Target Organs	Liver,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Bioaccumulation	Pimephales promelas (fathead minnow) - 32 d Bioconcentration factor (BCF): 22,000

Ecotoxicity effects

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 7.6 mg/l - 96 h
	NOEC - Pimephales promelas (fathead minnow) - > 0.0048 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 mg/l - 48 h

Further information on ecology

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2729 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobenzene
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2729 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: HEXACHLOROBENZENE
Marine pollutant: No

IATA
UN-Number: 2729 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobenzene

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer. Hexachlorobenzene	118-74-1	2007-09-28

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm. Hexachlorobenzene	118-74-1	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 12/26/2008
Print Date 10/27/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Heptachlor

Product Number : PS78
Brand : Supelco

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene

Formula : $C_{10}H_5Cl_7$
Molecular Weight : 373.32 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Heptachlor			
76-44-8	200-962-3	602-046-00-2	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen, Highly toxic by ingestion, Highly toxic by skin absorption

HMIS Classification
Health Hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating
Health Hazard: 3
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May cause skin irritation. May be fatal if absorbed through skin.

Eyes May cause eye irritation.
Ingestion May be fatal if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis

Heptachlor	76-44-8	TWA	0.05 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
Remarks	Skin contact does contribute to exposure. Confirmed animal carcinogen with unknown relevance to humans. 1994-1995 Adoption Substance identified by other sources as a suspected or confirmed human carcinogen. Refers to Appendix A -- Carcinogens.				
		TWA	0.5 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
	Skin contact does contribute to exposure.				
		TWA	0.5 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.
	Skin contact does contribute to exposure.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

pH	no data available
Melting point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 40.0 mg/kg

LD50 Dermal - rat - 119.0 mg/kg

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	Group 2B - The agent (mixture) is possibly carcinogenic to humans. (Heptachlor)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May cause skin irritation. May be fatal if absorbed through skin.
Eyes	May cause eye irritation.
Ingestion	May be fatal if swallowed.

Additional Information
RTECS: PC0700000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Bioaccumulation	Pimephales promelas (fathead minnow) - 276 d Bioconcentration factor (BCF): 23,814

Ecotoxicity effects

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.007 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	LC50 - Daphnia magna (Water flea) - 0.078 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solids, organic, n.o.s. (Heptachlor)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2811 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Heptachlor)
Marine pollutant: No

IATA
UN-Number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solid, organic n.o.s. (Heptachlor)

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen, Highly toxic by ingestion, Highly toxic by skin absorption

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Heptachlor	76-44-8

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Heptachlor	76-44-8	1987-01-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Heptachlor	76-44-8	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Heptachlor	76-44-8	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Heptachlor	76-44-8	1987-01-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer. Heptachlor	76-44-8	1992-11-09

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm. Heptachlor	76-44-8	1992-11-09

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 10/25/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Fluorene
Product Number	:	128333
Brand	:	Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
No known OSHA hazards

Not a dangerous substance according to GHS.

HMIS Classification

Health hazard: 1
Flammability: 1
Physical hazards: 0

NFPA Rating

Health hazard: 1
Fire: 1
Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula	:	$C_{13}H_{10}$
Molecular Weight	:	166.22 g/mol

No ingredients are hazardous according to HCS criteria.

4. FIRST AID MEASURES

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIREFIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	crystalline
Colour	white

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 111 - 114 °C (232 - 237 °F) - lit.
Boiling point	298 °C (568 °F) - lit.
Flash point	151.0 °C (303.8 °F) - closed cup
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50

no data available

Other information on acute toxicity
LD50 Intraperitoneal - mouse - > 2.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: LL5670000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Fish - 0.82 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Remarks: no data available
Toxicity to algae	EC50 - Algae - 3.4 mg/l - 96 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 24 h Bioconcentration factor (BCF): 512

Mobility in soil
Adsorbs on soil.

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s.
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Fluorene)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Fluorene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.2
Revision Date 05/19/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Fluoranthene
Product Number	:	423947
Brand	:	Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Harmful by ingestion., Carcinogen

GHS Classification
Acute toxicity, Oral (Category 4)
Acute toxicity, Dermal (Category 5)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H313	May be harmful in contact with skin.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	1
Physical hazards:	0

NFPA Rating

Health hazard:	1
Fire:	1
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Benzo[*j*,*k*]fluorene

Formula : $C_{16}H_{10}$

Molecular Weight : 202.25 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Fluoranthene			
206-44-0	205-912-4	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 105 - 110 °C (221 - 230 °F) - lit.
Boiling point	384 °C (723 °F) - lit.
Flash point	198.0 °C (388.4 °F) - closed cup
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available

Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 2,000 mg/kg

Inhalation LC50
no data available

Dermal LD50
LD50 Dermal - rabbit - 3,180 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Fluoranthene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be human carcinogens. (Fluoranthene)
	Reasonably anticipated to be a human carcinogen (Fluoranthene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: LL4025000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.0077 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 560 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 - < 0.01 mg/l - 3 d
	Immobilization EC50 - Daphnia magna (Water flea) - 0.78 mg/l - 20 h
	NOEC - Daphnia magna (Water flea) - 0.085 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Fluoranthene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
Harmful by ingestion., Carcinogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Fluoranthene	206-44-0	1990-01-01

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.2
Revision Date 04/06/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Ethylbenzene
Product Number	:	03079
Brand	:	Fluka
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Carcinogen, Irritant

Target Organs

Central nervous system, Blood

GHS Classification
Flammable liquids (Category 2)
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Oral (Category 5)
Serious eye damage (Category 1)
Acute aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H303	May be harmful if swallowed.
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H401	Toxic to aquatic life.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P280	Wear protective gloves/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard: 2
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

NFPA Rating

Health hazard: 3
Fire: 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C_8H_{10}
Molecular Weight : 106.17 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Ethylbenzene			
100-41-4	202-849-4	601-023-00-4	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

hygroscopic

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Ethylbenzene	100-41-4	TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.				
		STEL	125 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.			
		TWA	100 ppm 435 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	125 ppm 545 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m3 is approximate.			
		TWA	100 ppm 435 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	125 ppm	USA. NIOSH Recommended Exposure Limits

			545 mg/m3	

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -95 °C (-139 °F) - lit.
Boiling point	136 °C (277 °F) - lit.
Flash point	15.0 °C (59.0 °F) - closed cup
Ignition temperature	432 °C (810 °F)
Autoignition temperature	432.0 °C (809.6 °F)
Lower explosion limit	1 %(V)
Upper explosion limit	6.7 %(V)
Vapour pressure	25.3 hPa (19.0 mmHg) at 37.7 °C (99.9 °F) 13.3 hPa (10.0 mmHg) at 20.0 °C (68.0 °F)
Density	0.867 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 2.92
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Inhalation LC50
Dermal LD50
LD50 Dermal - rabbit - 15,433 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
Eyes - rabbit - Risk of serious damage to eyes.

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Ethylbenzene)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
Central nervous system depression, Nausea, Headache, Vomiting, Ataxia., Tremors

Synergistic effects
no data available

Additional Information
RTECS: DA0700000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Cyprinodon variegatus (sheepshead minnow) - 88.00 mg/l - 96 h
	LC50 - Lepomis macrochirus (Bluegill) - 80.00 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 88 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 4.2 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 2.90 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1175 Class: 3 Packing group: II
Proper shipping name: Ethylbenzene
Reportable Quantity (RQ): 1000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1175 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ETHYLBENZENE
Marine pollutant: No

IATA
UN number: 1175 Class: 3 Packing group: II
Proper shipping name: Ethylbenzene

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Carcinogen, Irritant

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Ethylbenzene	100-41-4	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Ethylbenzene	100-41-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Ethylbenzene	100-41-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Ethylbenzene	100-41-4	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Ethylbenzene	100-41-4	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 08/23/2008
Print Date 10/29/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Endrin

Product Number : 36672
Brand : Riedel

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C12H8Cl6O
Molecular Weight : 380.91 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Endrin			
72-20-8	200-775-7	602-051-00-X	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Highly toxic by ingestion, Highly toxic by skin absorption

Target Organs

Central nervous system

HMIS Classification

Health Hazard: 4
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 4
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May cause skin irritation. May be fatal if absorbed through skin.
Eyes May cause eye irritation.

Ingestion May be fatal if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Endrin	72-20-8	TWA	0.1 mg/m3	1996-05-18	US. American Conference

					of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
Remarks	Skin contact does contribute to exposure. The agent (mixture , or exposure circumstance) is not classifiable as to its carcinogenicity to humans . Refers to Appendix A -- Carcinogens. 1996 Adoption				
		TWA	0.1 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
	Skin contact does contribute to exposure.				
		TWA	0.1 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.
	Skin contact does contribute to exposure.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	colourless

Safety data

pH	no data available
Melting point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Water solubility	insoluble
Partition coefficient: n-octanol/water	log Pow: 5.20

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Thermal decomposition
226.0 °C (438.8 °F)

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 3.0 mg/kg

LD50 Dermal - rabbit - 60.0 mg/kg

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: Group 3 - Not classifiable as to carcinogenicity to humans (Endrin)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May cause skin irritation. May be fatal if absorbed through skin.
Eyes	May cause eye irritation.
Ingestion	May be fatal if swallowed.
Target Organs	Central nervous system,

Additional Information
RTECS: IO1575000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Bioaccumulation	Pimephales promelas (fathead minnow) - 56 d Bioconcentration factor (BCF): 13,000

Ecotoxicity effects

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - < 0.001 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia pulex (Water flea) - 0.02 mg/l - 48 h
	Immobilization EC50 - Daphnia magna (Water flea) - 0.0042 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Endrin)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Endrin)
Marine pollutant: No

IATA

UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic n.o.s. (Endrin)

15. REGULATORY INFORMATION

OSHA Hazards
Highly toxic by ingestion, Highly toxic by skin absorption

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Endrin	72-20-8

SARA 302 Components

	CAS-No.	Revision Date
Endrin	72-20-8	1989-12-01

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Endrin	72-20-8	1989-12-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Endrin	72-20-8	1989-12-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Endrin	72-20-8	1989-12-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm. Endrin	72-20-8	1998-05-15

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MSDS Safety Information

TOP

FSC:	MSDS Date:	MSDS Num:
6810	03/10/1988	BHYRF

Submitter:	LIIN:	Tech Review:	Status CD:
N EN	00N010650	07/15/1989	C

Product ID: MFN:

ENDOSULFAN SULFATE 0.1 G,48580 01

Article: **Kit Part:**

N N

Cage:

Responsible Party HO582

Name:

SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:
BELLEFONTE	PA	16823−0048

Country:

NK

Info Phone Number:

814−359−3441

Emergency Phone Number:

814−359−3441

Preparer's Name:

N/P

Proprietary Ind:

N Review Ind: Y

Published: Y Special Project CD: N

Contractor Summary

TOP

Cage:	Name:
54968	SIGMA−ALDRICH INC.

Address: **Box:**

3050 SPRUCE STREET 14508

City:	State:	Zip:
ST. LOUIS	MO	63103

Country:	Phone:
US	314−771−5765/414−273−3850X5996

Cage:	Name:
HO582	SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:

BELLEFONTE PA 16823−0048

Country: **Phone:**

NK 814−359−3441

Ingredients

TOP

Cas: 1031−07−8 M RB9150000 M

Code: RTECS #: Code:

Name: **ENDOSULFAN SULFATE (SARA III)**

% Text: N/K Environmental Wt:

Other REC Limits: N/K (FP N/ORNL)

OSHA PEL:

NOT ESTABLISHED Code: M OSHA STEL: Code:

ACGIH TLV: NOT ESTABLISHED Code: M ACGIH STEL: N/P Code:

EPA Rpt Qty: 1 LB DOT Rpt Qty: 1 LB

Ozone Depleting Chemical:

N

Health Hazards Data

TOP

LD50 LC50 Mixture

N/A

Route Of Entry Inds − Inhalation:YES Skin:NO Ingestion:YES

Carcinogenicity Inds − NTP:NO IARC:NO OSHA:NO

Health Hazards Acute And Chronic

HARMFUL IF INHALED OR SWALLOWED.

Explanation Of Carcinogenicity

REPORTED ANIMAL CARCINOGEN (MFR).

Signs And Symptions Of Overexposure

EYES/SKIN:N/K (FP N/ORNL).INGESTION/INHALATION:HARMFUL.

Medical Cond Aggravated By Exposure

N/K (FP N/ORNL)

First Aid

EYES:FLUSH W/ H*2O FOR AT LEAST 15 MIN.SKIN:FLUSH W/ LARGE VOLUMES OF WATER.INGESTION:CALL MD IMMEDIATELY (FP N).INHALATION:IMMEDIATELY MOVE TO FRESH AIR.GIVE OXYGEN IF BREATHING IS LABORED.CONTACT MD .

Spill Release Procedures

TAKE UP WITH ABSORBENT MATERIAL.AVOID GENERATING DUST.

Neutralizing Agent

N/K (FP N/ORNL)

Waste Disposal Methods

DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS (FP N).

Handling And Storage Precautions

STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.AVOID GENERATING DUST.

Other Precautions

AVOID EYE OR SKIN CONTACT.REPORTED CANCER HAZARD (MFR).

========== Fire and Explosion Hazard Information ==========

TOP

Flash Point Method:

N/P

Flash Point:

Flash Point Text: N/K (FP N/ORNL)

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: N/K (FP N)

Upper Limits: N/K (FP N)

Extinguishing Media

WATER,CO*2,DRY CHEMICAL.

Fire Fighting Procedures

USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire/Explosion Hazard

TOXIC VAPORS OF CHLORIDES AND SO*X ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

========== **Control Measures** ========== TOP

Respiratory Protection

NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation

LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN (FP N/ORNL).

Protective Gloves

RECOMMENDED

Eye Protection

CHEMICAL WORKERS GOGGLES (FP N).

Other Protective Equipment

N/A

Work Hygienic Practices

N/K (FP N/ORNL)

Supplemental Safety and Health

ROUTES OF ENTRY:INHALATION/SKIN/INGESTION (FP N).

========== **Physical/Chemical Properties** ========== TOP

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point: B.P. Text: N/A

Melt/Freeze Pt: M.P/F.P Text: N/A

Decomp Temp:		Decomp Text:	N/K (FP N)
Vapor Pres:	N/A	Vapor Density:	N/A
Volatile Org Content %:		Spec Gravity:	N/A
VOC Pounds/Gallon:			
		PH:	N/K
VOC Grams/Liter:		Viscosity:	N/P
Evaporation Rate & Reference:	N/A		
Solubility in Water:	N/A		
Appearance and Odor:	N/K (FP N/ORNL)		
Percent Volatiles by Volume:	N/A	Corrosion Rate:	N/K

========== **Reactivity Data** ========== TOP

Stability Indicator:

YES

Stability Condition To Avoid: N/A

Materials To Avoid: N/A

Hazardous Decomposition Products: CHLORIDES AND SO*X.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization N/A

:

========== **Toxicological Information** ========== TOP

Toxicological Information:

N/P

========== **Ecological Information** ========== TOP

Ecological:

N/P

========== **MSDS Transport Information** ========== TOP

Transport Information:

N/P

========== Regulatory Information ==========

TOP

Sara Title III Information:

N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

========== Other Information ==========

TOP

Other Information:

N/P

==========

Back

Chem Service Inc.
Material Safety Data Sheet

Date: Tuesday, March 22, 2005
Last Revised Date: 4/24/03

SECTION 1 - CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Catalog Number: F203
Description: b-Endosulfan
Other Name(s): 1,4,5,6,7,7-Hexachloro-5-norborene-2,3-dimethanol cyclic sulfite beta/beta-Endosulfan

Supplied by CHEM SERVICE, Inc. PO BOX 599, WEST CHESTER, PA 19381 (610)-692-3026
EMERGENCY PHONE: 1-610-692-3026

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS No.: 33213-65-9
Description: b-Endosulfan
EINECS No.: Not Available
Hazard Symbols: Not Available

SECTION 3 - HAZARDS IDENTIFICATION

Contact lenses should not be worn in the laboratory.All chemicals should be considered hazardous - Avoid direct physical contact!
May be harmful if absorbed through the skin. May be harmful if inhaled. May be harmful if swallowed. Can cause nervous system injury. Exposure can cause liver damage. Exposure can cause kidney damage. Based on the toxicity of compounds of similar structure this material is probably highly hazardous.

SECTION 4 - FIRST AID MEASURES

An antidote is a substance intended to counteract the effect of a poison. It should be administered only by a physician or trained emergency personnel. Medical advice can be obtained from a POISON CONTROL CENTER.
In case of contact: Flush eyes continuously with water for 15-20 minutes. Flush skin with water for 15-20 minutes. If no burns have occurred-use soap and water to cleanse skin. If inhaled remove patient to fresh air. Administer oxygen if patient is having difficulty breathing. If patient has stopped breathing administer artificial respirations. If patient is in cardiac arrest administer CPR. Continue life supporting measures until medical assistance has arrived. Remove and wash contaminated clothing. If patient is exhibiting signs of shock - Keep warm and quiet. Contact Poison Control Center immediately if necessary. Do not administer liquids or induce vomiting to an unconscious or convulsing person. If patient is vomiting-watch closely to make sure airway does not become obstructed by vomit. Get medical attention if necessary. ANTIDOTE: A short acting barbituate for central nervouse system symptoms; Diazepam for convulsions; If ingested induce emesis administer Magnesium Sulfateand observe.

SECTION 5 - FIRE AND EXPLOSION DATA

Flash Point: Not Available
Extinguishing Media: Carbon dioxide, dry chemical powder or spray.

Upper Explosion Limit: Not Available
Lower Explosion Limit: Not Available
Autoignition Temperature: Not Available
NFPA Hazard Rating: Not Available

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills or leaks: Evacuate area. Wear appropriate OSHA regulated equipment. Ventilate area. Sweep up and place in an appropriate container. Hold for disposal.

Wash contaminated surfaces to remove any residues. Remove contaminated clothing and wash before reuse.

SECTION 7 - HANDLING AND STORAGE

Handling:
This chemical should be handled only in a hood. Eye shields should be worn.
Use appropriate OSHA/MSHA approved safety equipment.
Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation
Wash thoroughly after handling.

Storage:
Store in a cool dry place. Store only with compatible chemicals. Store only with compatible chemicals.
Keep tightly closed.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION
OSHA PEL (TWA): Not Available
ACGIH TLV (TWA): Not Available
ACGIH TLV (STEL): Not Available

Personal Protective Equipment
Eyes: Wear Safety Glasses.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirator's use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Color: White
Phase: Crystalline solid
Melting Point: 213.3 C
Boiling Point: Not Available
Specific Gravity: Not Available
Vapor Density: 1.745 mm@2
Vapor Preasure: Not Available
Solubility in Water: Insoluble (immiscible)
Odor: Not Available
Evaporation Rate (Butyl acetate=1): Not Available
Molecular Weight: 406.91
Molecular Formula: C9H6Cl6O3S

SECTION 10 - STABILITY AND REACTIVITY

Incompatible with strong bases. Reacts with water and most reactive hydrogen compounds. Readily absorbed and retained on clothing and/or shoes. Incompatible with Copper and Mercury or alkaline pesticides. Decomposes under alkaline conditions.

SECTION 11 - TOXICOLOGY INFORMATION

RTECS: Not Available
Oral Rat or Mouse LD50: 240mg/kg
Dermal Rat or Mouse LD50: Not Available
Rat or Mouse LC50 : Not Available

Carcinogenicity
OSHA: No
IARC: No
NTP: No
ACGIH: No
NIOSH: No
Other: No

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: Not Available
Environmental Fate: Not Available

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL: Burn in a chemicals incinerator equipped with an afterburner and scrubber.

SECTION 14 - TRANSPORTATION INFORMATION

Not regulated as a hazardous material.

SECTION 15 - REGULATORY INFORMATION

European Labeling in Accordance with EC Directives
Hazard Symbols: Not Available

Risk Phrases: Not Available

Safety Phrase: Not Available

SECTION 16 - OTHER INFORMATION

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded MSDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Material Safety Data Sheet (MSDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an MSDS for a solution or mixture the user should refer to the MSDS for every component of the solution or mixture. Chem Service warrants that this MSDS is based upon the most current information available to Chem Service at the time it

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EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR
ANY PARTICULAR PURPOSE. This MSDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE
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Back

Chem Service Inc.
Material Safety Data Sheet

Date: Monday, March 21, 2005
Last Revised Date: 4/24/03

SECTION 1 - CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Catalog Number: F202
Description: a-Endosulfan
Other Name(s): 1,4,5,6,7,7-Hexachloro-5-norborene-2,3-dimethanol cyclic sulfite alpha

Supplied by CHEM SERVICE, Inc. PO BOX 599, WEST CHESTER, PA 19381 (610)-692-3026
EMERGENCY PHONE: 1-610-692-3026

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS No.: 959-98-8
Description: a-Endosulfan
EINECS No.: Not Available
Hazard Symbols: Not Available

SECTION 3 - HAZARDS IDENTIFICATION

Contact lenses should not be worn in the laboratory.All chemicals should be considered hazardous - Avoid direct physical contact!
May be fatal if absorbed through the skin! May be fatal if inhaled! May be fatal if swallowed! Exposure can cause liver damage. Exposure can cause kidney damage. Can cause nervous system injury. Based on the toxicity of compounds of similar structure this material is probably highly hazardous.

SECTION 4 - FIRST AID MEASURES

An antidote is a substance intended to counteract the effect of a poison. It should be administered only by a physician or trained emergency personnel. Medical advice can be obtained from a POISON CONTROL CENTER.
In case of contact: Flush eyes continuously with water for 15-20 minutes. Flush skin with water for 15-20 minutes. If no burns have occurred-use soap and water to cleanse skin. If inhaled remove patient to fresh air. Administer oxygen if patient is having difficulty breathing. If patient has stopped breathing administer artificial respirations. If patient is in cardiac arrest administer CPR. Continue life supporting measures until medical assistance has arrived. Remove and wash contaminated clothing. If patient is exhibiting signs of shock - Keep warm and quiet. Contact Poison Control Center immediately if necessary. Do not administer liquids or induce vomiting to an unconscious or convulsing person. If patient is vomiting-watch closely to make sure airway does not become obstructed by vomit. Get medical attention if necessary. ANTIDOTE: A short acting barbituate for central nervouse system symptoms; Diazepam for convulsions; If ingested induce emesis administer Magnesium Sulfateand observe.

SECTION 5 - FIRE AND EXPLOSION DATA

Flash Point: Not Available
Extinguishing Media: Carbon dioxide, dry chemical powder or spray.
Upper Explosion Limit: Not Available

Lower Explosion Limit: Not Available
Autoignition Temperature: Not Available
NFPA Hazard Rating: Not Available

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills or leaks: Evacuate area. Wear appropriate OSHA regulated equipment. Ventilate area. Sweep up and place in an appropriate container. Hold for disposal.

Wash contaminated surfaces to remove any residues. Remove contaminated clothing and wash before reuse.

SECTION 7 - HANDLING AND STORAGE

Handling:
This chemical should be handled only in a hood. Eye shields should be worn.
Use appropriate OSHA/MSHA approved safety equipment.
Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation
Wash thoroughly after handling.

Storage:
Store in a cool dry place. Store only with compatible chemicals. Store only with compatible chemicals.
Keep tightly closed.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION
OSHA PEL (TWA): Not Available
ACGIH TLV (TWA): 0.1 mg/m3 skin
ACGIH TLV (STEL): Not Available

Personal Protective Equipment
Eyes: Wear Safety Glasses.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirator's use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Color: White
Phase: Crystalline solid
Melting Point: 108-110 C
Boiling Point: Not Available
Specific Gravity: Not Available
Vapor Density: 1.745 mm@2
Vapor Preasure: Not Available
Solubility in Water: Insoluble (immiscible)
Odor: Not Available
Evaporation Rate (Butyl acetate=1): Not Available
Molecular Weight: 406.93
Molecular Formula: C9 H6 Cl6 O3 S

SECTION 10 - STABILITY AND REACTIVITY

Incompatible with strong bases. Reacts with water and most reactive hydrogen compounds. Readily absorbed and retained on clothing and/or shoes.

SECTION 11 - TOXICOLOGY INFORMATION

RTECS: Not Available
Oral Rat or Mouse LD50: 76mg/kg
Dermal Rat or Mouse LD50: Not Available
Rat or Mouse LC50 : Not Available

Carcinogenicity
OSHA: No
IARC: No
NTP: No
ACGIH: No
NIOSH: No
Other: No

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: Not Available
Environmental Fate: Not Available

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL: Burn in a chemicals incinerator equipped with an afterburner and scrubber.

SECTION 14 - TRANSPORTATION INFORMATION

UN Number: UN2811
Class: 6.1
Packing Group: III
Proper Shipping Name: TOXIC SOLID, ORGANIC, NOS*

SECTION 15 - REGULATORY INFORMATION

European Labeling in Accordance with EC Directives
Hazard Symbols: Not Available

Risk Phrases: Not Available

Safety Phrase: Not Available

SECTION 16 - OTHER INFORMATION

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded MSDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED

as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Material Safety Data Sheet (MSDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an MSDS for a solution or mixture the user should refer to the MSDS for every component of the solution or mixture. Chem Service warrants that this MSDS is based upon the most current information available to Chem Service at the time it

was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY,
EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR
ANY PARTICULAR PURPOSE. This MSDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE
FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES.

This product is furnished FOR LABORATORY USE ONLY!

Material Safety Data Sheet

Catalog Number: 157672
Revision date: 24-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 157672

Product name: DIELDRIN

Synonyms: Alvit, Dieldrex
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
DIELDRIN	60-57-1	90 - 100%	0.25 mg/m³ TWA	0.25 mg/m³ TWA

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful to flora, fauna, soil organisms and aquatic organisms., Very toxic: danger of very serious irreversible effects in contact with skin. May also have serious irreversible effects through inhalation or ingestion.

Category of Danger:
Very Toxic , Dangerous for the environment , Carc. cat. 3

Principle routes of exposure: Skin
Inhalation: Harmful: possible risk of irreversible effects through inhalation.
Ingestion: Harmful: danger of serious damage to health if ingested.
Skin contact: Very Toxic: danger of serious damage to health by prolonged skin contact.
Eye contact: Risk of serious damage to eyes

Statements of hazard Very toxic in contact with skin
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Statement of First Aid (Insert POISON with Skull & Crossbones)
Call a physician immediately. If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.
Precautions - ANSI Label Do not taste or swallow. Wash thoroughly after handling. Avoid contact with skin, eyes and clothing Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not breathe vapors or spray mist

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician Remove and wash contaminated clothing before re-use
Ingestion: Call a physician immediately. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Drink 1 or 2 glasses of water. Induce vomiting if person is conscious.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	2
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep containers tightly closed in a cool, well-ventilated place. Keep container tightly closed in a dry and well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	White to light brown; odorless or mild chemical odor
Physical state:	Solid
Formula:	C12H8Cl6O
Molecular weight:	380.93
Melting point/range:	177 °C
Boiling point/range:	Decomposes upon boiling.
Density:	1.75 (water = 1)
Vapor pressure:	Less than 8 x 10-7 mm Hg at 20 °C 7.78 x 10-7 mm Hg at 25 °C
Evaporation rate:	No data available
Vapor density:	13.2 (air = 1)
Solubility (in water):	Practically not soluble
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Chloride/Hydrochloric acid
Materials to avoid:	-

Strong oxidizers, active metals like sodium, strong acids, phenols

Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	**RTECS Number:**	**Selected LD50s and LC50s**
DIELDRIN	IO1750000	Inhalation LC50 Rat : 13 mg/m³/4H Oral LD50 Rat : 38300 ug/kg Oral LD50 Mouse : 38 mg/kg Dermal LD50 Rabbit : 250 mg/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	Possible carcinogen
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

Components	**NIOSH - Health Effects**	**NIOSH - Target Organs**
DIELDRIN		CNS, liver, skin, kidneys (in animals: lung, liver, thyroid and adrenal gland tumors)

12. ECOLOGICAL INFORMATION

Mobility:	No data available

Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
DIELDRIN	Not Listed	DOT regulated severe marine pollutant	Original entry

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
DIELDRIN	3	0.03 ug/L	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
DIELDRIN	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
DIELDRIN	Rank (of 275): 018	Not Listed	Maximum concentration = 0.24 ug/L; continuous concentration = 0.056 ug/L

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
DIELDRIN	Water and organisms = 0.00014 ug/L; organisms only = 0.00014 ug/L	Maximum concentration = 0.71 ug/L; continuous concentration = 0.0019 ug/L

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: 2761

DOT:

Proper shipping name: Organochlorine, pesticide, solid, toxic
IATA Hazard Label(s): Toxic
Hazard Class 6.1 **-**
Toxic substances - dermal
Packing group: II

Emergency Response Guide Number (ERG): 151

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
DIELDRIN	RQ = 1 pound (0.454 kg); also listed as 2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-,(1a.alpha.,2.beta.,2a.alpha.,3.beta.,6.beta.,6a.alpha.,7.beta.,7a.a

TDG (Canada):

WHMIS hazard class: D1b toxic materials

:

IMDG/IMO

Proper shipping name: Organochlorine, pesticide, solid, toxic

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
DIELDRIN	Not Listed	DOT regulated severe marine pollutant

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
DIELDRIN	
Inventory - United States TSCA - Sect. 8(b)	Not Listed
Canada DSL Inventory List -	Not Listed
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	200-484-5; C12H8Cl6O
Inventory - Japan:	4-299
Korean KECL:	KE-18415
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
DIELDRIN	carcinogen; initial date 7/1/88	carcinogen; extraordinarily hazardous	sn 0683	environmental hazard

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
DIELDRIN	[present]	Toxic; skin	B2 Carcinogen, Present on Great Waters or Great Lakes list	5 ug/m^3 HLV

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
DIELDRIN	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

MATERIAL SAFETY DATA SHEET

Date Printed: 05/01/2006
Date Updated: 02/05/2006
Version 1.3

Section 1 - Product and Company Information

Product Name	DIBENZOFURAN
Product Number	42980
Brand	FLUKA
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
DIBENZOFURAN	132-64-9	Yes

Formula	C12H8O
Synonyms	2,2'-Biphenylene oxide * 2,2'-Biphenylylene oxide * Dibenzo(b,d)furan * Diphenylene oxide
RTECS Number:	HP4430000

Section 3 - Hazards Identification

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLASH POINT
266 °F 130 °C Method: closed cup

AUTOIGNITION TEMP

N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Avoid contact and inhalation. Do not get in eyes, on skin, on clothing.

STORAGE
Suitable: Keep tightly closed. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

WORK PRACTICES
Use with adequate ventilation.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks.
Hand: Rubber gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Appearance	Color: White Form: Crystals	
Property	Value	At Temperature or Pressure
Molecular Weight	168.2 AMU	
pH	N/A	

BP/BP Range	285 °C	760 mmHg
MP/MP Range	83 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	266 °F 130 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption. May cause irritation.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - MUTAGEN

Species: Hamster
Dose: 10 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Dissolve or mix the material with a combustible solvent and burn

in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
S: 22-24/25
Safety Statements: Do not breathe dust. Avoid contact with skin and eyes.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 12/16/2011
Date Updated: 05/07/2009
Version 1.4

Section 1 - Product and Company Information

Product Name	1,2:5,6-DIBENZANTHRACENE, 97% (NO BULK ORDERS ALLOWED)
Product Number	D31400
Brand	ALDRICH
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
1,2:5,6-DIBENZANTHRACENE	53-70-3	Yes

Formula C22H14
Synonyms 1,2:5,6-Benzanthracene * DB(a,h)A * 1,2,5,6-Dba *
1,2,5,6-Dibenzanthraceen (Dutch) *
1,2:5,6-Dibenzanthracene *
1,2:5,6-Dibenz(a)anthracene *
Dibenzo(a,h)anthracene *
1,2:5,6-Dibenzoanthracene * RCRA waste number U063
RTECS Number: HN2625000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic. Dangerous for the environment.
May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Target organ(s): Lungs. Liver. Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	0.004 MG/M3
Poland		NDSCh	-
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance: Physical State: Solid

Property	Value	At Temperature or Pressure
Molecular Weight	278.35 AMU	
pH	N/A	
BP/BP Range	524 °C	760 mmHg
MP/MP Range	262 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Lungs. Liver.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Intratracheal
Dose: 100 MG/KG
Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Species: Mouse
Route of Application: Oral
Dose: 4160 MG/KG
Exposure Time: 26W
Frequency: I
Result: Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse
Route of Application: Skin
Dose: 1200 MG/KG
Exposure Time: 50W
Frequency: I
Result: Tumorigenic:Tumors at site or application. Tumorigenic:Carcinogenic by RTECS criteria. Skin and Appendages: Other: Tumors.

Species: Mouse
Route of Application: Subcutaneous
Dose: 445 UG/KG
Result: Skin and Appendages: Other: Tumors. Tumorigenic:Carcinogenic by RTECS criteria. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Intravenous
Dose: 40 MG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Liver:Tumors.

Species: Mouse
Route of Application: Implant
Dose: 80 MG/KG
Result: Kidney, Ureter, Bladder:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse
Route of Application: Multiple
Dose: 40 MG/KG
Exposure Time: 12D
Frequency: I
Result: Tumorigenic:Tumors at site or application. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Guinea pig
Route of Application: Subcutaneous
Dose: 250 MG/KG
Exposure Time: 24D
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application. Lungs, Thorax, or Respiration:Tumors.

Species: Guinea pig
Route of Application: Intravenous
Dose: 30 MG/KG
Result: Tumorigenic:Tumors at site or application. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

Species: Pigeon
Route of Application: Intramuscular
Dose: 6 MG/KG
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors. Tumorigenic:Tumors at site or application.

Species: Frog
Route of Application: Intrarenal
Dose: 12 MG/KG
Result: Kidney, Ureter, Bladder:Kidney tumors. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Neoplastic by RTECS criteria.

Species: Mouse
Route of Application: Implant
Dose: 14 MG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Subcutaneous
Dose: 78 UG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Tumorigenic:Tumors at site or application.

Species: Mouse

Route of Application: Oral
Dose: 4520 MG/KG
Exposure Time: 36W
Frequency: C
Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Gastrointestinal:Tumors.

Species: Mouse
Route of Application: Implant
Dose: 200 MG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Skin
Dose: 6 UG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Skin and Appendages: Other: Tumors.

Species: Mouse
Route of Application: Subcutaneous
Dose: 6 MG/KG
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Skin
Dose: 400 MG/KG
Exposure Time: 40W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Skin and Appendages: Other: Tumors.

Species: Mouse
Route of Application: Implant
Dose: 100 MG/KG
Result: Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors. Tumorigenic:Tumors at site or application.

Species: Rat
Route of Application: Subcutaneous
Dose: 135 MG/KG
Exposure Time: 9W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Subcutaneous
Dose: 400 MG/KG
Exposure Time: 10W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Tumorigenic:Tumors at site or application.

IARC CARCINOGEN LIST

Rating: Group 2A

NTP CARCINOGEN LIST

Rating: Anticipated to be a carcinogen.

CHRONIC EXPOSURE - MUTAGEN
Result: Laboratory experiments have shown mutagenic effects.

Species: Human
Dose: 360 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Human
Dose: 100 UMOL/L
Cell Type: fibroblast
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 10 MG/L
Cell Type: Other cell types
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 100 NMOL/L
Cell Type: HeLa cell
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 54 UG/L
Cell Type: lymphocyte
Mutation test: Mutation in mammalian somatic cells.

Species: Rat
Route: Intratracheal
Dose: 25500 UG/KG
Exposure Time: 16H
Mutation test: Micronucleus test

Species: Rat
Route: Oral
Dose: 200 MG/KG
Mutation test: Morphological transformation.

Species: Rat
Dose: 100 UG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Rat
Route: Intratracheal
Dose: 25560 UG/KG
Mutation test: DNA

Species: Rat
Route: Intratracheal
Dose: 51150 UG/KG
Mutation test: Sister chromatid exchange

Species: Mouse
Route: Intraperitoneal
Dose: 500 MG/KG
Mutation test: Micronucleus test

Species: Mouse
Dose: 4250 UG/L (+S9)
Cell Type: lymphocyte
Mutation test: Mutation in microorganisms

Species: Mouse
Dose: 500 UG/L
Cell Type: fibroblast
Mutation test: Morphological transformation.

Species: Mouse
Dose: 100 UG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Mouse
Dose: 6 UMOL/L
Cell Type: liver
Mutation test: DNA

Species: Mouse
Route: Skin
Dose: 40 UMOL/KG
Mutation test: DNA

Species: Mouse
Dose: 1 MG/L
Cell Type: Other cell types
Mutation test: DNA

Species: Mouse
Dose: 1 MG/L
Cell Type: Other cell types
Mutation test: Other mutation test systems

Species: Mouse
Dose: 510 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Mouse
Dose: 510 NMOL/L
Cell Type: Embryo
Mutation test: Other mutation test systems

Species: Hamster
Dose: 56400 NMOL/L (+S9)
Cell Type: lung
Mutation test: Mutation in microorganisms

Species: Hamster
Dose: 2500 UG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Hamster
Dose: 25 UG/L
Cell Type: kidney
Mutation test: Morphological transformation.

Species: Hamster
Dose: 5 MG/L

Exposure Time: 24H
Cell Type: fibroblast
Mutation test: DNA damage

Species: Hamster
Dose: 360 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Hamster
Dose: 5 MG/L
Cell Type: kidney
Mutation test: DNA damage

Species: Hamster
Dose: 1 MG/L
Cell Type: lung
Mutation test: DNA

Species: Hamster
Dose: 1 MG/L
Cell Type: lung
Mutation test: Other mutation test systems

Species: Hamster
Dose: 1 MMOL/L
Cell Type: fibroblast
Mutation test: Cytogenetic analysis

Species: Hamster
Route: Intraperitoneal
Dose: 900 MG/KG
Exposure Time: 24H
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 500 UG/L
Cell Type: lung
Mutation test: Mutation in mammalian somatic cells.

Species: Mammal
Dose: 2 NMOL/L
Cell Type: lymphocyte
Mutation test: DNA damage

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations. (DN)Requires special label: "Contains a substance which is regulated by Dannish work environmental law due to the risk of carcinogenic properties."

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous

substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T-N
Indication of Danger: Toxic. Dangerous for the environment.
R: 45-50/53
Risk Statements: May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 53-45-60-61
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic. Dangerous for the environment.
Risk Statements: May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Wear suitable protective clothing, gloves, and eye/face protection. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Target organ(s): Lungs. Liver. Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: Yes

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MSDS Safety Information

TOP

FSC:	MSDS Date:	MSDS Num:
6810	03/10/1988	BHCDX

Submitter:	LIIN:	Tech Review:	Status CD:
N EN	00N010730	02/20/1989	C

Product ID: MFN:

DELT−BHC, 50MG,CATALOG NO 48495 01

Article: **Kit Part:**

N N

Cage:

Responsible Party HO582

Name:

SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:
BELLEFONTE	PA	16823−0048

Country:

NK

Info Phone Number:

814−359−3441

Emergency Phone Number:

814−359−3441

Preparer's Name:

N/P

Proprietary Ind:

N Review Ind: Y

Published: Y Special Project CD: N

Contractor Summary

TOP

Cage:	Name:
54968	SIGMA−ALDRICH INC.

Address: **Box:**

3050 SPRUCE STREET 14508

City:	State:	Zip:
ST. LOUIS	MO	63103

Country:	Phone:
US	314−771−5765/414−273−3850X5996

Cage:	Name:
HO582	SUPELCO,INC.

Address:

SUPELCO PARK

City:	State:	Zip:

BELLEFONTE PA 16823−0048

Country: **Phone:**

NK 814−359−3441

Ingredients

TOP

Cas: 319−86−8 M GV4550000 M

Code: RTECS #: Code:

Name: **DELTA−BHC (SARA III)**

% Text: N/K FPN Environmental Wt:

Other REC Limits: N/K FPN

OSHA PEL:

NOT ESTABLISHED Code: M OSHA STEL: Code:

ACGIH TLV: NOT ESTABLISHED Code: M ACGIH STEL: N/P Code:

EPA Rpt Qty: 1 LB DOT Rpt Qty: 1 LB

Ozone Depleting Chemical:

N

Health Hazards Data

TOP

LD50 LC50 Mixture

LD50 1000 MG/KG ORAL RAT

Route Of Entry Inds − Inhalation:NO Skin:NO Ingestion:NO

Carcinogenicity Inds − NTP:NO IARC:NO OSHA:NO

Health Hazards Acute And Chronic

ANIMAL SUSPECT(MFR).

Explanation Of Carcinogenicity

ANIMAL SUSPECT(MFR)

Signs And Symptions Of Overexposure

IRRITATES EYES,IRRITATES SKIN.

Medical Cond Aggravated By Exposure

N/K FPN.

First Aid

EYES:FLUSH WITH PLENTY OF POTABLE WATER FOR AT LEAST 15 MIN,THEN OBTAIN PROMPT MEDICAL ATTENTION (FP N).SKIN:FLUSH SKIN WITH LARGE VOLUMES OF WATER.INHALATION:IMMEDIATELY MOVE TO FRESH AIR,GIVE OXYGE N IF BREATHING IS LABORED,CONTACT A PHYSICIAN.INGESTION:CALL MD IMMEDIATELY(FPN).NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON,NEVER TRY TO MAKE AN UNCONCIOUS PERSON VOMIT.

Spill Release Procedures

SWEEP UP MATERIAL,TAKE UP WITH ABSORBENT MATERIAL.

Neutralizing Agent

N/K FPN

Waste Disposal Methods

COMPLY WITH ALL APPLICABLE FEDERAL,STATE,OR LOCAL REGULATIONS.

Handling And Storage Precautions

STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.

Other Precautions

AVOID EYE OR SKIN CONTACT.

========== Fire and Explosion Hazard Information ==========

TOP

Flash Point Method:

N/P

Flash Point:

Flash Point Text: N/A MFR

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: N/K FPN

Upper Limits: N/K FPN

Extinguishing Media

WATER,CO*2,DRY CHEMICAL.

Fire Fighting Procedures

USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT(FPN).NEAR SCBA WHWN FIGHTING A CHEMICAL FIRE(MFR).

Unusual Fire/Explosion Hazard

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION,CHLORIDES.

========== Control Measures ==========

TOP

Respiratory Protection

NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN(FPN).

Ventilation

USE ONLY IN WELL VENTILATED AREA.

Protective Gloves

N/A

Eye Protection

CHEMICAL WORKERS GOGGLES(FPN).

Other Protective Equipment

N/A

Work Hygienic Practices

OBSERVE GOOD WORK HYGIENE PRACTICES(FPN).

Supplemental Safety and Health

N/P

========== Physical/Chemical Properties ==========

TOP

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point:

B.P. Text: N/A MFR

Melt/Freeze Pt:		M.P/F.P Text:	280 F;138 C
Decomp Temp:		Decomp Text:	N/K FPN
Vapor Pres:	N/AMFR	Vapor Density:	N/AMFR
Volatile Org Content %:		Spec Gravity:	N/A MFR
VOC Pounds/Gallon:			
		PH:	N/AMFR
VOC Grams/Liter:		Viscosity:	N/P

Evaporation Rate & Reference: N/A MFR.

Solubility in Water: N/A FPN.

Appearance and Odor: WHITE POWDER

Percent Volatiles by Volume: N/AMFR Corrosion Rate: N/AMFR

========== **Reactivity Data** ========== TOP

Stability Indicator:

YES

Stability Condition To Avoid: REACT VIOLENTLY WITH KETONES AND WIDE VARIETY OF OTHER COMPOUNDS.

Materials To Avoid: N/A

Hazardous Decomposition Products: CHLORIDES.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization WILL NOT OCCUR.

:

========== **Toxicological Information** ========== TOP

Toxicological Information:

N/P

========== **Ecological Information** ========== TOP

Ecological:

N/P

========== **MSDS Transport Information** ========== TOP

Transport Information:

N/P

========== **Regulatory Information** ========== TOP

Sara Title III Information:

N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

========== **Other Information** ========== TOP

Other Information:

N/P

==========

Material Safety Data Sheet

Version 4.2
Revision Date 05/27/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Sodium cyanide
Product Number	:	380970
Brand	:	Sigma-Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Highly toxic by skin absorption

Target Organs

Central nervous system, Blood, Lungs, Cardiovascular system., Thyroid.

GHS Classification
Acute toxicity, Oral (Category 1)
Acute toxicity, Inhalation (Category 2)
Acute toxicity, Dermal (Category 1)
Acute aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H300 + H310	Fatal if swallowed or in contact with skin.
H330	Fatal if inhaled.
H400	Very toxic to aquatic life.

Precautionary statement(s)

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash hands thoroughly after handling.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P284	Wear respiratory protection.
P302 + P350	IF ON SKIN: Gently wash with plenty of soap and water.
P310	Immediately call a POISON CENTER or doctor/ physician.

HMIS Classification

Health hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 4
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be fatal if inhaled. May cause respiratory tract irritation.
Skin May be fatal if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be fatal if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : CNNa
Molecular Weight : 49.01 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Sodium cyanide			
143-33-9	205-599-4	006-007-00-5	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Dry powder

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage. Do not store near acids.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Sodium cyanide	143-33-9	TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
Remarks	Skin designation			
		C	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Upper Respiratory Tract irritation Headache Nausea Thyroid effects Danger of cutaneous absorption varies			
		TWA	5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		C	4.7 ppm 5 mg/m3	USA. NIOSH Recommended Exposure Limits
	10 minute ceiling value			

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	crystalline
Colour	white

Safety data

pH	11.0 - 12.0 at 49.0 g/l at 25 °C (77 °F)
Melting point/freezing point	Melting point/range: 563.7 °C (1,046.7 °F) - lit.
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	1 hPa (1 mmHg) at 817 °C (1,503 °F)
Density	no data available
Water solubility	ca.49 g/l at 20 °C (68 °F)
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Do not store near acids., Strong oxidizing agents, Carbon dioxide (CO_2)

Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 4.8 mg/kg
Remarks: Behavioral:Tetany. Behavioral:Ataxia. Lungs, Thorax, or Respiration:Respiratory obstruction.

Inhalation LC50
no data available

Dermal LD50

LD50 Dermal - rabbit - 10.4 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Tremor. Lungs, Thorax, or Respiration:Dyspnea.

Other information on acute toxicity
LD50 Intramuscular - rabbit - 1.666 mg/kg

LD50 Intraperitoneal - rat - 4.3 mg/kg

LD50 Intraperitoneal - mouse - 4.9 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Reproductive toxicity - rat - Oral
Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count). Paternal Effects: Testes, epididymis, sperm duct.
Reproductive toxicity - Hamster - Implant
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Specific Developmental Abnormalities: Central nervous system.

no data available

Teratogenicity

Developmental Toxicity - Hamster - Implant
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Ingestion	May be fatal if swallowed.

Skin	May be fatal if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea

Synergistic effects
no data available

Additional Information
RTECS: VZ7525000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.05 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	LC50 - Daphnia magna (Water flea) - 0.09 mg/l - 96 h
Toxicity to algae	EC50 - Nitzschia closterium - 0.051 mg/l - 72 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1689 Class: 6.1 Packing group: I
Proper shipping name: Sodium cyanide, solid
Reportable Quantity (RQ): 10 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1689 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: SODIUM CYANIDE, SOLID
Marine pollutant: No

IATA
UN number: 1689 Class: 6.1 Packing group: I

Proper shipping name: Sodium cyanide, solid

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Highly toxic by skin absorption

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Sodium cyanide	143-33-9	1993-04-24

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Sodium cyanide	143-33-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium cyanide	143-33-9	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Sodium cyanide	143-33-9	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.2
Revision Date 06/29/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Copper
Product Number	:	12806
Brand	:	Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable solid, Target Organ Effect

Target Organs

Lungs

GHS Classification
Flammable solids (Category 1)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H228	Flammable solid
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P273	Avoid release to the environment.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical hazards:	3

NFPA Rating

Health hazard:	0

Fire: 3
Reactivity Hazard: 3

Health hazard: 0
Fire: 3
Reactivity Hazard: 3

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Cu
Molecular Weight : 63.54 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Copper			
7440-50-8	231-159-6	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability
Flammable in the presence of a source of ignition, through friction or retained heat. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Copper oxides

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Copper	7440-50-8	TWA	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Irritation Gastrointestinal metal fume fever			
		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	1 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Irritation Gastrointestinal metal fume fever			
		TWA	0.1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.1 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	Turnings
Colour	light red

Safety data

pH	no data available
Melting point/freezing point	no data available
Boiling point	no data available
Flash point	no data available
Flammability (solid, gas)	The substance or mixture is a flammable solid with the subcategory 1.
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	8.940 g/cm3
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
Strong acids, Strong oxidizing agents, Acid chlorides, Halogens

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Copper oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
LD50 Intraperitoneal - mouse - 3.5 mg/kg

Skin corrosion/irritation
May irritate skin.

Serious eye damage/eye irritation
May irritate eyes.

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.

Synergistic effects
no data available

Additional Information
RTECS: GL5325000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 0.022 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	mortality NOEC - Daphnia - 0.004 mg/l - 24 h
	EC50 - Daphnia magna (Water flea) - 0.04 - 0.05 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 40 d Bioconcentration factor (BCF): 108

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3089 Class: 4.1 Packing group: II
Proper shipping name: Metal powders, flammable, n.o.s.
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3089 Class: 4.1 Packing group: II EMS-No: F-G, S-G
Proper shipping name: METAL POWDER, FLAMMABLE, N.O.S.
Marine pollutant: No

IATA
UN number: 3089 Class: 4.1 Packing group: II
Proper shipping name: Metal powder, flammable, n.o.s.

15. REGULATORY INFORMATION

OSHA Hazards
Flammable solid, Target Organ Effect

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Copper	7440-50-8	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Copper	7440-50-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Copper	7440-50-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Copper	7440-50-8	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet
Chrysene, 98%

ACC# 95251

Section 1 - Chemical Product and Company Identification

MSDS Name: Chrysene, 98%
Catalog Numbers: AC224140000, AC224140010, AC224140050, AC224145000, NC9381297, XXAC22414-300G
Synonyms: 1,2-Benzophenanthrene; Benzo(a)phenanthrene; 1,2,5,6-Dibenzonaphthalene.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
218-01-9	Chrysene	98	205-923-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: very light beige solid.
Caution! May cause eye and skin irritation. May cause respiratory tract irritation. May cause cancer in humans.
Target Organs: Liver, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: May cause respiratory tract irritation.
Chronic: May cause cancer according to animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while

removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: ; Flammability: 1; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing dust.
Storage: Store in a tightly closed container. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chrysene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Chrysene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: very light beige
Odor: Not available.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 448 deg C @ 760 mm Hg
Freezing/Melting Point:250-255 deg C
Decomposition Temperature: Not available.
Solubility: insoluble
Specific Gravity/Density: Not available.
Molecular Formula:C18H12
Molecular Weight:228.29

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 218-01-9: GC0700000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90

- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: Chrysene was mutagenic to S. Typhimurium in the presence of an exogenous metabolic system.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea LC50 = 1.9 mg/L; 2 Hr.; Unspecified Fish toxicity : LC50 (96hr) Neauthes arenacedentata >1ppm.(Rossi,S.S. et al Marine Pollut. Bull. 1978) Invertebrate toxicity : lethal treshold concentration (24hr) Daphnia Magna 0,7æg/l.(* Newsted,J.L. et al Environ. Toxicol. Chem. 1987) Bioaccumulation : 24hr Daphnia Magna log bioconcentration factor 3.7845 (*)
Environmental: Degradation studies : biodegradated by white rot fungus (Proc.Annu.Meet.Am.Wood-Preserv.Assoc.1989) May be utilised by axenic cultures of microorganisms e.g. Pseudomonas pancimobilis EPA505, which may have novel degradative systems(Mueller,J.G. et al ppl.Environ.Microbiol.1990; Mueller, J.G. et al Environ.Sci.Technol.1991).
Physical: Not found.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 218-01-9: waste number U050.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.	No information available.
Hazard Class:	9	
UN Number:	UN3077	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 218-01-9 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313

This material contains Chrysene (CAS# 218-01-9, 98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Chrysene, a chemical known to the state of California to cause cancer.
California No Significant Risk Level: CAS# 218-01-9: 0.35 æg/day NSRL (oral)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 45 May cause cancer.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardou s waste.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 218-01-9: No information available.

Canada - DSL/NDSL

CAS# 218-01-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/30/1999
Revision #5 Date: 3/15/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Version 4.1
Revision Date 03/15/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Chromium
Product Number	:	374849
Brand	:	Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect

Target Organs

Liver, Kidney

GHS Classification
Acute aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H400 Very toxic to aquatic life.

Precautionary statement(s)
P273 Avoid release to the environment.

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	0
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.

Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Cr
Molecular Weight : 52.00 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Chromium			
7440-47-3	231-157-5	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Chromium oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Chromium	7440-47-3	TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits
Remarks	See Appendix C			
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Upper Respiratory Tract & skin irritation Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.			
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	1 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	chips
Colour	light grey

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 1,857 °C (3,375 °F) - lit.
Boiling point	2,672 °C (4,842 °F) - lit.
Flash point	not applicable
Ignition temperature	no data available

Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	7.14 g/mL at 25 °C (77 °F)
Water solubility	insoluble
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong acids, Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Chromium oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Carcinogenicity - rabbit - Implant
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Musculoskeletal:Tumors.

Carcinogenicity - rat - Implant
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Blood:Lymphomas including Hodgkin's disease.
Tumorigenic:Tumors at site or application.

Carcinogenicity - rat - Intravenous
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal:Tumors. Blood:Lymphomas including Hodgkin's disease.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Chromium)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: GB4200000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	mortality NOEC - Pimephales promelas (fathead minnow) - 12 mg/l - 7 d

	mortality LOEC - Pimephales promelas (fathead minnow) - 2.4 mg/l - 7 d
	LC50 - Cyprinus carpio (Carp) - 14.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 0.07 mg/l - 48 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 30 d Bioconcentration factor (BCF): 1.03 - 1.22

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chromium)
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chromium)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chromium)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Chromium	7440-47-3	2007-07-01

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chromium	7440-47-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chromium	7440-47-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chromium	7440-47-3	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MSDS Safety Information

TOP

FSC: 6810 **NIIN:** 00−222−2639 **MSDS Date:** 02/24/1998 **MSDS Num:** CKWBP

Submitter: D DG **Tech Review:** 11/16/2000 **Status CD:** A

Product ID: 14458, CHLOROFORM **MFN:** 01

Article: N **Kit Part:** N

Responsible Party **Cage:** 91224

Name: HACH COMPANY

Box: 389

City: LOVELAND **State:** CO **Zip:** 80539

Country: US

Info Phone Number: 970−669−3050

Emergency Phone Number: 303−623−5716

Resp. Party Other MSDS No.: MSDS #: M00190

Proprietary Ind: N Review Ind: Y

Published: Y Special Project CD:

Contractor Summary

TOP

Cage: 91224 **Name:** HACH CO

Address: 5600 LINDBERGH DR **Box:** 389

City: LOVELAND **State:** CO **Zip:** 80539

Country: US **Phone:** 970−669−3050/ 303−623−5716

Item Description Information

TOP

Item Manager: S9G

Item Name: CHLOROFORM,ACS

Specification Number: O−C−265C Type/Grade/Class: NONE

Unit of Issue: BT Quantitative Expression: 00000000005PT

UI Container Qty: 4 Type of Container: BOTTLE

Ingredients

TOP

Cas: 67−66−3 Code: T **RTECS #:** FS9100000 Code: T

Name: **CHLOROFORM**

Environmental Wt:

Other REC Limits: PEL(MSDS): 2 PPM

OSHA PEL: C240 MG/M3;C50 PPM Code: T OSHA STEL: N/P Code:

ACGIH TLV:	49 MG/M3;10 PPM	Code: T	ACGIH STEL:	NOT ESTABLISHED	Code: T
EPA Rpt Qty:	10 LBS		DOT Rpt Qty:	10 LBS	

Ozone Depleting Chemical: N

Health Hazards Data

TOP

LD50 LC50 Mixture LD50 ORAL RAT = 908 MG/KG

Route Of Entry Inds − Inhalation:	YES	Skin: YES	Ingestion: N/P
Carcinogenicity Inds − NTP:	YES	IARC: YES	OSHA: NO

Health Hazards Acute And Chronic

TARGET ORGANS: CENTRAL NERVOUS SYSTEM, KIDNEY, LIVER. EYE: MAY CAUSE IRRITATION. SKIN: NO EFFECTS ARE ANTICIPATED. SKIN ABSORPTION: HARMFUL IF ABSORBED THROUGH SKIN. CAUSES: CENTRAL NERVOUS SYSTEM DEP RESSION, KIDNEY DAMAGE, LIVER DAMAGE. INGESTION: CAUSES: CENTRAL NERVOUS SYSTEM DEPRESSION, KIDNEY DAMAGE, LIVER DAMAGE. INHALATION: CAUSES: CENTRAL NERVOUS SYSTEM DEPRESSION, KIDNEY DAMAGE, LIVER D AMAGE. CHRONIC: NONE REPORTED.

Explanation Of Carcinogenicity

NTP: REASONABLE ANTICIPATED CARCINOGEN. IARC: 2B, POSSIBLY CARCINOGENIC TO HUMANS. PER MSDS IT'S LISTED BY OSHA.

Signs And Symptions Of Overexposure

NONE PROVIDED BY MFR. HMIS: IRRITATION OF EYES, CNS DEPRESSION, LIVER AND KIDNEY DAMAGE.

Medical Cond Aggravated By Exposure

PRE−EXISTING CNS DISEASE, KIDNEY AND LIVER CONDITIONS.

First Aid

EYE: IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINS. CALL PHYSICIAN. SKIN: WASH SKIN WITH SOAP & PLENTY OF WATER. INGESTION: DO NOT INDUCE VOMITING. CALL PHYSICIAN IMMEDIATELY. INHALATION: REMOVE TO FR ESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY. CALL PHYSICIAN.

Spill Release Procedures

RELEASES OF THIS MATERIAL MAY CONTAMINATE THE ENVIRONMENT. ABSORB SPILLED LIQUID WITH NON−REACTIVE SORBENT MATERIAL. STOP SPILLED MATERIAL FROM BEING RELEASED TO ENVIRONMENT. DIKE THE SPILL TO CONTAIN THE MATERIAL, RECOVER OR ABSORB IN INERT MATERIAL FOR LATER DISPOSAL.

Neutralizing Agent

DECONTAMINATE THE SPILL AREA WITH SOAP SOLUTION.

Waste Disposal Methods

EPA WASTE ID NUMBER: D022, U044. DISPOSE OF MATERIAL IN AN E.P.A. APPROVED HAZARDOUS WASTE FACILITY. EMPTY CONTAINERS: RINSE THREE TIMES WITH AN APPROPRIATE SOLVENT. DISPOSE OF EMPTY CONTAINER AS NOR MAL TRASH. DISPOSAL MUST BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

Handling And Storage Precautions

HANDLING: AVOID CONTACT WITH EYES, SKIN, CLOTHING. DO NOT BREATHE MIST OR VAPORS. WASH THOROUGHLY AFTER HANDLING. USE WITH ADEQUATE VENTILATION. MAINTAIN GENERAL INDUSTRIAL HYGIENE PRACTICES WHEN USIN G THIS PRODUCT. STORAGE: PROTECT FROM: LIGHT, AIR. STORE IN A COOL, WELL−VENTILATED PLACE.

Other Precautions

AVOID CONTACT WITH: EYES, SKIN, CLOTHING. DO NOT BREATHE: MIST/VAPOR. WASH THOROUGHLY AFTER HANDLING. USE WITH ADEQUATE VENTILATION. KEEP AWAY FROM: ALKALI METALS, ALKALIES.

Fire and Explosion Hazard Information

TOP

Flash Point Method: N/A

Flash Point:

Flash Point Text: NOT APPLICABLE

Autoignition Temp:

Autoignition Temp Text: NOT AP

Lower Limits: NOT APPLICAB

Upper Limits: NOT APPLICAB

Extinguishing Media

CARBON DIOXIDE, ALCOHOL FOAM, DRY CHEMICAL

Fire Fighting Procedures

AS IN ANY FIRE, WEAR SELF CONTAINED BREATHING APPARATUS PRESSURE−DEMAND & FULL PROTECTIVE GEAR. EVACUATE AREA & FIGHT FIRE FROM A SAFE DISTANCE. WATER RUNOFF CAN CAUSE ENVIROMENTAL DAMAGE. DIKE & COLL ECT WATER USED TO FIGHT FIRE.

Unusual Fire/Explosion Hazard

MAY REACT VIOLENTLY WITH: ALKALI METALS, ALUMINUM/ALUMINUM COMPOUNDS, STRONG BASES. THIS MATERIAL WILL NOT BURN. DURING A FIRE, CORROSIVE & TOXIC GASES MAY BE GENERATED BY THERMAL DECOPOSITION.

Control Measures

TOP

Respiratory Protection

USE A FUME HOOD TO AVOID EXPOSURE TO DUST, MIST OR VAPOR.

Ventilation

LABORATORY FUME HOOD

Protective Gloves

PVA (POLYVINYL ALCOHOL) GLOVES

Eye Protection

CHEMICAL SPLASH GOGGLES

Other Protective Equipment

LAB COAT, EYEWASH STATION, SAFETY SHOWER. .

Work Hygienic Practices

MAINTAIN GENERAL INDUSTRIAL HYGIENE PRACTICES WHEN USING THIS PRODUCT. WASH THOROUGHLY AFTER HANDLING.

Supplemental Safety and Health

DO NOT BREATH MIST/VAPORS. AVOID CONTACT WITH EYES, SKIN AND CLOTHING.

Physical/Chemical Properties

TOP

HCC: T4 NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point: =61.C, 141.8F B.P. Text:

Melt/Freeze Pt: =−64.C, −83.2F M.P/F.P Text:

Decomp Temp: Decomp Text: NONE PROVIDED BY MFR.

Vapor Pres: 159 MMHG @ 20 DEG C Vapor Density: 4.1 @B.P.

Volatile Org Content %: 100 Spec Gravity: 1.49 @ 20 DEG C (WATER=1)

VOC Pounds/Gallon: PH: NOT DETERMINED

VOC Grams/Liter: Viscosity: NONE PROVIDED BY MFR.

Evaporation Rate & Reference: C/CE. PLEASE FILL OUT THI

Solubility in Water: 1ML IN 200ML WATER @ 25C

Appearance and Odor: CLEAR, COLORLESS, LIQUID, ETHER−LIKE ODOR

Percent Volatiles by Volume: NONE PROVIDE Corrosion Rate: NOT DETERMINED

Reactivity Data

TOP

Stability Indicator: YES

Stability Condition To Avoid: EXPOSURE TO AIR. EXPOSURE TO LIGHT. EXTREME TEMPERATURES. HEATING TO DECOMPOSITION.

Materials To Avoid: ALKALI METALS, ALKALIES, ALUMINUM, CAUSTICS COATINGS (SUCH AS PAINT, VARNISH, WAX, LACQUER, ETC.) PLASTICS, RUBBER.

Hazardous Decomposition Products: HEATING TO DECOMPOSITION RELEASES TOXIC CORROSIVE FUMES OF: PHOSGENE CHLORIDES, CARBON MONOXIDE

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization WILL NOT OCCUR

:

Toxicological Information

TOP

Toxicological Information: LD50: ORAL RAT =908 MG/KG; ORAL MOUSE = 36 MG/KG. LC50: INHALATION RAT LC50 = 47,702 MG/M3/4HRS. DERMAL TOXICITY DATA: SKIN RABBIT LD50 =>20 G/KG. SKIN AND EYE IRRITATION DATA: SKIN RABBIT (DRAIZE TE ST) 500 MG/24HRS=MILD. EYE RABBIT(STANDARD DRAIZE TEST) 20 MG/24HRS= MODERATE. MUTATION DATA:SISTER CHROMATID EXCHANGE IN HUMAN LYMPHOCYTES @10 MMOL/L; DNA DAMAGE IN MAMMALIAN LYMPHOCYRES @1 MMOL/L. REPRODUCTIVE EFFECTS: ORAL RAT TDL0 (FEMALE)= 1260 MG/KG (FETOTOXICITY, MUSCULOSKELETAL ABNORMALITIES); ORAL MOUSE TDL0 (MALE)= 2177 MG/KG (REDUCED WEIGHT GAIN IN NEWBORNS, BIOCHEM & METABOLIC EFFECTS IN NEWBORN).

Ecological Information

TOP

Ecological: NO SPECIFIC ECOLOGICAL DATA AVAILABLE FOR THIS PRODUCT.

MSDS Transport Information

TOP

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Transport Information: PSN: CHLOROFORM, 6.1, UN1888, III.

========== **Regulatory Information** ========== TOP

Sara Title III Information: SARA SECTION 302 (40CFR355.30): ESH TPQ=10,000 LBS. SARA SECTION 304 (40CFR302.40):CERCLA RQ= 10 LBS. SARA SECTION 313 (40CFR372.65): THIS CHEMICAL IS SUBJECT TO THE REPORTING REQUIREMENTS OF SEC 313. RCRA: CONTAINS RCRA REGULATED SUBSTANCE. EPA WASTE ID# D022, U044. SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21): ACUTE: YES., CHRONIC: YES

Federal Regulatory Information: OSHA: THIS PRODUCT MEETS THE CRITERIA FOR A HAZARDOUS SUBSTANCE AS DEFINED IN THE HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200. US INVENTORY STATUS: TSCA LISTED: YES. (TSCA CAS #67−66−3).

State Regulatory Information: CALIFORNIA PROPOSITION 65 − THIS PRODUCT CONTAINS CHEMICAL (CHLOROFORM) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

========== **Other Information** ========== TOP

Other Information: ONLY PERSONS PROPERLY QUALIFIED TO RESPOND TO AN EMERGENCY INVOLVING HAZARDOUS SUBSTANCES MAY RESPOND TO A SPILL ACCORDING TO FEDERAL REGULATIONS (OSHA 29 CFR 1910.120(A)(V).

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Material Safety Data Sheet

Version 3.2
Revision Date 04/05/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Chlorobenzene
Product Number	:	08650
Brand	:	Fluka
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Harmful by ingestion., Carcinogen

Target Organs

Liver, Kidney, Central nervous system, Thymus., Spleen., Bone marrow, Lungs, Testes.

GHS Classification
Flammable liquids (Category 3)
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Oral (Category 4)
Acute aquatic toxicity (Category 2)
Chronic aquatic toxicity (Category 4)

GHS Label elements, including precautionary statements

Pictogram

Signal word: Warning

Hazard statement(s)

H226	Flammable liquid and vapour.
H302 + H332	Harmful if swallowed or if inhaled.
H401	Toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s): none

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	3
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C_6H_5Cl

Molecular Weight : 112.56 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Chlorobenzene			
108-90-7	203-628-5	602-033-00-1	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Chlorobenzene	108-90-7	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Liver damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.			
		TWA	75 ppm 350 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	75 ppm 350 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m3 is approximate.			
	See Appendix D - Substances with No Established RELs			

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -45 °C (-49 °F) - lit.
Boiling point	132 °C (270 °F) - lit.
Flash point	27.0 °C (80.6 °F) - closed cup
Ignition temperature	637 °C (1,179 °F)
Autoignition temperature	637.0 °C (1,178.6 °F)
Lower explosion limit	1.3 %(V)
Upper explosion limit	7.1 %(V)
Vapour pressure	15.7 hPa (11.8 mmHg) at 25.0 °C (77.0 °F)
Density	1.106 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 2.89 log Pow: 5
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 1,110 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Tremor. Behavioral:Ataxia.

Inhalation LC50
LC50 Inhalation - rat - 2965 ppm

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

Incoordination., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: CZ0175000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC100 - Leuciscus idus (Golden orfe) - 0.03 - 28 mg/l - 48.0 h
	LC50 - Cyprinodon variegatus (sheepshead minnow) - 10 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 4.5 - 7.4 mg/l - 76.0 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 6.2 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 4.30 - 16.00 mg/l - 24 h
	EC50 - No information available. - 7.60 mg/l - 24 h
	NOEC - Daphnia magna (Water flea) - < 1.4 mg/l - 11 d
	LC50 - Daphnia magna (Water flea) - 10.7 mg/l - 48 h
Toxicity to algae	EC50 - No information available. - 235.00 mg/l - 48 h
	EC50 - Pseudokirchneriella subcapitata (green algae) - 12.50 mg/l - 96 h

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d Bioconcentration factor (BCF): 75

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

Toxic to aquatic life.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1134 Class: 3 Packing group: III
Proper shipping name: Chlorobenzene
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No

Poison Inhalation Hazard: No

IMDG
UN number: 1134 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: CHLOROBENZENE
Marine pollutant: No

IATA
UN number: 1134 Class: 3 Packing group: III
Proper shipping name: Chlorobenzene

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Harmful by ingestion., Carcinogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Chlorobenzene	108-90-7	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chlorobenzene	108-90-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chlorobenzene	108-90-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chlorobenzene	108-90-7	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 07/30/2010
Print Date 10/26/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	α-Chlordane
Product Number	:	442449
Brand	:	Supelco
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+18003255832
Fax	:	+18003255052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Toxic by inhalation., Toxic by ingestion, Toxic by skin absorption, Irritant

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H302 + H332	Harmful if swallowed or if inhaled.
H311	Toxic in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.

HMIS Classification

Health hazard:	2
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	Toxic if inhaled. Causes respiratory tract irritation.
Skin	Toxic if absorbed through skin. Causes skin irritation.

Eyes	Causes eye irritation.
Ingestion	Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Molecular Weight : 208.29 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Chlordane			
5103-71-9	225-825-5	-	-

4. FIRST AID MEASURES

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	crystalline
Colour	colourless

Safety data

pH	no data available
Melting point	93.0 - 94.0 °C (199.4 - 201.2 °F)
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - 500.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	Toxic if inhaled. Causes respiratory tract irritation.
Ingestion	Toxic if swallowed.
Skin	Toxic if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Additional Information

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 0.0074 mg/l - 96 h

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 24 h Bioconcentration factor (BCF): 322

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chlordane)
Marine pollutant: Marine pollutant
Poison Inhalation Hazard: No

IMDG
UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chlordane)
Marine pollutant: Marine pollutant

IATA
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chlordane)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
Toxic by inhalation., Toxic by ingestion, Toxic by skin absorption, Irritant

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Chlordane	5103-71-9

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Carbon Tetrachloride

1 . Product and company identification

Product name : Carbon Tetrachloride

Product code : M02224

Supplier : EMD Chemicals Inc.
480 S. Democrat Rd.
Gibbstown, NJ 08027
856-423-6300 Technical Service
Monday-Friday: 8:00 -5:00 PM

Synonym : Tetrachloromethane

Material uses : Other non-specified industry: Analytical reagent.

Validation date : 8/4/2009.

In case of emergency : 800-424-9300 CHEMTREC (USA)
613-996-6666 CANUTEC (Canada)
24 Hours/Day: 7 Days/Week

2 . Hazards identification

Emergency overview : DANGER!

MAY BE FATAL IF INHALED, ABSORBED THROUGH SKIN OR SWALLOWED.
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
CAUSES DAMAGE TO THE FOLLOWING ORGANS: EYE, LENS OR CORNEA.
SUSPECT CANCER HAZARD - MAY CAUSE CANCER.
MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: KIDNEYS, LUNGS, LIVER, SKIN, EYES, CENTRAL NERVOUS SYSTEM.
ASPIRATION HAZARD.
Warning: Contains Carbon Tetrachloride, a substance which harms public and environment by destroying ozone in the upper atmosphere.

WARNING: This product contains a chemical known to the State of California to cause cancer.

Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Physical state : Liquid. [Colorless.]

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Very toxic by inhalation. Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : Very toxic if swallowed.

Skin : Very toxic in contact with skin. Irritating to skin.

Eyes : Irritating to eyes.

Potential chronic health effects

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : Causes damage to the following organs: eye, lens or cornea.
May cause damage to the following organs: kidneys, lungs, liver, skin, eyes, central nervous system (CNS).

Continued on next page

2 . Hazards identification

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	% by weight
Carbon Tetrachloride	56-23-5	100

4 . First aid measures

Eye contact : Call medical doctor or poison control center immediately. Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : Call medical doctor or poison control center immediately. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Call medical doctor or poison control center immediately. Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Call medical doctor or poison control center immediately. Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Continued on next page

6 . Accidental release measures

Spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container.

7 . Handling and storage

Handling : Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container, protected from direct sunlight. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Carbon Tetrachloride	**ACGIH (United States, 1996). Absorbed through skin.** TWA: 31 mg/m³ STEL: 63 mg/m³ **OSHA (United States, 1989).** TWA: 12.6 mg/m³ STEL: 6543210.0123456 mg/m³ **ACGIH TLV (United States, 1/2009). Absorbed through skin.** TWA: 5 ppm 8 hour(s). TWA: 31 mg/m³ 8 hour(s). STEL: 10 ppm 15 minute(s). STEL: 63 mg/m³ 15 minute(s). **OSHA PEL 1989 (United States, 3/1989).** TWA: 2 ppm 8 hour(s). TWA: 12.6 mg/m³ 8 hour(s). **OSHA PEL Z2 (United States, 11/2006).** TWA: 10 ppm 8 hour(s). CEIL: 25 ppm AMP: 200 ppm 5 minute(s). **NIOSH REL (United States, 6/2008).** STEL: 2 ppm 60 minute(s). STEL: 12.6 mg/m³ 60 minute(s).

Consult local authorities for acceptable exposure limits.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Continued on next page

8 . Exposure controls/personal protection

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: nitrile rubber

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: splash goggles

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Recommended: lab coat

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid. [Colorless.]

Color : Colorless.

Odor : Ethereal.

Molecular weight : 153.81 g/mole

Molecular formula : C-Cl4

pH : Not available.

Boiling/condensation point : 76.7°C (170.1°F)

Melting/freezing point : -22.8°C (-9°F)

Critical temperature : 282.9°C (541.2°F)

Relative density : 1.59

Vapor pressure : 12.1 kPa (91 mm Hg)

Vapor density : 5.3 [Air = 1]

Volatility : 99% (v/v)

Odor threshold : >10 ppm

Evaporation rate : 7.52 compared with(n-BUTYL ACETATE=1)

VOC : 99 (%)

Solubility : Very slightly soluble in the following materials: water

10 . Stability and reactivity

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Materials to avoid : Slightly reactive or incompatible with the following materials: oxidizing materials and alkalis.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Continued on next page

11 . Toxicological information

Acute toxicity

Product/ingredient name	Test	Route	Species	Result
Carbon Tetrachloride	LD	Intraperitoneal	Rat	0.1 mL/kg
	LD50	Dermal	Rabbit	>20 g/kg
	LD50	Intraperitoneal	Rat	1500 uL/kg
	LD50	Oral	Rat	2350 mg/kg
	LD50	Oral	Rabbit	5760 mg/kg
	LD50	Oral	Guinea pig	5760 mg/kg
	LD50	Dermal	Rat	5070 mg/kg
	LDLo	Intraperitoneal	Rat	3 mL/kg
	LDLo	Intratracheal	Rat	90 mg/kg
	LDLo	Oral	Man	429 mg/kg
	TDLo	Intraperitoneal	Rat	2 mL/kg
	TDLo	Intraperitoneal	Rat	1.5 mL/kg
	TDLo	Intraperitoneal	Rat	300 mg/kg
	TDLo	Intraperitoneal	Rat	120 mg/kg
	TDLo	Intraperitoneal	Rat	0.25 mL/kg
	TDLo	Intraperitoneal	Rat	26 uL/kg
	TDLo	Intraperitoneal	Rat	0.2 mL/kg
	TDLo	Intravenous	Rat	3200 mg/kg
	TDLo	Oral	Rat	2.5 mg/kg
	TDLo	Intraperitoneal	Rat	1 mL/kg
	TDLo	Oral	Rat	1600 mg/kg
	TDLo	Oral	Rat	0.3 mL/kg
	TDLo	Oral	Rat	800 mg/kg
	TDLo	Oral	Rat	0.25 mL/kg
	TDLo	Oral	Rat	1 g/kg
	TDLo	Oral	Rat	300 mg/kg
	TDLo	Oral	Rat	0.66 mg/kg
	TDLo	Oral	Rat	200 mg/kg
	TDLo	Oral	Rat	1 mL/kg
	TDLo	Oral	Rat	0.1 mL/kg
	TDLo	Oral	Rat	8 mg/kg
	TDLo	Oral	Rat	0.8 mL/kg
	TDLo	Parenteral	Rat	1 mL/kg
	TDLo	Subcutaneous	Rat	4000 mg/kg
	TDLo	Intraperitoneal	Rat	3 mL/kg
	TDLo	Unreported	Rat	1 mL/kg
	LC50	Inhalation Vapor	Rat	46000 mg/m3
	LC50	Inhalation Gas.	Rat	8000 ppm

Carcinogenicity

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Carbon Tetrachloride	A2	2B	-	+	Possible	-

Continued on next page

11 . Toxicological information

May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity

No known significant effects or critical hazards.

Teratogenicity

No known significant effects or critical hazards.

12 . Ecological information

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Carbon Tetrachloride	Acute LC50 125 mg/L	Fish	96 hours
	Acute LC50 43.3 mg/L Fresh water	Fish - Fathead minnow - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 8 weeks - 12 to 16 mm	96 hours
	Acute LC50 42.9 mg/L Fresh water	Fish - Fathead minnow - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 8 weeks - 12 to 16 mm	96 hours
	Acute LC50 41.4 mg/L	Fish	96 hours
	Acute LC50 27 mg/L Fresh water	Fish - Bluegill - Lepomis macrochirus - Young of the year - 0.32 to 1.2 g	96 hours
	Acute LC50 24.3 mg/L	Fish	96 hours
	Acute LC50 4.8 ml/kg Marine water	Fish - English sole - Parophrys vetulus - 78.4 g	96 hours
	Acute LC50 41400 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - 30 days - 17.4 mm - 0.098 g	96 hours
	Acute LC50 35000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <=24 hours	48 hours
	Acute LC50 27000 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	Acute LC50 10400 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - 30 days - 0.092 g	96 hours
	Acute LC50 150000 ug/L Marine water	Fish - Inland silverside - Menidia beryllina - 40 to 100 mm	96 hours
	Acute LC50 125000 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 33 to 75 mm	96 hours
	Chronic NOEC 7700 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <=24 hours	48 hours

Environmental effects : No known significant effects or critical hazards.

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

Continued on next page

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	-	Not available.	-	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Highly toxic material
Irritating material
Carcinogen
Target organ effects

U.S. Federal regulations : **United States inventory (TSCA 8b):** This material is listed or exempted.

TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Carbon Tetrachloride
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Carbon Tetrachloride : Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: Carbon Tetrachloride

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 accidental release prevention: No products were found.

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements :	Carbon Tetrachloride	56-23-5	100
Supplier notification :	Carbon Tetrachloride	56-23-5	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Massachusetts Substances : This material is listed.

New Jersey Hazardous Substances : This material is listed.

New York Acutely Hazardous Substances : This material is listed.

Pennsylvania RTK Hazardous Substances : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Carbon Tetrachloride	Yes.	No.	Yes.	No.

Canada

Continued on next page

15 . Regulatory information

WHMIS (Canada) : Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

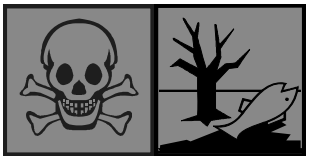
Canadian lists : **CEPA Toxic substances:** This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

CEPA DSL / CEPA NDSL : This material is listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

EU regulations

Hazard symbol or symbols :



Risk phrases : R40- Limited evidence of a carcinogenic effect.
R23/24/25- Toxic by inhalation, in contact with skin and if swallowed.
R48/23- Toxic: danger of serious damage to health by prolonged exposure through inhalation.
R52/53- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R59- Dangerous for the ozone layer.

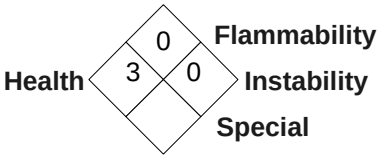
Safety phrases : S1/2- Keep locked up and out of the reach of children.
S23- Do not breathe [***].
S36/37- Wear suitable protective clothing and gloves.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S59- Refer to manufacturer/supplier for information on recovery/recycling.
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

International regulations

International lists : **Australia inventory (AICS):** This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory (ENCS): This material is listed or exempted.
Japan inventory (ISHL): This material is listed or exempted.
Korea inventory (KECI): This material is listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.

16 . Other information

National Fire Protection Association (U.S.A.) :



Notice to reader

Continued on next page

16 . Other information

The statements contained herein are based upon technical data that EMD Chemicals Inc. believes to be reliable, are offered for information purposes only and as a guide to the appropriate precautionary and emergency handling of the material by a properly trained person having the necessary technical skills. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use, storage and disposal of these materials and the safety and health of employees and customers and the protection of the environment. EMD CHEMICALS INC. MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, WITH RESPECT TO THE INFORMATION HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

Material Safety Data Sheet

Version 3.0
Revision Date 07/03/2009
Print Date 10/22/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Cadmium

Product Number : 20900
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Cd
Molecular Weight : 112.41 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Cadmium			
7440-43-9	231-152-8	048-011-00-X	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen, Highly toxic by inhalation

HMIS Classification
Health Hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating
Health Hazard: 3
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be fatal if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation. May be fatal if absorbed through skin.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	not applicable
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

Storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Cadmium	7440-43-9	TWA	0.002 mg/m3	1994-09-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Suspected human carcinogen: Human data are accepted as adequate in quality but are conflicting or insufficient to classify the agent as a confirmed human carcinogen; OR, the agent is carcinogenic in experimental animals at dose(s), by route(s) of exposure, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. The A2 is used primatrily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenitity in experimental animals with relevance to humans. Inhalable fraction. See Appendix C, paragraph A. Inhalable Particulate Mass TLVs (IPM-TLVs) for those materials that are hazardous when deposited anywhere in the respiratory tract. Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Substance identified by other sources as a suspected or confirmed human carcinogen. Refers to Appendix A -- Carcinogens.					
		TWA	0.01 mg/m3	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Kidney damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen: Human data are accepted as adequate in quality but are conflicting or insufficient to classify the agent as a confirmed human carcinogen; OR, the agent is carcinogenic in experimental animals at dose(s), by route(s) of exposure, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. The A2 is used primatrily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenitity in experimental animals with relevance to humans.				
		TWA	0.002 mg/m3	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Kidney damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen: Human data are accepted as adequate in quality but are conflicting or insufficient to classify the agent as a confirmed human carcinogen; OR, the agent is carcinogenic in experimental animals at dose(s), by route(s) of exposure, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. The A2 is used primatrily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenitity in experimental animals with relevance to humans.				
		TWA	0.1 mg/m3	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.5-1970 This standard applies to any operations or sectors for which the Cadmium standard, 1910.1027, is stayed or otherwise not in effect.				
		CEIL	0.3 mg/m3	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.5-1970 This standard applies to any operations or sectors for which the Cadmium				

	standard, 1910.1027, is stayed or otherwise not in effect.				
	See 1910.1027. See Table Z-2 for the exposure limits for any operations or sectors where the exposure limits in 1910.1027 are stayed or are otherwise not in effect.				
		TWA	0.2 mg/m3	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.5-1970 This standard applies to any operations or sectors for which the Cadmium standard, 1910.1027, is stayed or otherwise not in effect.				
		CEIL	0.6 mg/m3	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.5-1970 This standard applies to any operations or sectors for which the Cadmium standard, 1910.1027, is stayed or otherwise not in effect.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	Rods
Colour	grey

Safety data

pH	no data available
Melting point	320.9 °C (609.6 °F)
Boiling point	765 °C (1,409 °F)
Flash point	not applicable

Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	1.29 hPa (0.97 mmHg) at 394 °C (741 °F)
Density	8.65 g/mL at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Oxidizing agents, acids

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Cadmium/cadmium oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 2,330 mg/kg

LCLO Inhalation - Human - 20 h - 39 mg/m3
Remarks: Cardiac:Other changes. Vascular:Thrombosis distant from injection site. Respiratory disorder

LC50 Inhalation - rat - 30 h - 25 mg/m3
Remarks: Lungs, Thorax, or Respiration:Dyspnea.

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

IARC:	1 - Group 1: Carcinogenic to humans (Cadmium)
NTP:	Known to be human carcinogen (Cadmium)
	Known to be human carcinogenThe reference note has been added by Royal Haskoning based on the background information of the NTP. (Cadmium)
OSHA:	1910.1027 (Cadmium)

Signs and Symptoms of Exposure

Acute inhalation exposure to cadmium fumes may cause "metal fume fever" with flu-like symptoms of weakness, fever, headache, chills, nausea, vomiting, dizziness, sweating, muscular pain, cough and difficulty breathing. Acute pulmonary edema may develop within 24 hours and reaches a maximum by three days.The first chronic effect of exposure to cadmium is generally kidney damage, manifested by excretion of excessive protein in the urine, followed by anemia, teeth discoloration and loss of smell. Cadmium also is believed to cause pulmonary emphysema and bone disease.

Potential Health Effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation. May be fatal if absorbed through skin.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 72 d Bioconcentration factor (BCF): 55

Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 1.0 µg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	mortality NOEC - Daphnia - 0.019 mg/l - 24 h
	EC50 - Daphnia magna (Water flea) - 0.024 mg/l - 48 h
	mortality LOEC - Daphnia - 0.039 mg/l - 24 h
Toxicity to algae	Growth inhibition IC50 - Chaetoceros sp. - 0.028 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen, Highly toxic by inhalation

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Cadmium	7440-43-9	1993-04-24

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Cadmium	7440-43-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Cadmium	7440-43-9	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Cadmium	7440-43-9	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm. Cadmium	7440-43-9	2007-09-28

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer. Cadmium	7440-43-9	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 01/01/2011
Print Date 02/14/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : *cis*-1,2-Dichloroethene

Product Number : 48597
Brand : Supelco
Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +18003255832
Fax : +18003255052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid

Target Organs

Central nervous system, Liver, Kidney

GHS Classification
Flammable liquids (Category 2)
Acute toxicity, Inhalation (Category 4)
Acute aquatic toxicity (Category 3)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H332	Harmful if inhaled.
H402	Harmful to aquatic life.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical hazards:	1

NFPA Rating

Health hazard: 2
Fire: 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : *cis*-Acetylene dichloride
cis-1,2-Dichloroethylene

Formula : $C_2H_2Cl_2$ $C_2H_2Cl_2$
Molecular Weight : 96.94 g/mol96.94 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
cis-Dichloroethylene			
156-59-2	205-859-7	602-026-00-3	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature: 2 - 8 °C

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	light yellow

Safety data

pH	no data available
Melting/freezing point	Melting point/range: -80 °C (-112 °F) - lit.
Boiling point	60 °C (140 °F) - lit.
Flash point	6.0 °C (42.8 °F) - closed cup

Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	1.284 g/cm3 at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
Oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Inhalation LC50
LC50 Inhalation - rat - 13700 ppm
Remarks: Behavioral:Somnolence (general depressed activity). Liver:Fatty liver degeneration.

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: KV9420000

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,2-DICHLOROETHYLENE
Marine pollutant: No

IATA
UN-Number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid

DSL Status
This product contains the following components listed on the Canadian NDSL list. All other components are on the Canadian DSL list.

	CAS-No.
cis-Dichloroethylene	156-59-2

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 05/22/2006
Date Updated: 01/29/2006
Version 1.4

Section 1 - Product and Company Information

Product Name	BETA-BHC, 50MG, NEAT
Product Number	48494
Brand	SUPELCO
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
B-BENZENE HEXACHLORIDE	319-85-7	No

Formula	C6H6Cl6
Synonyms	trans-alpha-Benzenehexachloride * beta-BHC * Cyclohexane, beta-1,2,3,4,5,6-hexachloro- * Cyclohexane, 1,2,3,4,5,6-hexachloro-, beta- * Cyclohexane, 1,2,3,4,5,6-hexachloro-, trans- * ENT 9,233 * beta-HCH * beta-Hexachlorobenzene * 1-alpha,2-beta,3-alpha,4-beta,5-alpha,6-beta-Hexachlorocyclohexane * beta-Hexachlorocyclohexane * beta-1,2,3,4,5,6-Hexachlorocyclohexane * beta-Lindane
RTECS Number:	GV4375000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic. Dangerous for the environment.
Harmful in contact with skin. Toxic if swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Possible Carcinogen (US). Target organ(s): Liver. Kidneys.

HMIS RATING
HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING
HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid Color: Colorless

Property	Value	At Temperature or Pressure
Molecular Weight	290.8 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	> 300 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 3.78	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:Insoluble.	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas, Nitrogen oxides, Phosgene gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: Harmful if absorbed through skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: Toxic if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Blood. Kidneys. Liver. Central nervous system.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Rat
6000 mg/kg
LD50

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Species: Mouse
Route of Application: Oral
Dose: 18 GM/KG
Exposure Time: 2Y
Frequency: C
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Liver:Tumors.

IARC CARCINOGEN LIST
Rating: Group 2B Group 2B

NTP CARCINOGEN LIST

Rating: Anticipated to be a carcinogen.

IRIS/EPA CARCINOGEN LIST
Rating: Group C

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 672 MG/KG/
Route of Application: Oral

Exposure Time: (2W MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish
Species: Poecilia reticulata
Time: 96 h
Value: 1.6 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T-N
Indication of Danger: Toxic. Dangerous for the environment.
R: 21-25-40-50/53
Risk Statements: Harmful in contact with skin. Toxic if swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 22-36/37-45-60-61
Safety Statements: Do not breathe dust. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic. Dangerous for the environment.
Risk Statements: Harmful in contact with skin. Toxic if swallowed. Limited evidence of a carcinogenic effect. Very toxic to aquatic organisms, may cause long-term adverse effects in the

aquatic environment.
Safety Statements: Do not breathe dust. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Possible Carcinogen (US). Target organ(s): Liver. Kidneys.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: Yes

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.0
Revision Date 07/25/2010
Print Date 10/16/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Beryllium
Product Number	:	378135
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+18003255832
Fax	:	+18003255052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Carcinogen, Highly toxic by inhalation, Toxic by ingestion, Skin sensitiser, Irritant

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H301	Toxic if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H350	May cause cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves.
P284	Wear respiratory protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.

HMIS Classification

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	3
Fire:	0
Reactivity Hazard:	3

Potential Health Effects

Inhalation	May be fatal if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Be
Molecular Weight : 9.01 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
BERYLLIUM FOIL			
7440-41-7	231-150-7	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
BERYLLIUM FOIL	7440-41-7	TWA	2 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z2
Remarks	(Z37.29-1970)				
		CEIL	5 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z2
	(Z37.29-1970)				
		Peak	25 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z2
	(Z37.29-1970)				
		TWA	0.002 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	This value is from Table Z-2, 29 CFR 1910.1000				
		CEIL	0.005 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	This value is from Table Z-2, 29 CFR 1910.1000				
		Peak	0.025 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	This value is from Table Z-2, 29 CFR 1910.1000				
		TWA	0.002 mg/m3	1997-05-21	USA. ACGIH Threshold Limit Values (TLV)
	Confirmed human carcinogen: The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies.				
		STEL	0.01 mg/m3	1997-05-21	USA. ACGIH Threshold Limit Values (TLV)
	Confirmed human carcinogen: The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies.				
		TWA	2microgram per cubic meter	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z27.29-1970				
		CEIL	5microgram per cubic meter	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z27.29-1970				
		Peak	25microgram per cubic meter	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z27.29-1970				
		TWA	0.00005 mg/m3	2009-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Beryllium sens Chronic beryllium disease (berylliosis) Confirmed human carcinogen: The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies. Danger of cutaneous absorption Sensitizer				

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder

Safety data

pH	no data available
Melting point	1,278 °C (2,332 °F) - lit.
Boiling point	2,970 °C (5,378 °F) - lit.
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	1.85 g/cm3 at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Alkali metals

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity
Inhalation: Irritating to respiratory system.

Inhalation: Irritating to respiratory system.

Inhalation: Irritating to respiratory system.

LD50 Intravenous - rat - 0.496 mg/kg
Remarks: Liver:Hepatitis (hepatocellular necrosis), zonal.

LD50 Intratracheal - rat - 51 mg/kg

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
May cause allergic skin reaction.

Germ cell mutagenicity

Genotoxicity in vitro - Human - HeLa cell
DNA damage

Genotoxicity in vitro - mouse - Ascites tumor
DNA damage

Carcinogenicity

Carcinogenicity - rat - Intratracheal
Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.

Carcinogenicity - rabbit - Intravenous
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Musculoskeletal:Tumors.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (BERYLLIUM FOIL)
NTP:	Known to be human carcinogen (BERYLLIUM FOIL)
	Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (BERYLLIUM FOIL)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
May cause respiratory irritation.
May cause respiratory irritation.
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be fatal if inhaled. Causes respiratory tract irritation.
Ingestion	Toxic if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Additional Information
RTECS: DS1750000

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium, powder
Reportable Quantity (RQ): 10 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1567 Class: 6.1 (4.1) Packing group: II EMS-No: F-G, S-G
Proper shipping name: BERYLLIUM POWDER
Marine pollutant: No

IATA
UN-Number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium powder

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen, Highly toxic by inhalation, Toxic by ingestion, Skin sensitiser, Irritant

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
BERYLLIUM FOIL	7440-41-7	1993-04-24

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
BERYLLIUM FOIL	7440-41-7	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
BERYLLIUM FOIL	7440-41-7	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
BERYLLIUM FOIL	7440-41-7	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. BERYLLIUM FOIL	7440-41-7	2008-10-10

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Back

Chem Service Inc.
Material Safety Data Sheet

Date: Monday, March 21, 2005
Last Revised Date: 5/5/03

SECTION 1 - CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Catalog Number: PS-71
Description: Lindane
Other Name(s): 1.2.3.4.5.6-Hexachlorocyclohexane-gamma isomer

Supplied by CHEM SERVICE, Inc. PO BOX 599, WEST CHESTER, PA 19381 (610)-692-3026
EMERGENCY PHONE: 1-610-692-3026

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS No.: 58-89-9
Description: Lindane
EINECS No.: 200-401-2
Hazard Symbols: T;N

SECTION 3 - HAZARDS IDENTIFICATION

Contact lenses should not be worn in the laboratory.All chemicals should be considered hazardous - Avoid direct physical contact!
Suspected Carcinogen-may produce cancer. May be fatal if inhaled! May be fatal or cause blindness if swallowed. May be fatal if swallowed! Exposure can cause nausea, headache dizziness and/or vomiting. Aplastic anemia may be related to this compound. Can cause eye irritation. Can cause skin irritation. May be fatal if absorbed through the skin! Can cause cyanosis. Can cause blood disorders. Can cause cardiovascular system injury. Can cause sensitization by skin contact. Exposure can cause liver damage. Can cause nervous system injury. Vapors and/or direct eye contact can cause severe eye burns. Exposure can cause kidney damage.

SECTION 4 - FIRST AID MEASURES

An antidote is a substance intended to counteract the effect of a poison. It should be administered only by a physician or trained emergency personnel. Medical advice can be obtained from a POISON CONTROL CENTER.
In case of contact: Flush eyes continuously with water for 15-20 minutes. Flush skin with water for 15-20 minutes. If no burns have occurred-use soap and water to cleanse skin. If inhaled remove patient to fresh air. Administer oxygen if patient is having difficulty breathing. If patient has stopped breathing administer artificial respirations. If patient is in cardiac arrest administer CPR. Continue life supporting measures until medical assistance has arrived. Remove and wash contaminated clothing. If patient is exhibiting signs of shock - Keep warm and quiet. Contact Poison Control Center immediately if necessary. Induce vomiting if swallowed. Do not administer liquids or induce vomiting to an unconscious or convulsing person. If patient is vomiting-watch closely to make sure airway does not become obstructed by vomit. Get medical attention if necessary. ANTIDOTE: A short acting barbituate for central nervouse system symptoms; Diazepam for convulsions; If ingested induce emesis administer Magnesium Sulfateand observe.

SECTION 5 - FIRE AND EXPLOSION DATA

Flash Point: Not Available
Extinguishing Media: Carbon dioxide, dry chemical powder or spray.
Upper Explosion Limit: Not Available
Lower Explosion Limit: Not Available
Autoignition Temperature: Not Available
NFPA Hazard Rating: Not Available

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills or leaks: Evacuate area. Wear appropriate OSHA regulated equipment. Ventilate area. Sweep up and place in an appropriate container. Hold for disposal.

Wash contaminated surfaces to remove any residues. Remove contaminated clothing and wash before reuse.

SECTION 7 - HANDLING AND STORAGE

Handling:
This chemical should be handled only in a hood. Eye shields should be worn.
Use appropriate OSHA/MSHA approved safety equipment.
Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation
Wash thoroughly after handling.

Storage:
Store in a cool dry place. Store only with compatible chemicals.
Keep tightly closed.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION
OSHA PEL (TWA): 0.5 mg/m3
ACGIH TLV (TWA): 0.5mg/m3 skin
ACGIH TLV (STEL): Not Available

Personal Protective Equipment
Eyes: Wear Safety Glasses.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirator's use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Color: White
Phase: Crystalline solid
Melting Point: 112.5 C
Boiling Point: 323 C
Specific Gravity: 10.06
Vapor Density: 0.00001mm @20
Vapor Preasure: Not Available
Solubility in Water: Insoluble (immiscible)
Odor: Pungent, acrid
Evaporation Rate (Butyl acetate=1): Not Available
Molecular Weight: 290.82
Molecular Formula: C6H6Cl6

SECTION 10 - STABILITY AND REACTIVITY

Incompatible with strong bases. Incompatible with strong oxidizing agents.

SECTION 11 - TOXICOLOGY INFORMATION

RTECS: GV4900000
Oral Rat or Mouse LD50: 76mg/kg
Dermal Rat or Mouse LD50: 414mg/kg
Rat or Mouse LC50 : Not Available

Carcinogenicity
OSHA: No
IARC: No
NTP: Yes
ACGIH: No
NIOSH: No
Other: Yes

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: Not Available
Environmental Fate: Not Available

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL: Burn in a chemicals incinerator equipped with an afterburner and scrubber.

SECTION 14 - TRANSPORTATION INFORMATION

UN Number: UN2811
Class: 6.1
Packing Group: III
Proper Shipping Name: Toxic solids, organic, nos

SECTION 15 - REGULATORY INFORMATION

European Labeling in Accordance with EC Directives
Hazard Symbols: T;N

Risk Phrases:
R23/24/25: Toxic by inhalation, in contact with skin, and if swallowed.
R36/38: Irritating to eyes and skin.
R50/53: Very toxic to aquatic organisms and May cause long-term adverse effects in the aquatic environment.

Safety Phrase:
S13: Keep away from food, drink and animal feeding stuffs.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).
S60: This material and/or it's container must be disposed of as hazardous waste.
S61: Avoid release to the environment. Refer to special instructions/Safety data sheet.

SECTION 16 - OTHER INFORMATION

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded MSDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Material Safety Data Sheet (MSDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an MSDS for a solution or mixture the user should refer to the MSDS for every component of the solution or mixture. Chem Service warrants that this MSDS is based upon the most current information available to Chem Service at the time it

was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY,
EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR
ANY PARTICULAR PURPOSE. This MSDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE
FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES.

This product is furnished FOR LABORATORY USE ONLY!

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: MIXED XYLENES
Product Description: Aromatic Hydrocarbon

Intended Use: Chemical intermediate, Solvent

COMPANY IDENTIFICATION

Supplier: **EXXONMOBIL CHEMICAL COMPANY**
P.O. BOX 3272
HOUSTON, TX. 77253-3272 USA

24 Hour Health Emergency	(800) 726-2015
Transportation Emergency Phone	(800) 424-9300 or (703) 527-3887 CHEMTREC
Product Technical Information	(281) 870-6000/Health & Medical (281) 870-6884
Supplier General Contact	(281) 870-6000

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
Mixed Xylenes	1330-20-7	100 %

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*
ETHYL BENZENE	100-41-4	10 - 20%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an ignition.

POTENTIAL HEALTH EFFECTS

Irritating to eyes. Possible human cancer hazard. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs.

Target Organs: Eye |

NFPA Hazard ID:	Health:	2	Flammability:	3	Reactivity: 0
HMIS Hazard ID:	Health:	2*	Flammability:	3	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This light hydrocarbon material, or a component, may be associated with cardiac sensitization following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Flammable. Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >23C (73F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: 432°C (810°F) - 528°C (982°F) [Technical literature]

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 degrees C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid contact with eyes. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding

and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Loading/Unloading Temperature: [Ambient]

Transport Temperature: [Ambient]
Transport Pressure: [Ambient]

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The container choice, for example storage vessel, may effect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.
Storage Temperature: [Ambient]
Storage Pressure: [Ambient]

Suitable Containers/Packing: Tankers; Drums; Tank Trucks; Barges; Tank Cars
Suitable Materials and Coatings (Chemical Compatibility): Carbon Steel; Polyester; Stainless Steel; Teflon
Unsuitable Materials and Coatings: Natural Rubber; Butyl Rubber; Ethylene-proplyene-diene monomer (EPDM); Polystyrene; Polyethylene; Polypropylene; PVC; Polyvinyl Alcohol; Polyacrylonitrile; Compatibility with plastics will vary

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source	Form	Limit / Standard			NOTE	Source
ETHYL BENZENE		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
ETHYL BENZENE		TWA	20 ppm		N/A	ACGIH
Mixed Xylenes		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
Mixed Xylenes		STEL	150 ppm		N/A	ACGIH
Mixed Xylenes		TWA	100 ppm		N/A	ACGIH
XYLENES	Vapor.	RCP - TWA	434 mg/m3	100 ppm	Total Hydrocarbons	ExxonMobil

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Half-face filter respirator

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Form: Clear
Color: Colorless
Odor: Aromatic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.869 [Technical literature]
Density (at 15 ºC): 870 kg/m³ (7.26 lbs/gal, 0.87 kg/dm³) [ISO 12185]
Flash Point [Method]: >23C (73F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: 432°C (810°F) - 528°C (982°F) [Technical literature]
Boiling Point / Range: 136C (277F) - 145C (292F) [Technical literature]
Vapor Density (Air = 1): < 1 at 101 kPa [Technical literature]
Vapor Pressure: 0.8 kPa (6 mm Hg) at 20 C [Calculated]
Evaporation Rate (n-butyl acetate = 1): 0.85 [In-house method]
pH: N/D
Log Pow (n-Octanol/Water Partition Coefficient): 3.12 - 3.16 [Technical literature]
Solubility in Water: Negligible
Viscosity: [N/D at 40 °C] | 0.79 cSt (0.79 mm2/sec) at 20C [ASTM D7042]
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: -54°C (-65°F) [Technical literature]
Melting Point: -39°C (-39°F) [Technical literature]
Pour Point: -95°C (-139°F) - 13°C (56°F) [Technical literature]
Molecular Weight: 106 G/MOLE [Calculated]
Hygroscopic: No
Coefficient of Thermal Expansion: 0.00105 V/VDEGC [Calculated] [In-house method]
Decomposition Temperature: N/D

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 20 mg/l	Minimally Toxic. Based on test data for the material.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or

	lungs.
Ingestion	
Toxicity (Rat): LD50 > 3523 mg/kg	Minimally Toxic. Based on test data for the material.
Skin	
Toxicity (Rabbit): LD50 > 4200 mg/kg	Minimally Toxic. Based on test data for the material.
Irritation: Data available.	Irritating to the skin. Based on test data for the material.
Eye	
Irritation: Data available.	Moderately irritating to the eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Very high exposure (confined spaces / abuse) to light hydrocarbons may result in abnormal heart rhythm (arrhythmias). Concurrent high stress levels and/or co-exposure to high levels of hydrocarbons (above occupational exposure limits), and to heart-stimulating substances like epinephrine, nasal decongestants, asthma drugs, or cardiovascular drugs may initiate arrhythmias.

Contains:

ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

Additional information is available by request.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ETHYL BENZENE	100-41-4	5

--REGULATORY LISTS SEARCHED--

1 = NTP CARC
2 = NTP SUS
3 = IARC 1
4 = IARC 2A
5 = IARC 2B
6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms.
Material -- Not expected to demonstrate chronic toxicity to aquatic organisms.

MOBILITY

Material -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:
Material -- Expected to be readily biodegradable.
Hydrolysis:
Material -- Transformation due to hydrolysis not expected to be significant.
Photolysis:
Material -- Transformation due to photolysis not expected to be significant.
Atmospheric Oxidation:
Material -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL
Material -- Potential to bioaccumulate is low.

OTHER ECOLOGICAL INFORMATION
VOC (EPA Method 24): 7.252 lbs/gal

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS
Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION
RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: IGNITABILITY.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT)
Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (Xylenes, Ethylbenzene)
Hazard Class & Division: 3
ID Number: 1993
Packing Group: III
Product RQ: 100 LBS - Mixed Xylenes
ERG Number: 128
Label(s): 3
Transport Document Name: UN1993, FLAMMABLE LIQUIDS, N.O.S. (Xylenes, Ethylbenzene), 3, PG III

LAND (TDG)

Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (Xylenes, Ethylbenzene)
Hazard Class & Division: 3
UN Number: 1993
Packing Group: III
Special Provisions: 16

SEA (IMDG)

Proper Shipping Name: XYLENES
Hazard Class & Division: 3
EMS Number: F-E, S-D
UN Number: 1307
Packing Group: III
Label(s): 3
Transport Document Name: UN1307, XYLENES, 3, PG III, (23°C c.c.)

AIR (IATA)

Proper Shipping Name: XYLENES
Hazard Class & Division: 3
UN Number: 1307
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name: UN1307, XYLENES, 3, PG III

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

Complies with the following national/regional chemical inventory requirements:: AICS, KECI, ENCS, DSL, IECSC, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

CERCLA:

Chemical Name	CAS Number	Typical Value	Component RQ	Product RQ
ETHYL BENZENE	100-41-4	10 - 20%	1000 LBS	5000 LBS
Mixed Xylenes	1330-20-7	100 %	100 LBS	100 LBS

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
Mixed Xylenes	1330-20-7	100 %
ETHYL BENZENE	100-41-4	10 - 20%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ETHYL BENZENE	100-41-4	1, 4, 10, 13, 16, 17, 18, 19
Mixed Xylenes	1330-20-7	1, 4, 5, 9, 13, 15, 16, 17, 18, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:
Section 15: CERCLA Table was modified.
Section 15: SARA (313) TOXIC RELEASE INVENTORY - Table was modified.
Section 15: National Chemical Inventory Listing was modified.
Section 08: Exposure Limits Table was modified.
Section 06: Protective Measures was modified.
Section 09: Vapor Pressure was added.
Section 12: Photolysis - Header was added.
Section 09: Phys/Chem Properties Note was modified.
Section 09: Boiling Point C(F) was modified.
Section 09: Pour Point - Header was added.
Section 09: Pour Point C(F) was added.
Section 09: Density kg/m3(lbs/gal) was modified.
Section 09: Evaporation Rate was modified.
Section 09: Flash Point C(F) was modified.
Section 09: n-Octanol/Water Partition Coefficient was modified.
Section 09: Molecular Weight was modified.
Section 09: Coefficient of Thermal Expansion was modified.
Section 09: VAPOR PRESSURE was deleted.
Section 09: Vapor Pressure was modified.
Section 11: Dermal Lethality Test Data was modified.
Section 11: Dermal Lethality Test Comment was modified.
Section 11: Oral Lethality Test Data was modified.
Section 11: Inhalation Lethality Test Data was modified.
Section 11: Oral Lethality Test Comment was modified.
Section 11: Inhalation Lethality Test Comment was modified.
Section 11: Dermal Irritation Test Comment was modified.
Section 11: Eye Irritation Test Comment was modified.
Section 11: Inhalation Irritation Test Data was modified.
Section 09: Flammable Limits - LEL was modified.
Section 09: Flash Point C(F) was modified.
Section 09: Autoignition Temperature was modified.

Section 09: Viscosity was modified.
Section 14: Transport Document Name was added.
Section 14: Transport Document Name was added.
Section 14: Product RQ was modified.
Section 14: Transport Document Name was added.
Composition: Component table was modified.
Section 15: List Citations Table was modified.
Section 11: Inhalation Lethality Test Comment was modified.
Section 15: National Chemical Inventory Listing - Header was modified.
Section 09: Relative Density was modified.
Section 16: Precautions was modified.
Section 16: Water Spill was modified.
Section 16: NA Contains was modified.
Section 09: Freezing Point C(F) was modified.
Section 09: Melting Point C(F) was modified.
Section 12: Ecological Information - Hydrolysis was added.
Section 12: Ecological Information - Photolysis was added.
Section 12: Ecological Information - Hydrolysis was added.
Section 12: Ecological Information - Photolysis was added.
Section 09: Decomposition Temperature was added.
Section 09: Decomposition Temp - Header was added.
Section 12: Ecological Information - Acute Aquatic Toxicity was added.
Section 12: Ecological Information - Acute Aquatic Toxicity was added.
Section 09: Vapor Pressure was added.
Section 12: Hydrolysis - Header was added.

PRECAUTIONARY LABEL TEXT:

Contains: Mixed Xylenes

WARNING!

HEALTH HAZARDS

Irritating to eyes. Possible human cancer hazard. If swallowed, may be aspirated and cause lung damage.

Target Organs: Eye |

PHYSICAL HAZARDS

Flammable. Material can accumulate static charges which may cause an ignition. Flammable.

PRECAUTIONS

Avoid contact with skin. Avoid contact with eyes. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation.

FIRST AID

Eye: Flush thoroughly with water for at least 15 minutes. Get medical assistance.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

SPILL/LEAK

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Water Spill: Stop leak if you can do it without risk. Eliminate sources of ignition. Warn other shipping. Report spills as required to appropriate authorities. If the Flash Point exceeds the Ambient Temperature by 10 degrees C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer.

Internal Use Only

MHC: 1A, 0, 0, 1, 4, 1

DGN: 4401236AUS (1004500)

Material Safety Data Sheet

Version 3.2
Revision Date 01/06/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Vinyl chloride

Product Number : 387622
Brand : Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Chloroethylene

Formula : C_2H_3Cl

CAS-No.	EC-No.	Index-No.	Concentration
Vinyl chloride			
75-01-4	200-831-0	602-023-00-7	-
Hydroquinone			
123-31-9	204-617-8	604-005-00-4	<= 0.0001 %
Phenol			
108-95-2	203-632-7	604-001-00-2	<= 0.01 %

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable gas, Compressed Gas, Carcinogen, Toxic by ingestion

Target Organs

Liver, Blood, Brain., Central nervous system

HMIS Classification

Health hazard: 2
Chronic Health Hazard: *
Flammability: 4
Physical hazards: 3

NFPA Rating

Health hazard: 2
Fire: 4
Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Toxic if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	-61.0 °C (-77.8 °F) - closed cup
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up
Wipe up with absorbent material (e.g. cloth, fleece).

7. HANDLING AND STORAGE

Handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment.

Storage
Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

Contents under pressure. Light sensitive.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Vinyl chloride	75-01-4	TWA	1 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Liver damage Lung cancer Confirmed human carcinogen: The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies.				
		TWA	1 ppm	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Sec. 1910.1017 Vinyl Chloride.				
		STEL	5 ppm	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Sec. 1910.1017 Vinyl Chloride.				
		TWA	1 ppm	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	5 ppm	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	See 1910.1017				
Hydroquinone	123-31-9	TWA	1 mg/m3	2008-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye irritation Eye damage 2008 Adoption Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is lilkely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. Sensitizer				
		TWA	2 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	2 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) -

					Table Z-1 Limits for Air Contaminants

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	Compressed gas

Safety data

pH	no data available
Melting point	-153.8 °C (-244.8 °F) - lit.
Boiling point	-13.4 °C (7.9 °F) - lit.
Flash point	-61.0 °C (-77.8 °F) - closed cup
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	0.911 g/cm3 at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Chemically active metals, Copper

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Contains the following stabiliser(s):
Hydroquinone (>=0 - <=0.0001 %)
Phenol (>=0 - <=0.01 %)

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 500.0 mg/kg

LC50 Inhalation - rat - 0.3 h - 180000 ppm
Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

IARC: 1 - Group 1: Carcinogenic to humans (Vinyl chloride)

1 - Group 1: Carcinogenic to humans (Vinyl chloride)

NTP: Known to be human carcinogen (Vinyl chloride)

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Signs and Symptoms of Exposure

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Toxic if swallowed.
Target Organs	Liver, Blood, Brain., Central nervous system,

Additional Information
RTECS: KU9625000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

no data available

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1086 Class: 2.1 EMS-No: F-D, S-U
Proper shipping name: VINYL CHLORIDE, STABILIZED
Marine pollutant: No

IATA
UN-Number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

OSHA Hazards
Flammable gas, Compressed Gas, Carcinogen, Toxic by ingestion

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01

SARA 313 Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Sudden Release of Pressure Hazard, Acute Health Hazard, Chronic Health Hazard
Reportable Quantity : lowest RQ > 999999 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01
Vinyl chloride	75-01-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Vinyl chloride	75-01-4	1990-06-15

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.0
Revision Date 03/12/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Toluene
Product Number	:	244511
Brand	:	Sigma-Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Irritant, Teratogen, Reproductive hazard

Target Organs

Bladder, Liver, Kidney, Brain.

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H371	May cause damage to organs.
H401	Toxic to aquatic life.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P281	Use personal protective equipment as required.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P331	Do NOT induce vomiting.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical hazards:	0

NFPA Rating

Health hazard: 2
Fire: 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Skin May be harmful if absorbed through skin. Causes skin irritation.

Eyes Causes eye irritation.

Ingestion Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C_7H_8

Molecular Weight : 92.14 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Toluene			
108-88-3	203-625-9	601-021-00-3	-

4. FIRST AID MEASURES

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

Handle and store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Toluene	108-88-3	TWA	100 ppm 375 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	150 ppm 560 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	200 ppm	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z2
Remarks	Z37.12-1967				
		CEIL	300 ppm	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.12-1967				
		Peak	500 ppm	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.12-1967				
		TWA	20 ppm	2008-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Visual impairment Female reproductive Pregnancy loss 2008 Adoption Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of

workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	no data available
Melting point	-93 °C (-135 °F)
Boiling point	110 - 111 °C (230 - 232 °F)
Flash point	4.0 °C (39.2 °F) - closed cup
Ignition temperature	535 °C (995 °F)
Lower explosion limit	1.2 %(V)
Upper explosion limit	7 %(V)
Vapour pressure	29.1 hPa (21.8 mmHg) at 20.0 °C (68.0 °F)
Density	0.865 g/mL at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - > 5,580 mg/kg

LC50 Inhalation - rat - 4 h - 12,500 - 28,800 mg/m3

LD50 Dermal - rabbit - 12,196 mg/kg

Skin corrosion/irritation
Skin - rabbit - Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Severe eye irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Toluene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Damage to fetus possible
Suspected human reproductive toxicant

Reproductive toxicity - rat - Inhalation
Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Experiments have shown reproductive toxicity effects in male and female laboratory animals.

Developmental Toxicity - rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Specific target organ toxicity - single exposure (GHS)
May cause damage to organs.

Specific target organ toxicity - repeated exposure (GHS)
no data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
Lung irritation, chest pain, pulmonary edema, Inhalation studies on toluene have demonstrated the development of inflammatory and ulcerous lesions of the penis, prepuce, and scrotum in animals.

Additional Information
RTECS: XS5250000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 74.00 - 340.00 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 7.63 mg/l - 96 h
	NOEC - Pimephales promelas (fathead minnow) - 5.44 mg/l - 7 d
	LOEC - Pimephales promelas (fathead minnow) - 8.04 mg/l - 7 d
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 8.00 mg/l - 24 h
	Immobilization EC50 - Daphnia magna (Water flea) - 6 mg/l - 48 h
Toxicity to algae	EC50 - Chlorella vulgaris (Fresh water algae) - 245.00 mg/l - 24 h
	EC50 - Pseudokirchneriella subcapitata (green algae) - 10.00 mg/l - 24 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d Bioconcentration factor (BCF): 94

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1294 Class: 3 Packing group: II
Proper shipping name: Toluene
Reportable Quantity (RQ): 1000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1294 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: TOLUENE
Marine pollutant: No

IATA
UN-Number: 1294 Class: 3 Packing group: II
Proper shipping name: Toluene

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Irritant, Teratogen, Reproductive hazard

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Toluene	108-88-3	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Toluene	108-88-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Toluene	108-88-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Toluene	108-88-3	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Toluene	108-88-3	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 05/22/2006
Date Updated: 02/02/2006
Version 1.3

Section 1 - Product and Company Information

Product Name	TERT-BUTYLBENZENE, STANDARD FOR GC
Product Number	19640
Brand	FLUKA
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
TERT-BUTYLBENZENE	98-06-6	No

Formula	C10H14
Synonyms	Benzene, (1,1-dimethylethyl)- (9CI) * tert-Butylbenzene * Dimethylethylbenzene * 2-Methyl-2-phenylpropane * Phenyltrimethylmethane * Pseudobutylbenzene * Trimethylphenylmethane
RTECS Number:	CY9120000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable.
Toxic by inhalation and if swallowed. Irritating to eyes and skin.
Danger: Poison. May be fatal or cause blindness if swallowed.
Vapor harmful. Cannot be made non-poisonous. Causes irritation.
Target organ(s): Eyes. Kidneys.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Section 5 - Fire Fighting Measures

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions. Forms explosive mixtures in air.

FLASH POINT
140 ˚F 60 ˚C Method: closed cup

EXPLOSION LIMITS
Lower: 0.8 %

AUTOIGNITION TEMP
450 ˚C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Vapor may travel considerable distance to source of ignition and flash back.
Specific Method(s) of Fire Fighting: Use water spray to cool fire-exposed containers.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with an activated carbon adsorbent, take up and place in closed containers. Transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing.

STORAGE
Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Mechanical exhaust required. Safety shower and eye bath. Use nonsparking tools.

PERSONAL PROTECTIVE EQUIPMENT
Other: Wear appropriate government approved respirator, chemical-resistant gloves, safety goggles, other protective

clothing.

GENERAL HYGIENE MEASURES
Remove and wash contaminated clothing promptly. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance — Color: Colorless; Form: Clear liquid

Property	Value	At Temperature or Pressure
Molecular Weight	134.22 AMU	
pH	N/A	
BP/BP Range	167.0 - 168.0 ˚C	
MP/MP Range	- 58.0 ˚C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	3.16 g/l	169 ˚C
Saturated Vapor Conc.	N/A	
SG/Density	0.866 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	140 ˚F 60 ˚C	Method: closed cup
Explosion Limits	Lower: 0.8 %	
Flammability	N/A	
Autoignition Temp	450 ˚C	
Refractive Index	1.493	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Materials to Avoid: Oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption. May cause irritation.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Rat
3045 mg/kg
LD50
Remarks: Gastrointestinal:Changes in structure or function of salivary glands. Behavioral:Tremor. Behavioral:Somnolence (general depressed activity).

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Butyl benzenes
UN#: 2709
Class: 3
Packing Group: Packing Group III
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Butylbenzenes
IATA UN Number: 2709
Hazard Class: 3
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xn
Indication of Danger: Harmful.
R: 10-20-38
Risk Statements: Flammable. Harmful by inhalation. Irritating to skin.
S: 23-24/25
Safety Statements: Do not breathe vapor. Avoid contact with skin and eyes.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Flammable.
Risk Statements: Toxic by inhalation and if swallowed. Irritating to eyes and skin.
Safety Statements: Keep away from sources of ignition - no smoking.
US Statements: Danger: Poison. May be fatal or cause blindness if swallowed. Vapor harmful. Cannot be made non-poisonous. Causes irritation. Target organ(s): Eyes. Kidneys.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

NOTES: This product is subject to SARA section 313 reporting requirements. This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Date Printed: 05/16/2006
Date Updated: 02/01/2006
Version 1.9

Section 1 - Product and Company Information

Product Name	TRICHLOROETHENE
Product Number	46267
Brand	RIEDEL
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
1,1,2-TRICHLOROETHYLENE	79-01-6	Yes

Formula C2HCl3

Synonyms Acetylene trichloride * Algylen * Anamenth * Benzinol * Blacosolv * Blancosolv * Cecolene * Chlorilen * 1-Chloro-2,2-dichloroethylene * Chlorylen * Circosolv * Crawhaspol * Densinfluat * 1,1-Dichloro-2-chloroethylene * Dow-tri * Dukeron * Ethinyl trichloride * Ethylene trichloride * Fleck-flip * Flock FLIP * Fluate * Germalgene * Lanadin * Lethurin * Narcogen * Narkosoid * NCI-C04546 * Nialk * Perm-A-chlor * Petzinol * Philex * RCRA waste number U228 * Threthylen * Threthylene * Trethylene * Tri * Triad * Trial * Triasol * Trichlooretheen (Dutch) * Trichloorethyleen, tri (Dutch) * Trichloraethen (German) * Trichloraethylen, tri (German) * Trichloran * Trichloren * Trichlorethylene, tri (French) * Trichloroethene * Trichloroethylene (IUPAC) * 1,1,2-Trichloroethylene * 1,2,2-Trichloroethylene * Trichloroethylene (ACGIH:OSHA) * Tri-clene * Tricloretene (Italian) * Tricloroetilene (Italian) * Trielene * Trielin * Trielina (Italian) * Trieline * Trilen * Trilene * Trilene TE-141 * Triline * Trimar * Triol * Tri-plus * Tri-plus M * Vestrol * Vitran * Westrosol

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic.

May cause cancer. Irritating to eyes, respiratory system and skin. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Vapors may cause drowsiness and dizziness. Possible risk of irreversible effects.

Target organ(s): Liver. Central nervous system. Calif. Prop. 65

carcinogen.

HMIS RATING
HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 1

NFPA RATING
HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

EXPLOSION LIMITS
Lower: 8 % Upper: 10.5 %

AUTOIGNITION TEMP
410 °C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Handle and store under nitrogen. Store in a cool dry place.
Store at 2-8°C

SPECIAL REQUIREMENTS
Light sensitive. Handle and store under inert gas.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	STEL	100 PPM
USA	ACGIH	TWA	50 PPM
USA	MSHA Standard-air	TWA	100 PPM (535 MG/M3)
USA	OSHA.	PEL	8H TWA 100 PPM;CL 200;PK 300/5
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	25 PPM
		Ceiling co2 PPM/1H	

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	50 MG/M3
Poland		NDSCh	400 MG/M3
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear liquid Color: Colorless

Property	Value	At Temperature or Pressure
Molecular Weight	131.39 AMU	
pH	N/A	
BP/BP Range	86.0 - 88.0 °C	
MP/MP Range	- 84.8 °C	
Freezing Point	N/A	
Vapor Pressure	61 mmHg	20 °C
Vapor Density	4.5 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	1.463 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: 2.29	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	Lower: 8 % Upper: 10.5 %	
Flammability	N/A	
Autoignition Temp	410 °C	
Refractive Index	1.478	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions of Instability: Light sensitive.
Materials to Avoid: Oxidizing agents, Strong bases, Magnesium.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Lungs. Heart. Central nervous system. Liver.

SIGNS AND SYMPTOMS OF EXPOSURE
Exposure to and/or consumption of alcohol may increase toxic effects. Exposure can cause: Gastrointestinal disturbances. Damage to the kidneys. Narcotic effect. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

TOXICITY DATA

Oral
Human
7000 mg/kg
LDLO

Inhalation
Man
2,900 ppm
LCLO

Oral
Rat
4920 mg/kg
LD50

Intraperitoneal
Rat
1282 MG/KG
LD50

Oral
Mouse
2402 mg/kg
LD50
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Ataxia. Skin and Appendages: Other: Hair.

Inhalation
Mouse
8,450 ppm
LC50

Subcutaneous
Mouse
16 GM/KG
LD50
Remarks: Behavioral:Sleep. Behavioral:Ataxia.

Intravenous
Mouse
33900 UG/KG
LD50

Intraperitoneal
Dog
1900 MG/KG
LD50
Remarks: Liver:Liver function tests impaired.

Skin
Rabbit
> 20000 mg/kg
LD50

IRRITATION DATA

Skin
Rabbit
2 mg
24H
Remarks: Severe irritation effect

Eyes
Rabbit
20 mg
24H
Remarks: Moderate irritation effect

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Inhalation
Dose: 150 PPM
Exposure Time: 7H/2Y
Frequency: I
Result: Skin and Appendages: Other: Tumors.
Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Species: Mouse
Route of Application: Oral
Dose: 455 GM/KG
Exposure Time: 78W
Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

Species: Mouse
Route of Application: Inhalation
Dose: 150 PPM
Exposure Time: 7H/2Y
Frequency: I
Result: Lungs, Thorax, or Respiration:Tumors. Vascular:Tumors.
Tumorigenic:Carcinogenic by RTECS criteria.

Species: Hamster
Route of Application: Inhalation
Dose: 100 PPM
Exposure Time: 6H/77W
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Blood:Lymphomas including Hodgkin's disease.
Liver:Tumors.

Species: Mouse
Route of Application: Oral
Dose: 912 GM/KG
Exposure Time: 78W

Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

Species: Mouse
Route of Application: Inhalation
Dose: 500 PPM
Exposure Time: 6H/77W
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Blood:Lymphomas including Hodgkin's disease.

Species: Mouse
Route of Application: Inhalation
Dose: 150 PPM
Exposure Time: 7H/2Y
Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Skin and Appendages: Other: Tumors.

Species: Mouse
Route of Application: Oral
Dose: 515 GM/KG
Exposure Time: 2Y
Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors. Blood:Tumors.

IARC CARCINOGEN LIST

Rating: Group 2A

NTP CARCINOGEN LIST

Rating: Clear evidence.
Species: Mouse
Route: Gavage

ACGIH CARCINOGEN LIST

Rating: A5

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 1140 MG/KG
Route of Application: Oral
Exposure Time: (14D PRE-21D POST)
Result: Specific Developmental Abnormalities: Central nervous system.

Species: Rat
Dose: 1800 PPM/24H
Route of Application: Inhalation
Exposure Time: (1-20D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Other developmental abnormalities.

Species: Rat
Dose: 1800 PPM/6H
Route of Application: Inhalation

Exposure Time: (1-20D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Rat
Dose: 100 PPM/4H
Route of Application: Inhalation
Exposure Time: (8-21D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 150 PPM/24H
Route of Application: Inhalation
Exposure Time: (4W MALE/4W PRE-3W PREG)
Result: Specific Developmental Abnormalities: Central nervous system.

CHRONIC EXPOSURE - MUTAGEN
Result: Laboratory experiments have shown mutagenic effects.

Species: Human
Dose: 100 MG/L
Cell Type: lung
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 5 ML/L
Cell Type: lymphocyte
Mutation test: DNA inhibition

Species: Human
Dose: 178 MG/L
Cell Type: lymphocyte
Mutation test: Sister chromatid exchange

Species: Rat
Route: Inhalation
Dose: 5 PPM
Exposure Time: 6H
Mutation test: Micronucleus test

Species: Rat
Route: Oral
Dose: 4 MMOL/KG
Mutation test: Micronucleus test

Species: Rat
Dose: 1100 UMOL/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Rat
Dose: 100 UMOL/L
Cell Type: liver
Mutation test: DNA damage

Species: Rat
Dose: 2800 UMOL/L
Cell Type: liver
Mutation test: Unscheduled DNA synthesis

Species: Rat

Route: Oral
Dose: 16500 MG/KG
Exposure Time: 3W
Mutation test: Unscheduled DNA synthesis

Species: Mouse
Route: Intraperitoneal
Dose: 1 GM/KG
Mutation test: Micronucleus test

Species: Mouse
Dose: 146 MG/L (+S9)
Cell Type: lymphocyte
Mutation test: Mutation in microorganisms

Species: Mouse
Route: Intraperitoneal
Dose: 140 MG/KG
Mutation test: specific locus test

Species: Mouse
Dose: 20 MG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Mouse
Route: Intraperitoneal
Dose: 6 MMOL/KG
Mutation test: DNA damage

Species: Mouse
Dose: 100 UMOL/L
Cell Type: liver
Mutation test: DNA damage

Species: Mouse
Route: Oral
Dose: 2500 MG/L
Mutation test: Unscheduled DNA synthesis

Species: Mouse
Dose: 1 MMOL/L
Cell Type: Bone marrow
Mutation test: Unscheduled DNA synthesis

Species: Mouse
Route: Oral
Dose: 600 MG/KG
Mutation test: Other mutation test systems

Species: Mouse
Dose: 400 MG/KG
Cell Type: S. cerevisiac
Mutation test: Host-mediated assay

Species: Mouse
Route: Inhalation
Dose: 100 PPM
Mutation test: sperm

Species: Hamster
Dose: 5 MG/L

Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Hamster
Dose: 1 PPH
Cell Type: fibroblast
Mutation test: Other mutation test systems

Species: Hamster
Dose: 401 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 1150 UMOL/L
Cell Type: lung
Mutation test: SLN

Species: Mammal
Dose: 1 MMOL/L
Cell Type: lymphocyte
Mutation test: DNA

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 2688 MG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG/21D POST)
Result: Effects on Newborn: Behavioral.

Species: Rat
Dose: 36 GM/KG
Route of Application: Oral
Exposure Time: (15D PRE/1-21D PREG)
Result: Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4).

Species: Rat
Dose: 100 PPM/4H
Route of Application: Inhalation
Exposure Time: (6-22D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 100 PPM/7H
Route of Application: Inhalation
Exposure Time: (5D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Section 12 - Ecological Information

ACCUMULATION

Bioaccumulation Potential: No indication of bioaccumulation.

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 41 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: 18 mg/l

Test Type: IC50 Algae
Species: Selenastrum capricornutum resp.
Time: 96 h
Value: 175 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations. (DN)Requires special label: "Contains a substance which is regulated by Dannish work environmental law due to the risk of carcinogenic properties."

Section 14 - Transport Information

DOT
Proper Shipping Name: Trichloroethylene
UN#: 1710
Class: 6.1
Packing Group: Packing Group III
Hazard Label: Toxic Substance
PIH: Not PIH

IATA
Proper Shipping Name: Trichloroethylene
IATA UN Number: 1710
Hazard Class: 6.1
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T
Indication of Danger: Toxic.
R: 45-36/38-52/53-67-68
Risk Statements: May cause cancer. Irritating to eyes and skin. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Vapors may cause drowsiness and dizziness. Also possible risks of irreversible effects.
S: 53-45-61
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic.
Risk Statements: May cause cancer. Irritating to eyes, respiratory system and skin. Harmful to aquatic organisms, may

cause long-term adverse effects in the aquatic environment. Vapors may cause drowsiness and dizziness. Possible risk of irreversible effects.
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Target organ(s): Liver. Central nervous system. Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

SCHUMACHER

Material Safety Data Sheet

TRANS-LC
Part No. 1315-0002 D
May1999

1. Chemical Product and Company Identification

Chemical Name: **TRANS-LC® (trans 1,2-Dichloroethene)**

Synonyms:	trans-1,2-dichloroethylene; trans-dichloroethylene acetylene dichloride, Dioform	***Chemical Family:***	Chlorinated Unsaturated Hydrocarbon
Formula:	$C_2H_2 Cl_2$	***Molecular Weight:***	96.94
CAS#:	156-60-5		

SCHUMACHER, 1969 PALOMAR OAKS WAY, CARLSBAD, CA 92009 • EMERGENCY PHONE NUMBERS: 8:00 AM TO 5:00 PM PST Monday thru Friday, call: 760-931-9555. AFTER HOURS CALL: 1-800-523-9374; IN PENNSYLVANIA: 1-800-322-9092; OUTSIDE THE USA: 610-481-7711

2. Composition

Chemical Name	***CAS#***	***% by weight***
trans-1,2-Dichloroethylene	156-60-5	100

3. Hazard Identification

Emergency Overview: Clear, colorless liquid. Sweet order. Contact may cause eye, skin and mucous membrane irritation. Flammable liquid. Vapors may flashback. Fire may produce irritating or poisonous gases. Contaminated run-off water to sewer may create a fire or explosion hazard.

Potential Health Effects

Inhalation: May cause dizziness, headache, nausea, vomiting, and tremors. Causes depression of the central nervous system (CNS).

Eye Contact: May cause eye irritation.

Skin Contact: Can act as primary irritant and produce dermatitis.

Ingestion: May cause nausea and vomiting. Slight to deep depression of the CNS.

Chronic/Carcinogenicity: Chronic exposure may cause damage to the lung, liver and kidneys. Not listed as a carcinogen by OSHA, IARC and NTP. Tests have shown non-mutagenicity.

4. First Aid Measures

Inhalation: Remove to fresh air. Give artificial respiration if not breathing. Oxygen may be given by qualified personnel if breathing is difficult. Get immediate medical attention.

Eye Contact: Immediately flush with plenty of water for at least 15 minutes. Get immediate medical attention.

Skin Contact: Immediately wash with soap or mild detergent and flush skin with plenty of water. Remove contaminated clothing. Get medical attention.

Ingestion: Get medical attention immediately. Do not induce vomiting.

SCHUMACHER

Material Safety Data Sheet

5. Fire Fighting Measures

Flash Point (Test Method):	<2°C (COC)
Auto-Ignition Temperature:	460°C
Flammable Limits in Air, % by volume:	Lower: 9.0% Upper: 16.5% Lower in pure oxygen: 6%
Extinguishing Media:	Water spray, carbon dioxide, dry chemical powder, foam, and fog. Water used in solid streams may not be effective. For larger fires, flood area with water from a distance.
Special Fire Fighting Procedures:	Use positive-pressure self-contained breathing apparatus (SCBA) and full personal protective equipment (PPE). Do not get water inside the chemical container.
Unusual Fire and Explosion Hazards:	Flammable liquid, dangerous fire hazard. Emits toxic, corrosive fumes under fire conditions. Vapor is heavier than air and may travel along surfaces for considerable distances to an ignition source and flash back. Closed containers may rupture violently when heated.

6. Accidental Release Measures

Isolate hazard area. Eliminate ignition sources and moisture. Keep unnecessary and unprotected personnel from entering. In emergency entry where an unknown concentration exists, wear positive pressure breathing apparatus and full PPE. See **Exposure Control/Personal Protection** section. Absorb with inert material (e.g., activated carbon, vermiculite, dry sand). Place in appropriate chemical waste container.

7. Handling and Storage

Store in a standard flammable liquids storage room or cabinet, separate from oxidizers. Keep away from moisture. Store in a cool, dry, well ventilated area. Wear appropriate PPE when handling this chemical. Avoid skin contact and breathing vapors.

8. Exposure Control/Personal Protection

Engineering Controls:	Use process enclosures, local exhaust ventilation or other engineering controls to maintain airborne levels below Exposure Guidelines. An eyewash and safety shower should be readily accessible.
Respiratory Protection:	Use a NIOSH/MSHA full face respirator with organic vapor cartridge(s) when the airborne concentration is les than 1000 ppm. In an emergency or when the airborne concentration is greater than 1000 ppm, use positive pressure self-contained breathing apparatus (SCBA).
Skin Protection:	When chemical contact is possible, wear Viton or polyvinyl alcohol gloves, splash apron, work uniform and shoes or coverlets to prevent skin contact.
Eye Protection:	Use approved safety goggles or safety glasses with side shields worn with a face shield to prevent liquid splash contact.
Exposure Guidelines:	OSHA PEL 200 ppm; ACGIH TLV-TWA 200 ppm; TLV-STEL: Not Available; TLV-IDLH 4000 ppm.

SCHUMACHER

Material Safety Data Sheet

9. Physical and Chemical Properties

Boiling Point:	48° C	***Freezing Point:***	-50° C
Specific Gravity at 20°C (H_2O=1):	1.257	***Vapor Pressure at 20° C:***	250 Torr
Vapor Density at 48°C (air=1):	3.67	***Solubility in Water, % by wt.:***	0.63
Percent Volatile by Volume:	100%	***Evaporation Rate:***	Not Available
Appearance and Odor:	Clear, colorless liquid. Sweet odor; detectable at 0.08 ppm	***pH:***	Not Available

10. Stability and Reactivity

Chemical Stability: Stable

Conditions to Avoid: Heat, sparks and flame can ignite material. Decomposition by exposure to air, light, and moisture.

Incompatibility (Materials to Avoid): Exposure to alkalis, sulfuric acid, or copper and its alloys produces explosive or spontaneously flammable, chloroacetylene. Avoid amines, aluminum and its alloys, and other reducing agents such as sodium, magnesium and zinc. A fire or explosion hazard also exists when exposed to strong oxidizing agents, ozone, or nitrogen tetroxide. Reacts with rubber, plastics and coatings (causes swelling).

Hazardous Decomposition Products: Hydrochloric chloride gas, carbon monoxide, phosgene.

Hazardous Polymerization: Will not occur.

11. Toxicological Information

Toxicology: Trans 1,2-Dichloroethene is toxic by ingestion, inhalation, skin or eye contact. Inhalation may cause nausea, vomiting, weakness, tremors, and epigastric cramps. Ingestion can cause slight to deep CNS depression. Skin contact may cause irritation or dermatitis. Eye contact may cause irritation, inflammation and opacity of the eye. Primarily excreted through the lungs. Tests show no mutagenic effects.

Target Organs: Eye, skin, lung, liver, kidney, mucous membranes, central nervous system (CNS).

Chronic Effects: To the best of our knowledge the chronic effects have not been thoroughly investigated.

lhl-hmn	TC50: > 3000 ppm, 8 hr.	Oral-rat	LD50: > 5000 mg/kg
lhl-hmn	LD50: > 5000 mg/kg	Skin/Eye Irritation:	1.1/8 mean/45/110 max.

SCHUMACHER

Material Safety Data Sheet

TRANS-LC
Part No. 1315-0002 D
May1999

12. Ecological Information

If released to the soil, the material should leach into the groundwater. It will be lost from the water primarily by volatilization (half-life is 3 hours in a model river). Biodegradation, adsorption to sediment, and bioconcentration (BCF:22) in aquatic organisms should not be significant. If released to the atmosphere, it will be lost by reaction with hydroxy radicals (half-life is 3.6 days) or lost to rain, since it is water soluble.

13. Disposal Considerations

EPA Waste Number D001: Consult an expert for disposal. Any disposal must be in accordance with local, state and federal laws and regulations. Contact local, state or federal administering agency for specific rules.

14. Transport Information

DOT Description		***UN Description***	
Proper Shipping Name:	1,2-Dichloroethylene	***Proper Shipping Name:***	1,2-Dichloroethylene
Hazard Class:	3	***Class or Division:***	3
UN or ID Number:	UN1150	***Packing Group:***	II
		UN or ID Number:	UN1150

15. Regulatory Information

OSHA: Hazard Communication Standard (29 CFR 1910.1200): Yes

TSCA status: Listed in the TSCA Inventory

CERCLA Reportable Quantity (R.Q.): 1000 lbs. (454 kg)

SARA Title III:

- Section 302 Extremely Hazardous Substance: No
- Section 311/312 Hazard Categories: Acute, Fire and Reactive Hazard
- Section 302 Threshold Planning Quantity (TPQ): None
- Section 313: Yes

16. Other Information

National Fire Protection Association Rating - Hazardous Materials Identification System

	NFPA	HMIS
HEALTH	2	2
FIRE	3	3
REACTIVITY	2	3
SPECIAL	N/A	*

(4 = Extreme/Severe, 3 = High/Serious, 2 = Moderate, 1 = Slight, 0 = Minimum, ~~W~~ = Water Reactive, N/A = Not Applicable, * = See Exposure Control/Personal Protection section**)**

MATERIAL SAFETY DATA SHEET

Date Printed: 05/22/2006
Date Updated: 09/07/2002
Version 1.2

Section 1 - Product and Company Information

Product Name	EPA TCLP 2,4,5-TP (SILVEX) 1X1ML, MEOH 100UG/ML
Product Number	47897
Brand	SUPELCO
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
EPA TCLP 2,4,5-TP (SILVEX)	None	Yes

Ingredient Name	CAS #	Percent	SARA 313
METHANOL	67-56-1	>= 99 <= 100	Yes
2,4,5-TP	93-72-1	0.01	No

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Toxic.
Toxic by inhalation and if swallowed. Irritating to eyes and skin.
Target organ(s): Eyes. Kidneys.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give

artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS
Flammable Hazards: Yes

EXPLOSION HAZARDS
Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

ENVIRONMENTAL PRECAUTION(S)
Do not allow material to enter drains or water courses. Avoid contaminating sewers and waterways with this material.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Do not use if skin is cut or scratched. Wash thoroughly after handling.

STORAGE

Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame.
Store at 2-8°C

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Use supplied-air or SCBA respirators. Europe permits the use of type AXBEK full-face cartridge respirators (EN 14387).
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Discard contaminated clothing and shoes.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	100 MG/M3
Poland		NDSCh	300 MG/M3
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance: Physical State: Liquid

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	

Refractive Index	N/A
Optical Rotation	N/A
Miscellaneous Data	N/A
Solubility	N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Acids, Acid chlorides, Acid anhydrides, Oxidizing agents, Alkali metals, Reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Hydrogen chloride gas Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: Toxic if absorbed through skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. Toxic if inhaled.
Ingestion: Toxic if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Eyes. Kidneys. Liver. Heart.

SIGNS AND SYMPTOMS OF EXPOSURE
Nausea, headache, and vomiting. Gastrointestinal disturbances. Dizziness. Weakness. Confusion. Drowsiness. Unconsciousness. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Ingestion can cause: Methyl alcohol may be fatal or cause blindness if swallowed. Cannot be made non-poisonous.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Methanol
UN#: 1230
Class: 3
Packing Group: Packing Group II

Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Methanol
IATA UN Number: 1230
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T
Indication of Danger: Toxic.
R: 23/24/25-39/23/24/25
Risk Statements: Toxic by inhalation, in contact with skin and if swallowed. Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
S: 36/37-45
Safety Statements: Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Flammable (USA) Highly Flammable (EU). Toxic.
Risk Statements: Toxic by inhalation and if swallowed. Irritating to eyes and skin.
Safety Statements: Keep container tightly closed. Keep away from sources of ignition - no smoking. Avoid contact with skin. Take precautionary measures against static discharges. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
US Statements: Target organ(s): Eyes. Kidneys.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
NOTES: This product is or contains a component that is subject to SARA313 reporting requirements.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.0
Revision Date 07/29/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Silver

Product Number : 327077
Brand : Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
No known OSHA hazards

HMIS Classification
Health hazard: 0
Flammability: 0
Physical hazards: 0

NFPA Rating
Health hazard: 0
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Ag
Molecular Weight : 107.87 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Silver			
7440-22-4	231-131-3	-	-

4. FIRST AID MEASURES

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. Store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Silver	7440-22-4	TWA	0.01 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.01 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.01 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.1 mg/m3	2008-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Argyria				
		TWA	0.01 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	flakes

Safety data

pH	no data available
Melting point	960 °C (1,760 °F) - lit.
Boiling point	2,212 °C (4,014 °F) - lit.
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	10.49 g/cm3
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Oxygen, Strong acids and strong bases

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Silver/silver oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - male - > 5,000 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

Carcinogenicity - rat - Unreported
Tumorigenic:Tumors at site or application.

Carcinogenicity classification not possible from current data.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
May cause argyria (a slate-gray or bluish discoloration of the skin and deep tissues due to the deposit of insoluble albuminate of silver).

Additional Information

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential

Mobility in soil

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Silver)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.0
Revision Date 03/13/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Selenium
Product Number	:	229865
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Toxic by inhalation.

Target Organs

Central nervous system, Liver, Spleen., Gastrointestinal tract, Teeth.

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H301	Toxic if swallowed.
H330	Fatal if inhaled.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P284	Wear respiratory protection.
P310	Immediately call a POISON CENTER or doctor/physician.
P501	Dispose of contents/container to an approved waste disposal plant.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	Toxic if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.

Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Se
Molecular Weight : 78.96 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Selenium			
7782-49-2	231-957-4	034-001-00-2	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis

			parameters		
Selenium	7782-49-2	TWA	0.2 mg/m3	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye & Upper Respiratory Tract irritation				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	light grey

Safety data

pH	no data available
Melting point	217 °C (423 °F) - lit.
Boiling point	684.9 °C (1,264.8 °F) - lit.
Flash point	not applicable
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	4.81 g/mL at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents, Do not store near acids.

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Selenium/selenium oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
Skin corrosion/irritation

no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Carcinogenicity - mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Selenium)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Developmental Toxicity - mouse - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Specific target organ toxicity - single exposure (GHS)
no data available

Specific target organ toxicity - repeated exposure (GHS)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	Toxic if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
anemia, Vomiting, Diarrhoea, Cough, Difficulty in breathing, Acute selenium poisoning produces central nervous system effects, which include nervousness, convulsions, and drowsiness. Other signs of intoxication can include skin eruptions, lassitude, gastrointestinal distress, teeth that are discolored or decayed, odorous ("garlic") breath, and partial loss of hair and nails. Chronic exposure by inhalation can produce symptoms that include pallor, coating of the tongue, anemia, irritation of the mucosa, lumbar pain, liver and spleen damage, as well as any of the other previously mentioned symptoms. Chronic contact with selenium compounds may cause garlic odor of breath and sweat, dermatitis, and moderate emotional instability., Dermatitis, garlic-like breath odor, pallor, nervousness, depression

Additional Information
RTECS: VS7700000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 2 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 1 mg/l - 96.0 h
	mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 7.8 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates.	LC50 - Daphnia magna (Water flea) - 0.43 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata - 99 mg/l - 72 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus - 60 d Bioconcentration factor (BCF): 7.7

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

May cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Selenium)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Selenium)
Marine pollutant: No

IATA
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Selenium)

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Toxic by inhalation.

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Selenium	7782-49-2	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Selenium	7782-49-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Selenium	7782-49-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Selenium	7782-49-2	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.1
Revision Date 01/09/2009
Print Date 10/29/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : *sec*-Butylbenzene

Product Number : 19620
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 2-Phenylbutane

Formula : $C_{10}H_{14}$
Molecular Weight : 134.22 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
sec-Butylbenzene			
135-98-8	205-227-0	-	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid, Irritant

HMIS Classification
Health Hazard: 2
Flammability: 2
Physical hazards: 0

NFPA Rating
Health Hazard: 2
Fire: 2
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	52.0 °C (125.6 °F) - closed cup
Ignition temperature	418 °C (784 °F)

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-75.5 °C (-103.9 °F)
Boiling point	173 - 174 °C (343 - 345 °F)
Flash point	52.0 °C (125.6 °F) - closed cup
Ignition temperature	418 °C (784 °F)
Lower explosion limit	0.8 %(V)
Density	0.863 g/mL at 25 °C (77 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Dermal - rabbit - > 13,792 mg/kg

Irritation and corrosion

Skin - rabbit - Skin irritation - 24 h

Eyes - rabbit - Mild eye irritation - 24 h

Sensitisation

no data available

Chronic exposure

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

Additional Information
RTECS: CY9100000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

no data available

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant: No

IATA
UN-Number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid, Irritant

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	1991-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	1991-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	1991-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 12/06/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Pyrene
Product Number	:	185515
Brand	:	Aldrich
Product Use	:	For laboratory research purposes.

Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA	Manufacturer	: Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	:	+1 800-325-5832		
Fax	:	+1 800-325-5052		
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555		
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956		

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen

Target Organs

Liver, Blood, Kidney

Other hazards which do not result in classification
Rapidly absorbed through skin.

GHS Classification
Acute toxicity, Oral (Category 5)
Skin irritation (Category 3)
Eye irritation (Category 2B)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 4)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H303	May be harmful if swallowed.
H316	Causes mild skin irritation.
H320	Causes eye irritation.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if

present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	1
Physical hazards:	0

NFPA Rating

Health hazard:	0
Fire:	1
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Benzo[*def*]phenanthrene

Formula : $C_{16}H_{10}$

Molecular Weight : 202.25 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Pyrene			
129-00-0	204-927-3	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Pyrene	129-00-0	TWA	0.2 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	crystalline
Colour	yellow

Safety data

pH	no data available
Melting/freezing point	Melting point/range: 145 - 148 °C (293 - 298 °F) - lit.
Boiling point	390.0 - 395.0 °C (734.0 - 743.0 °F)
Flash point	> 200.0 °C (> 392.0 °F)
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	1.21 g/cm3
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 4.88
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 2,700 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Conjunctive irritation. Behavioral:Excitement. Behavioral:Muscle contraction or spasticity.

Inhalation LC50
LC50 Inhalation - rat - 170.0 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Conjunctive irritation. Behavioral:Excitement. Behavioral:Muscle contraction or spasticity.

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Mild eye irritation

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Pyrene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Known to be human carcinogen (Pyrene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Inhalation studies in animals have caused:, Liver toxicity, pulmonary pathologies, intragastric pathologies, neutropenia, leukopenia, anemia, Contact with skin can cause:, hyperemia, weight loss, hematopoietic changes, Dermatitis, Chronic effects, leukocytosis

Synergistic effects

no data available

Additional Information
RTECS: UR2450000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - > 2 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 0.002 - 0.003 mg/l - 48 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	other fish - 48 h Bioconcentration factor (BCF): 4,810

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

Very toxic to aquatic life.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Pyrene)
Marine pollutant: Marine pollutant

IATA
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Pyrene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components

	CAS-No.	Revision Date
Pyrene	129-00-0	2007-03-01

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Pyrene	129-00-0	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Pyrene	129-00-0	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Pyrene	129-00-0	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Pyrene	129-00-0	1990-01-01

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MSDS Safety Information

TOP

FSC: 6810 **MSDS Date:** 03/23/1988 **MSDS Num:** BQYZZ

Submitter: F BT **LIIN:** 00F027073 **Tech Review:** 04/16/1993 **Status CD:** C

Product ID: 0403693 PHENOL,LIQUIFIED **MFN:** 01

Article: N **Kit Part:** N

Responsible Party **Cage:** 63612

Name: E M SCIENCE DIV OF E M IND INC

Address: 111 WOODCREST ROAD **Box:** N/K

City: CHERRY HILL **State:** NJ **Zip:** 08034−0395

Country: US

Info Phone Number: 513−631−0445

Emergency Phone Number: 800−424−9300

Preparer's Name: N/P

Proprietary Ind: N Review Ind: Y

Published: Y Special Project CD: N

Preparer Co. when other than Responsible Party Co.

TOP

Cage: 63612 **Assigned Ind:** N

Name: E M SCIENCE DIV OF E M INDUSTRIES INC

Address: 480 DEMOCRAT ROAD **Box:** 70

City: GIBBSTOWN **State:** NJ **Zip:** 08027

Contractor Summary

TOP

Cage: 15481 **Name:** CURTIN MATHESON SCIENTIFIC INC

Address: 9999 VETERANS MEMORIAL DR **Box:** 1546

City: HOUSTON **State:** TX **Zip:** 77038−2499

Country: US **Phone:** 713−820−9898

Cage: 63612 **Name:** E M SCIENCE DIV OF E M INDUSTRIES INC

Address: 480 DEMOCRAT ROAD **Box:** 70

City: GIBBSTOWN **State:** NJ **Zip:** 08027

Country: US **Phone:** 800−222−0342/609−423−6300

Ingredients

TOP

Cas: 108−95−2 Code: M RTECS #: SJ3325000 Code: M

Name: **PHENOL, CARBOLIC ACID SOLUTION; HYDROXYBENZENE**

% Text: 100 Environmental Wt:

Other REC Limits: 5 MG/CUM

OSHA PEL:	19 MG/CUM	Code: M	OSHA STEL:		Code:
ACGIH TLV:	19 MG/CUM (SKIN)	Code: M	ACGIH STEL:	N/P	Code:
EPA Rpt Qty:	1000 LBS		DOT Rpt Qty:	1000 LBS	

Ozone Depleting Chemical: N

========== Health Hazards Data ==========

TOP

LD50 LC50 Mixture N/K

Route Of Entry Inds − Inhalation: YES Skin: YES Ingestion: YES

Carcinogenicity Inds − NTP: NO IARC: NO OSHA: NO

Health Hazards Acute And Chronic

INHALATION: TOXIC, BURNS, HEADACHE, DIZZINESS, MUSCLE WEAKNESS. EYES/SKIN/INGESTION: TOXIC & BURNS.

Explanation Of Carcinogenicity

NONE

Signs And Symptions Of Overexposure

INHALATION: CONVULSIONS, DEATH, DAMAGE TO CENTRAL NERVOUS SYSTEM, KIDNEYS, LIVER, PANCREAS, HEART, SPLEEN, & LUNGS.

Medical Cond Aggravated By Exposure

LIVER, KIDNEY, CENTRAL NERVOUS SYSTEM, RESPIRATORY, PANCREATIC & CIRCULATORY CONDITIONS

First Aid

SKIN: IMMEDIATELY FLUSH THOROUGHLY W/LARGE AMOUNTS OF WATER. EYES: IMMEDIATELY FLUSH THOROUGHLY W/WATER FOR AT LEAST 15 MINS. INHALATION: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED. INGESTION: DON'T INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Spill Release Procedures

SPILL RESPONSE: USE CAUTION DIKE SPILL, TAKE UP W/ABSORBENT & CONTAINERIZE FOR PROPER DISPOSAL.

Neutralizing Agent

N/K

Waste Disposal Methods

TO BE PERFORMED IN COMPLIANCE W/ALL CURRENT LOCAL, STATE, & FEDERAL REGULATIONS. NA2821.

Handling And Storage Precautions

KEEP CONTAINER TIGHTLY CLOSED & PROTECT AGAINST PHYSICAL DAMAGE. STORE IN COOL/DRY AREA AWAY FROM IGNITION SOURCES & OXIDIZERS.

Other Precautions

DON'T BREATHE VAPOR. DON'T GET IN EYES, ON SKIN, OR ON CLOTHING. RETAINED RESIDUE MAY MAKE EMPTY CONTAINERS HAZARDOUS; USE CAUTION. DON'T TAKE INTERNALLY. ALUMINUM/MAGNESIUM/LEAD/ZINC ARE QUICKLY ATTA CKED BY HOT PHENOL.

Fire and Explosion Hazard Information

TOP

Flash Point Method: CC

Flash Point:

Flash Point Text: 175F

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: 1.8%

Upper Limits: 8.6%

Extinguishing Media

CO2, DRY CHEMICAL, FOAM, WATER SPRAY

Fire Fighting Procedures

WEAR SELF−CONTAINED BREATHING APPARATUS & PROTECTIVE CLOTHING.

Unusual Fire/Explosion Hazard

DANGEROUS FIRE & EXPLOSION HAZARD.

Control Measures

TOP

Respiratory Protection

NIOSH APPROVED RESPIRATOR SHOULD BE WORN IN THE ABSENCE OF ADEQUATE VENTILATION.

Ventilation

MATERIAL MUST BE HANDLED OR TRANSFERRED IN AN APPROVED FUME HOOD OR W/EQUIVALENT VENTILATION.

Protective Gloves

NEOPRENE OR EQUIVALENT

Eye Protection

SAFETY GLASSES W/SIDE SHIELDS

Other Protective Equipment

IMPERVIOUS PROTECTIVE CLOTHING, EYE WASH, &SAFETY EQUIPMENT

Work Hygienic Practices

REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. WASH THOROUGHLY AFTER HANDLING.

Supplemental Safety and Health

N/K

Physical/Chemical Properties

TOP

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:

Boiling Point:

B.P. Text: 182C

Melt/Freeze Pt:		M.P/F.P Text:	N/K
Decomp Temp:		Decomp Text:	N/K
Vapor Pres:	N/K	Vapor Density:	3.2
Volatile Org Content %:		Spec Gravity:	1.05
VOC Pounds/Gallon:		PH:	N/K
VOC Grams/Liter:		Viscosity:	N/P

Evaporation Rate & Reference: N/K
Solubility in Water: MISCIBLE
Appearance and Odor: COLORLESS TO PINK LIQUID, SHARP MEDICINAL ODOR.

Percent Volatiles by Volume: 100%
Corrosion Rate: N/K

Reactivity Data

TOP

Stability Indicator: YES

Stability Condition To Avoid: HEAT >100F (MATERIAL DISCOLORS) &OTHER SOURCES OF IGNITION
Materials To Avoid: ACIDS, OXIDIZERS, CALCIUM HYPOCHLORITE, ALKALIES, &ACETALDEHYDE
Hazardous Decomposition Products: CO, CO2

Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization N/K

:

Toxicological Information

TOP

Toxicological Information: N/P

Ecological Information

TOP

Ecological: N/P

MSDS Transport Information

TOP

Transport Information: N/P

Regulatory Information

TOP

Sara Title III Information: N/P

Federal Regulatory Information: N/P
State Regulatory Information: N/P

Other Information

TOP

Other Information: N/P

==========

Material Safety Data Sheet

Version 4.0
Revision Date 07/24/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Phenanthrene
Product Number	:	P11409
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Harmful by ingestion., Irritant

Other hazards which do not result in classification
Photosensitizer.

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.

Eyes	Causes eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{14}H_{10}$
Molecular Weight : 178.23 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Phenanthrene			
85-01-8	201-581-5	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis

			parameters		
Phenanthrene	85-01-8	TWA	0.2 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses with side-shields conforming to EN166

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

pH	no data available
Melting point	98 - 100 °C (208 - 212 °F)
Boiling point	340 °C (644 °F)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	1.063 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 4.57

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - mouse - 700.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Phenanthrene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 3.2 mg/l - 96.0 h
	LC100 - other fish - 1.5 mg/l - 1.0 h
Toxicity to daphnia	EC50 - Daphnia magna (Water flea) - 0.86 mg/l - 24 h

and other aquatic invertebrates.

EC50 - Daphnia magna (Water flea) - 0.38 mg/l - 48 h

Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae) - 1.20 mg/l - 3 h

Persistence and degradability

Biodegradability Result: 55 - 95 % - Partially biodegradable.

Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 28 d
Bioconcentration factor (BCF): 5,100

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms.

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Phenanthrene)
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Phenanthrene)
Marine pollutant: No

IATA

UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Phenanthrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards

Harmful by ingestion., Irritant

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Phenanthrene	85-01-8	1990-01-01

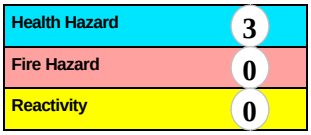
16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

GARDENA, CA
NEW BRUNSWICK, NJ

Material Safety Data Sheet

NFPA	HMIS	Personal Protective Equipment
		 See Section 15.

Section 1. Chemical Product and Company Identification

Common Name/ Trade Name	**Pentachlorophenol**
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 S. SAN PEDRO STREET GARDENA, CA 90248
Commercial Name(s)	Not available.
Synonym	Not available.
Chemical Name	Not available.
Chemical Family	Not available.
Chemical Formula	C6Cl5OH
Supplier	SPECTRUM CHEMICAL MFG. CORP. 14422 S. SAN PEDRO STREET GARDENA, CA 90248

Catalog Number(s).	P2124, P1011
CAS#	87-86-5
RTECS	SM6300000
TSCA	TSCA 8(b) inventory: Pentachlorophenol
CI#	Not available.

IN CASE OF EMERGENCY
CHEMTREC (24hr) 800-424-9300

CALL (310) 516-8000

Section 2.Composition and Information on Ingredients

		Exposure Limits			
Name	**CAS #**	**TWA (mg/m³)**	**STEL (mg/m³)**	**CEIL (mg/m³)**	**% by Weight**
1) Pentachlorophenol	87-86-5	0.5			100

Toxicological Data on Ingredients

Pentachlorophenol:
ORAL (LD50): Acute: 27 mg/kg [Rat]. 117 mg/kg [Mouse].
VAPOR (LC50): Acute: 502 ppm 4 hour(s) [Rat].

Section 3. Hazards Identification

Potential Acute Health Effects

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion. Hazardous in case of skin contact (permeator), of inhalation. Slightly hazardous in case of skin contact (corrosive, sensitizer). Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Continued on Next Page

Potential Chronic Health Effects	**CARCINOGENIC EFFECTS**: Not available. **MUTAGENIC EFFECTS**: Not available. **TERATOGENIC EFFECTS**: Not available. **DEVELOPMENTAL TOXICITY**: Not available. The substance is toxic to blood, kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.
Skin Contact	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.
Serious Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
Inhalation	Allow the victim to rest in a well ventilated area. Seek immediate medical attention.
Serious Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.
Ingestion	Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.
Serious Ingestion	Not available.

Section 5. Fire and Explosion Data

Flammability of the Product	Non-flammable.
Auto-Ignition Temperature	Not applicable.
Flash Points	Not applicable.
Flammable Limits	Not applicable.
Products of Combustion	Not available.
Fire Hazards in Presence of Various Substances	Not applicable.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	Not applicable.
Special Remarks on Fire Hazards	Not available.
Special Remarks on Explosion Hazards	Not available.

Continued on Next Page

Section 6. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container.
Large Spill	Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7. Handling and Storage

Precautions	Keep locked up Keep container dry. Do not ingest. Do not breathe dust. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes
Storage	Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	TWA: 0.5 (mg/m^3) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid.	**Odor**	Pungent. (Strong.)
Molecular Weight	266.34 g/mole	**Taste**	Not available.
pH (1% soln/water)	Not available.	**Color**	White.

Boiling Point	Decomposes. (310°C or 590°F)
Melting Point	188°C (370.4°F)
Critical Temperature	Not available.
Specific Gravity	1.987 (Water = 1)
Vapor Pressure	Not applicable.
Vapor Density	9.2 (Air = 1)
Volatility	Not available.
Odor Threshold	Not available.
Water/Oil Dist. Coeff.	Not available.
Ionicity (in Water)	Not available.
Dispersion Properties	Not available.
Solubility	Very slightly soluble in cold water.

Continued on Next Page

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	Not available.
Incompatibility with various substances	Not available.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	Not available.
Special Remarks on Corrosivity	Not available.
Polymerization	No.

Section 11. Toxicological Information

Routes of Entry	Dermal contact. Eye contact. Inhalation. Ingestion.
Toxicity to Animals	**WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.** Acute oral toxicity (LD50): 27 mg/kg [Rat]. Acute toxicity of the vapor (LC50): 502 ppm 4 hour(s) [Rat].
Chronic Effects on Humans	The substance is toxic to blood, kidneys, lungs, the nervous system, liver, mucous membranes.
Other Toxic Effects on Humans	Very hazardous in case of skin contact (irritant), of ingestion. Hazardous in case of skin contact (permeator), of inhalation. Slightly hazardous in case of skin contact (corrosive, sensitizer).
Special Remarks on Toxicity to Animals	Not available.
Special Remarks on Chronic Effects on Humans	Not available.
Special Remarks on other Toxic Effects on Humans	Not available.

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	The products of degradation are more toxic.
Special Remarks on the Products of Biodegradation	Not available.

Continued on Next Page

Section 13. Disposal Considerations

Waste Disposal

Section 14. Transport Information

DOT Classification	CLASS 6.1: Poisonous material.
Identification	: Chlorophenol, solid : UN2020 PG: III
Special Provisions for Transport	Marine Pollutant
DOT (Pictograms)	

Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Pentachlorophenol
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Pentachlorophenol
Pennsylvania RTK: Pentachlorophenol
Massachusetts RTK: Pentachlorophenol
TSCA 8(b) inventory: Pentachlorophenol
SARA 313 toxic chemical notification and release reporting: Pentachlorophenol

California Proposition 65 Warnings

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Pentachlorophenol

Other Regulations

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications

WHMIS (Canada)

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC)

R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R48/20- Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R48/25- Toxic: danger of serious damage to health in case of prolonged exposure if swallowed.

HMIS (U.S.A.)

Health Hazard	3
Fire Hazard	0
Reactivity	0
Personal Protection	E

National Fire Protection Association (U.S.A.)

Health
Flammability
Reactivity
Specific hazard

WHMIS (Canada) (Pictograms)

Continued on Next Page

DSCL (Europe) (Pictograms)

TDG (Canada) (Pictograms)

ADR (Europe) (Pictograms)

Protective Equipment

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Section 16. Other Information

MSDS Code	**P3190**
References	Not available.
Other Special Considerations	Not available.

Validated by Sonia Owen on 8/11/2006.

Verified by Sonia Owen.

Printed 9/13/2006.

CALL (310) 516-8000

Notice to Reader

Material Safety Data Sheet

p−Cresol

ACC# 17610

Section 1 − Chemical Product and Company Identification

MSDS Name: p−Cresol
Catalog Numbers: AC110590000, AC110590050, AC110591000, AC110595000, AC405740000, AC405740040 AC405740040, AC405740050, AC405741000, AC405745000
Synonyms: 4−Cresol; p−Cresylic Acid; 1−Hydroxy−4−Methylbenzene; p−Hydroxytoluene; 4−Hydroxytoluene; p−Methylphenol.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800−ACROS−01
For emergencies in the US, call CHEMTREC: 800−424−9300

Section 2 − Composition, Information on Ingredients

CAS#	*Chemical Name*	*Percent*	*EINECS/ELINCS*
106−44−5	p−Cresol	>98	203−398−6

Section 3 − Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless to light yellow solid. Flash Point: 187 deg F.

Danger! Toxic. Corrosive. Causes eye and skin burns. Causes digestive and respiratory tract burns. May be fatal if inhaled. Harmful if swallowed or absorbed through the skin. May cause liver and kidney damage. Hygroscopic (absorbs moisture from the air). Light sensitive. Material is a solid at room temperature that melts upon moderate heating into a combustible liquid with a flash point below 200°F(93.3°C). May cause sensitization by skin contact.
Target Organs: Kidneys, central nervous system, liver, respiratory system.

Potential Health Effects

Eye: Causes eye burns. May result in corneal injury. Contact with liquid is corrosive to the eyes and causes severe burns. May cause conjunctivitis and keratitis.
Skin: May be absorbed through the skin in harmful amounts. Causes severe skin irritation and burns. May cause sensitization by skin contact. Initial contact may cause prickling and intense burning. Affected tissue may initially show white discoloration, wrinkling, and softening, which subsequently may become gangrenous.
Ingestion: May cause severe and permanent damage to the digestive tract. May cause vascular collapse and damage. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause kidney, liver and spleen damage. Rapidly absorbed from the gastrointestinal tract. Cresols may cause abnormalities of the central nervous system, respiratory system, spleen and pancreas.
Inhalation: May be fatal if inhaled. Irritation may lead to chemical pneumonitis and pulmonary edema. May cause liver and kidney damage. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. Causes chemical burns to the respiratory tract. May cause headache. May cause nausea and possible vomiting. Exposure to vapors or aerosols produced by high temperature processes may cause systemic absorption. If sufficient amounts are absorbed vascular collapse, shock, hypthermia, unconciousness and respiratory failure are possible.
Chronic: May cause liver and kidney damage. Repeated exposure may cause sensitization dermatitis. May cause appetite loss, diarrhea, skin abnormalities, and digestive tract disturbances.

Section 4 − First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner which limits further exposure. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2−4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth−to−mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 − Fire Fighting Measures

General Information: As in any fire, wear a self−contained breathing apparatus in pressure−demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May polymerize explosively when involved in a fire. Material is a solid at room temperature that melts upon moderate heating into a combustible liquid with a flash point below 200°F(93.3°C).
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol−resistant foam, or water

spray.
Flash Point: 187e deg F (86.11 deg C)
Autoignition Temperature: 1038 deg F (558.89 deg C)
Explosion Limits, Lower:1.1% @ 150C
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 2; Instability: 0

Section 6 − Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Remove all sources of ignition. Provide ventilation. Evacuate unnecessary personnel.

Section 7 − Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well−ventilated area. Minimize dust generation and accumulation. Ground and bond containers when transferring material. Do not get in eyes, on skin, or on clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not ingest or inhale. Discard contaminated shoes. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from sources of ignition. Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well−ventilated area away from incompatible substances. Corrosives area. If the water content is below approximately 0.3% and the temperature exceeds 268°F (120°C), violent corrosion of aluminum and its alloys may occur.

Section 8 − Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	*ACGIH*	*NIOSH*	*OSHA − Final PELs*
p−Cresol	5 ppm TWA; Skin − potential significant contribution to overall exposure by the cutaneous r oute	2.3 ppm TWA; 10 mg/m3 TWA 250 ppm IDLH	none listed

OSHA Vacated PELs: p−Cresol: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 − Physical and Chemical Properties

Physical State: Solid
Appearance: colorless to light yellow
Odor: phenol−like
pH: Not available.
Vapor Pressure: 1 mm Hg @ 53C
Vapor Density: 3.72 (air=1)
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 396 deg F
Freezing/Melting Point:35 deg C
Decomposition Temperature: Not available.
Solubility: 22.6g/L @ 40C.
Specific Gravity/Density:1.03 (water=1)
Molecular Formula:C7H8O
Molecular Weight:108.0554

Section 10 − Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Low melting point solid.
Conditions to Avoid: Incompatible materials, light, ignition sources, excess heat.
Incompatibilities with Other Materials: Oxidizing agents, strong acids, bases, active metals, coatings, nitric acid, plastics, rubber, aliphatic amines, amides, chlorosulfonic acid, oleum, alkalies.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, cresol.
Hazardous Polymerization: Has not been reported.

Section 11 − Toxicological Information

RTECS#:
CAS# 106−44−5: GO6475000
LD50/LC50:
CAS# 106−44−5:
Draize test, rabbit, eye: 103 mg Severe;
Draize test, rabbit, skin: 517 mg/24H Severe;
Inhalation, rat: LC50 = >710 mg/m3/1H;
Inhalation, rat: LC50 = 29 mg/m3;
Oral, mouse: LD50 = 344 mg/kg;
Oral, mouse: LD50 = 160 mg/kg;
Oral, rabbit: LD50 = 620 mg/kg;
Oral, rat: LD50 = 207 mg/kg;
Oral, rat: LD50 = 270 mg/kg;
Skin, rabbit: LD50 = 301 mg/kg;
Skin, rabbit: LD50 = 301 mg/kg;
Skin, rat: LD50 = 750 mg/kg;
Skin, rat: LD50 = 750 mg/kg;
Carcinogenicity:
CAS# 106−44−5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found.
Teratogenicity: No information available.
Reproductive Effects: No information found.
Mutagenicity: No information available.
Neurotoxicity: No information found.
Other Studies:

Section 12 − Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 19−28.6 mg/L; 96 Hr.; UnspecifiedFish: LC50 = 19−28.6 mg/L; 96 Hr.; UnspecifiedBacteria: Phytobacterium phosphoreum: EC50 = 1.6 mg/L; 15 Minutes; Microtox test Goldfish (soft water) TLm=49.1−19ppm/24−96H Bluegill (soft water) TLm=22.2−20.8ppm/24−96H Fathead minnow (hard water) TLm=18−13.4ppm/24−96H Guppy (hard water) TLm=18−50ppm/24−96H
Environmental: In air, substance will react with photochemically−produced hydroxyl radicals (day) and nitrate radicals (night). In water, substance will biodegrade within days. Substance is mobile in most soils and will biodegrade.
Physical: No information available.
Other: Please refer to the Handbook of Environmental Fate and Exposure Data (Vol 1) for additional information.

Section 13 − Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P−Series: None listed.
RCRA U−Series: None listed.

Section 14 − Transport Information

	US DOT	***Canada TDG***
Shipping Name:	CRESOLS, SOLID	CRESOLS
Hazard Class:	6.1	6.1(8)
UN Number:	UN2076	UN2076
Packing Group:	II	II

Section 15 − Regulatory Information

US FEDERAL

TSCA
CAS# 106−44−5 is listed on the TSCA inventory.
Health &Safety Reporting List
CAS# 106−44−5: Effective 10/4/82, Sunset 10/4/92
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 106−44−5: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 106−44−5: acute, flammable.
Section 313
This material contains p−Cresol (CAS# 106−44−5, >98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 106−44−5 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 106−44−5 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 106−44−5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T C

Risk Phrases:

R 34 Causes burns.
R 24/25 Toxic in contact with skin and if swallowed.

Safety Phrases:

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 106−44−5: 2

Canada − DSL/NDSL

CAS# 106−44−5 is listed on Canada's DSL List.

Canada − WHMIS

This product has a WHMIS classification of B3, D1A, E.

Canadian Ingredient Disclosure List

CAS# 106−44−5 is listed on the Canadian Ingredient Disclosure List.

Section 16 − Additional Information

MSDS Creation Date: 5/05/1999
Revision #5 Date: 2/01/2005

MATERIAL SAFETY DATA SHEET

Date Printed: 05/16/2006
Date Updated: 02/05/2006
Version 1.7

Section 1 - Product and Company Information

Product Name	TETRACHLOROETHENE
Product Number	46260
Brand	RIEDEL
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
TETRACHLOROETHYLENE	127-18-4	Yes

Formula	C2Cl4
Synonyms	Ankilostin * Antisol 1 * Carbon bichloride * Carbon dichloride * Czterochloroetylen (Polish) * Didakene * Dilatin PT * Dow-per * ENT 1,860 * Ethene, tetrachloro- * Ethylene tetrachloride * Fedal-UN * NCI-C04580 * PER * Perawin * Perchloorethyleen, per (Dutch) * Perchlor * Perchloraethylen, per (German) * Perchlorethylene * Perchloroethylene (ACGIH:OSHA) * Perclene * Perclene D * Percloroetilene (Italian) * Percosolve * PERK * Perklone * Persec * RCRA waste number U210 * Tetlen * Tetracap * Tetrachlooretheen (Dutch) * Tetrachloraethen (German) * Tetrachlorethylene * Tetrachloroethene * Tetrachloroethylene (IUPAC) * 1,1,2,2-Tetrachloroethylene * Tetrachloroethylene (DOT:OSHA) * Tetracloroetene (Italian) * Tetraleno * Tetralex * Tetravec * Tetroguer * Tetropil
RTECS Number:	KX3850000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic. Dangerous for the environment.
Irritating to eyes, respiratory system and skin. Toxic to aquatic organisms. May cause cancer.
Target organ(s): Liver. Kidneys. Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 0*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.
Store at 2-8°C

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	STEL	100 PPM
USA	ACGIH	TWA	25 PPM
USA	MSHA Standard-air	TWA	100 PPM (670 MG/M3)
USA	OSHA.	PEL	8H TWA 100 PPM;CL 200;PK 300/5
USA	NIOSH		LOWEST FEASIBLE CONC.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	60 MG/M3
Poland		NDSCh	480 MG/M3
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Clear liquid Color: Colorless

Property	Value	At Temperature or Pressure
Molecular Weight	165.83 AMU	
pH	N/A	
BP/BP Range	120.0 - 122.0 °C	
MP/MP Range	- 22.0 °C	
Freezing Point	N/A	
Vapor Pressure	13 mmHg	20 °C
Vapor Density	5.83 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	1.622 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	

Volatile%	N/A
VOC Content	N/A
Water Content	N/A
Solvent Content	N/A
Evaporation Rate	N/A
Viscosity	N/A
Surface Tension	N/A
Partition Coefficient	N/A Log Kow: 3.4
Decomposition Temp.	N/A
Flash Point	N/A
Explosion Limits	N/A
Flammability	N/A
Autoignition Temp	N/A
Refractive Index	1.506
Optical Rotation	N/A
Miscellaneous Data	N/A
Solubility	N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents, Strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Nerves. Heart. Liver. Kidneys.

SIGNS AND SYMPTOMS OF EXPOSURE
Damage to the kidneys. Damage to the liver. Narcotic effect.
Exposure can cause:

TOXICITY DATA

Oral
Rat
2629 mg/kg
LD50

Inhalation
Rat
34,200 mg/m3
LC50

Intraperitoneal
Rat
4678 MG/KG
LD50

Oral
Mouse
8100 mg/kg
LD50
Remarks: Behavioral:General anesthetic.

Inhalation
Mouse
5,200 ppm
LC50

Subcutaneous
Mouse
65 GM/KG
LD50
Remarks: Behavioral:Ataxia. Behavioral:Sleep.

Intraperitoneal
Dog
2100 MG/KG
LD50
Remarks: Liver:Liver function tests impaired.

IRRITATION DATA

Skin
Rabbit
810 mg
24H
Remarks: Severe irritation effect

Skin
Rabbit
500 mg
24H
Remarks: Mild irritation effect

Eyes
Rabbit
162 mg
Remarks: Mild irritation effect

Eyes
Rabbit
500 mg
24H
Remarks: Mild irritation effect

CHRONIC EXPOSURE - CARCINOGEN
Result: This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Inhalation
Dose: 200 PPM
Exposure Time: 6H/2Y

Frequency: I
Result: Blood:Leukemia Tumorigenic:Carcinogenic by RTECS criteria. Tumorigenic Effects: Testicular tumors.

Species: Mouse
Route of Application: Oral
Dose: 195 GM/KG
Exposure Time: 50W
Frequency: I
Result: Liver:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse
Route of Application: Inhalation
Dose: 100 PPM
Exposure Time: 6H/2Y
Frequency: I
Result: Liver:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse
Route of Application: Oral
Dose: 240 GM/KG
Exposure Time: 62W
Frequency: I
Result: Liver:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Rat
Route of Application: Inhalation
Dose: 200 PPM
Exposure Time: 6H/2Y
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Kidney, Ureter, Bladder:Kidney tumors. Blood:Leukemia

Species: Mouse
Route of Application: Inhalation
Dose: 100 PPM
Exposure Time: 6H/2Y
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.

IARC CARCINOGEN LIST

Rating: Group 2A

NTP CARCINOGEN LIST

Rating: Clear evidence.
Species: Mouse
Route: Gavage

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 1000 PPM/24H
Route of Application: Inhalation
Exposure Time: (14D PRE/1-22D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 1000 PPM/24H
Route of Application: Inhalation

Exposure Time: (1-22D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 300 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Homeostasis

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 100 MG/L
Cell Type: lung
Mutation test: Unscheduled DNA synthesis

Species: Rat
Dose: 97 UMOL/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Rat
Route: Inhalation
Dose: 500 PPM
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Intraperitoneal
Dose: 4 MMOL/KG
Mutation test: DNA damage

Species: Mouse
Route: Oral
Dose: 1 GM/KG
Mutation test: Other mutation test systems

Species: Mouse
Dose: 100 PPM
Cell Type: S. typhimurium
Mutation test: Host-mediated assay

Species: Mouse
Route: Inhalation
Dose: 500 PPM
Mutation test: sperm

Species: Hamster
Dose: 190 UMOL/L
Cell Type: lung
Mutation test: SLN

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 900 PPM/7H
Route of Application: Inhalation
Exposure Time: (7-13D PREG)
Result: Effects on Newborn: Behavioral. Effects on Newborn:

Biochemical and metabolic. Effects on Newborn: Live birth index (# fetuses per litter; measured after birth).

Species: Rat
Dose: 300 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat
Dose: 1000 PPM/6H
Route of Application: Inhalation
Exposure Time: (MULTIGENERATION)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Live birth index (# fetuses per litter; measured after birth). Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive).

Species: Mouse
Dose: 500 PPM/7H
Route of Application: Inhalation
Exposure Time: (5D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Section 12 - Ecological Information

No data available.

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish
Species: Cyprinodon variegatus (Sheepshead minnow)
Time: 96 h
Value: 9.8 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: 7.5 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 13 mg/l

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96 h
Value: 4.9 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations. (DN)Requires special label: "Contains a substance which is regulated by Dannish work environmental law due to the risk of carcinogenic properties."

Section 14 - Transport Information

DOT
Proper Shipping Name: Tetrachloroethylene
UN#: 1897
Class: 6.1
Packing Group: Packing Group III
Hazard Label: Toxic Substance
PIH: Not PIH

IATA
Proper Shipping Name: Tetrachloroethylene
IATA UN Number: 1897
Hazard Class: 6.1
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xn-N
Indication of Danger: Harmful. Dangerous for the environment.
R: 40-51/53
Risk Statements: Limited evidence of a carcinogenic effect. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 23-36/37-61
Safety Statements: Do not breathe vapor. Wear suitable protective clothing and gloves. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic. Dangerous for the environment.
Risk Statements: Irritating to eyes, respiratory system and skin. Toxic to aquatic organisms. May cause cancer.
Safety Statements: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection.
US Statements: Target organ(s): Liver. Kidneys. Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 0.1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

ALGOMA STEEL INC. - Material Safety Evaluation

Product Name: PCB(POLYCHLORINATED BIPHENYLS)	HAZARD RATING: Health High	Skin Moderate
Material Type: Transformer, Capacitor Fluid Physical State: Liquid ** REVISED **	Fire Minimal	Reactivity Low

INGREDIENT LISTING

Ingredient	CAS #	%	TWAEV
Polychlorinated Biphenyls **REFER TO ALGOMA PCB MANUAL**	1336-36-3	Var.	.05 mg/m3

TWAEV=time weighted avg. exp. value

mg/m3=mgrams/cubic metre

ppm=parts per million

C=ceiling exposure value

N/A=not applicable

N/E=not established

EFFECTS OF OVEREXPOSURE

Route/Entry	Effects	First Aid
Inhalation	Not a serious hazard at room temperature. Hot fluid may produce vapour which irritates nose & throat.	Remove to fresh air. Call Medical if irritation persists.
Swallowing	May cause irritation to mouth, throat and gastrointestinal system.	Call Medical if necessary.
Eyes	May cause irritation.	Flush with clean water for 15 min. Call Medical if irritation persists.
Skin	May be absorbed through intact skin. May produce irritation, dermatitis, damage to liver & reproductive organs with prolonged/repeated overexposure.	Wash thoroughly with soap and water after handling. Call Medical if irritation persists. Launder contaminated clothing before re-use.

Manufacturer: V A R I O U S

Telephone: ( ) - 0

Prepared by:
Environmental Health & Safety
Feb. 1, 2000.

PHYSICAL DATA

% Volatile by Volume N/E	Solubility in Water N/E	Boiling Point ½C <375
Vapour Pressure (mmHg) N/E	Specific Gravity (H2O=1) 1.44 @ 30 deg C	Melting Point ½C N/A
Vapour Density (air=1) N/E	Evaporation Rate N/A	pH N/A

HANDLING PRECAUTIONS

Flash Point = >140 ½C / >284 ½F Flammable Limits: %LEL N/E
Auto-ignition Temp. = N/E ½C / N/E ½F %UEL N/E
Fire Extinguishing Media:
Use carbon dioxide, dry chemical, foam or sand. Firefighters wear Self Contained Breathing Apparatus.
Explosion Hazards:
None.

Ventilation:
General. Local exhaust in confined spaces or if ventilation inadequate.

Reactivity:
Stable. Thermal decomposition products may include oxides of carbon, hydrogen chloride, phenols and aldehydes.

Storage:
Keep container tightly sealed and away from excess heat & ignition sources. Refer to Algoma Steel PCB Safe Handling Procdures Manual.

Spill Cleanup & Disposal:
Report spills to 3294-3295. Contain spill. Absorb with inert material ie) sand, clay. Do not allow spill to enter environment. Wash area with varsol. See PCB Manual for disposal requirements. Wear proper protective equipment. Use trained personnel for clean-up.

Special:
Avoid inhalation of heated vapour or mist. Avoid skin and eye contact. PCB's are suspected of increasing the risk of contracting cancer with prolonged or repeated overexposure.

PERSONAL PROTECTIVE EQUIPMENT

Respirator:
Use combination organic vapour, mist respirator. In confined spaces or areas of inadequate ventilation, use Self Contained Breathing Apparatus.

Eyes: Use chemical goggles.	Clothes: Disposable coveralls.
Gloves: Solvex.	Special: Wear proper protective equipment to avoid all contact.

Material Safety Data Sheet

Catalog Number: 207935
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 207935

Product name: o-CRESOL

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
o-CRESOL	95-48-7	90 - 100%	5 ppm TWA	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Combustible material, Toxic: danger of very serious irreversible effects in contact with skin. May also have serious irreversible effects through inhalation or ingestion.

Category of Danger:
Toxic , Carc. cat. 3 , Lachrymator

Principle routes of exposure: Skin
Inhalation: Harmful: possible risk of irreversible effects through inhalation.
Ingestion: Harmful: danger of serious damage to health if ingested.
Skin contact: Toxic: danger of serious damage to health by prolonged skin contact.
Eye contact: Risk of serious damage to eyes
Vapors extremely irritating to eyes an respiratory tract

ANSI Classification Irritant - eye, severe
Statements of hazard COMBUSTIBLE MATERIAL AND VAPOR.
Toxic in contact with skin
CAUSES EYE IRRITATION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Statement of First Aid If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Call a physician. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician. In case of contact, flush eyes with running water for at least 15 minutes. Consult a physician for irritation or any other symptom.

Precautions - ANSI Label Do not taste or swallow. Wash thoroughly after handling. Avoid contact with skin, eyes and clothing Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not breathe vapors or spray mist Avoid breathing vapors.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician Remove and wash contaminated clothing before re-use
Ingestion: Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician Drink 1 or 2 glasses of water. Induce vomiting if person is conscious. If swallowed, seek medical advice immediately and show this container or label.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or `alcohol` foam.
Extinguishing media which must not be used for safety reasons:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards:	Combustible liquid. Products of combustion include fumes of cresols and other aromatic degradation products. Flammable
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	81 °C (closed cup and DIN 51758)
Autoignition temperature:	555 °C

NFPA rating:

NFPA Health:	3
NFPA Flammability:	2
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Remove all sources of ignition. Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.

Technical measures/storage conditions: Keep containers tightly closed in a cool, well-ventilated place. Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place.

Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless crystals or liquid; becomes dark with age or exposure to air and light; phenolic odor
Physical state:	Solid
Formula:	C7H8O
Molecular weight:	108.14
Melting point/range:	31 °C
Boiling point/range:	191 °C at 1013 hPa
Density:	1.0465 g/cm3 at 20 °C
Vapor pressure:	.24 hPa at 20 °C
Evaporation rate:	No data available
Vapor density:	3.7 (air = 1)
Solubility (in water):	Soluble
Flash point:	81 °C (closed cup and DIN 51758)
Autoignition temperature:	555 °C

10. STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions.
Polymerization: None under normal processing.
Hazardous decomposition products: Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid: -

Forms explosive mixture with air. Incompatible with strong acids, oxidizers, alkalies, aliphatic amines, amides, chlorosulfonic acid, oleum. Liquid attacks some plastics and rubber.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	**RTECS Number:**	**Selected LD50s and LC50s**
o-CRESOL	GO6300000	Inhalation LC50 Rat : >1220 mg/m³/1H Inhalation LC50 Mouse : 179 mg/m³/2H Oral LD50 Rat : 121 mg/kg Oral LD50 Mouse : 344 mg/kg Dermal LD50 Rabbit : 890 mg/kg

Chronic toxicity: Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects: May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation: No data is available on the product itself.
Carcinogenic effects: Possible carcinogen
Mutagenic effects: No data is available on the product itself.
Reproductive toxicity: No data is available on the product itself.

Components	NIOSH - Health Effects	NIOSH - Target Organs
o-CRESOL	Skin, liver, kidney, and pancreas effects	Eyes, skin, respiratory system, CNS, liver, kidneys, pancreas, CVS

12. ECOLOGICAL INFORMATION

Mobility: No data available
Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
o-CRESOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
o-CRESOL	2	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
o-CRESOL	Not Listed	EC50 (5,15,30 min) Photobacterium phosphoreum:22.6 - 26.5 mg/L Microtox test:15 °C	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
o-CRESOL	Rank (of 275): 195	indicator 2; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
o-CRESOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.
Contaminated packaging: Do not re-use empty containers
Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: 2811

DOT:

Proper shipping name: Toxic solid, organic, n.o.s.
IATA Hazard Label(s): Toxic
Hazard Class 6.1 -
Toxic substances - dermal
Packing group: III

Emergency Response Guide Number (ERG): 154

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
o-CRESOL	RQ = 100 pounds (45.4 kg); (Listed under "Cresols"); also listed as o-Cresylic acid

TDG (Canada):

WHMIS hazard class:
B3 combustible liquids
D1a very toxic materials
E corrosive material

:  :  : 

IMDG/IMO

Proper shipping name: Toxic solid, organic, n.o.s.

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
o-CRESOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components
o-CRESOL

Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Not Listed
Australia (AICS):	Present
EU EINECS List -	202-423-8; C7H8O
Inventory - Japan:	3-499; 4-57
Korean KECL:	KE-24792
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
o-CRESOL	Not Listed	extraordinarily hazardous	sn 1426	environmental hazard

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
o-CRESOL	[present]	Not Listed	Present on HAP list	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
o-CRESOL	form R reporting required for 1.0% de minimis concentration	TPQ = 1000/10,000 pounds; RQ = 100 pounds	None	None

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

Material Safety Data Sheet

Version 4.0
Revision Date 07/28/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Propylbenzene
Product Number	:	P52407
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid

Target Organs

Lungs, Eyes, Kidney

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H335	May cause respiratory irritation.
H401	Toxic to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P331	Do NOT induce vomiting.

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	2
Physical hazards:	0

NFPA Rating

Health hazard:	1
Fire:	2
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Ingestion Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1-Phenylpropane

Formula : C_9H_{12}

Molecular Weight : 120.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Propylbenzene			
103-65-1	203-132-9	601-024-00-X	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
For prolonged or repeated contact use protective gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-99 °C (-146 °F) - lit.
Boiling point	159 °C (318 °F) - lit.
Flash point	42.0 °C (107.6 °F) - closed cup
Ignition temperature	450 °C (842 °F)
Lower explosion limit	0.8 %(V)
Upper explosion limit	6 %(V)
Density	0.862 g/cm3 at 25 °C (77 °F)
Water solubility	slightly soluble

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - 6,040 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).

LC50 Inhalation - rat - 2 h - 65000 ppm

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: DA8750000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 1.55 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 2 mg/l - 24 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propyl benzene
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2364 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: PROPYLBENZENE
Marine pollutant: No

IATA
UN-Number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propylbenzene

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Propylbenzene	103-65-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Propylbenzene	103-65-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Propylbenzene	103-65-1	2007-03-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.0
Revision Date 07/06/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Nickel
Product Number	:	577995
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable solid, Carcinogen, Target Organ Effect, Skin sensitiser

Target Organs

Lungs

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H228	Flammable solid.
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.
H400	Very toxic to aquatic life.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P273	Avoid release to the environment.
P280	Wear protective gloves.
P314	Get medical advice/attention if you feel unwell.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	3

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	3

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.

Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Ni
Molecular Weight : 58.69 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Nickel, powder [particle diameter < 1 mm]			
7440-02-0	231-111-4	028-002-01-4	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

Handle and store under inert gas. Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Nickel, powder [particle diameter < 1 mm]	7440-02-0	TWA	1 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	1.5 mg/m3	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Dermatitis Pneumoconiosis Not suspected as a human carcinogen: The agent is not suspected to be a human carcinogen on the basis of properly conducted epidemiologic studies in humans. These studies have sufficiently long follow-up, reliable exposure histories, sufficiently high dose, and adequate statistical power to conclude that exposure to the agent does not convey a significant risk of cancer to humans; OR, the evidence suggesting a lack of carinogenicity in experimental anmimals is supporrted by mechenistic data.				
		TWA	1 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	white, silver, metallic

Safety data

pH	no data available
Melting point	1,453 °C (2,647 °F) - lit.
Boiling point	2,732 °C (4,950 °F) - lit.

Flash point	not applicable
Flammability (solid, gas)	The substance or mixture is a flammable solid with the subcategory 2.
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	1 hPa (1 mmHg) at 1,810 °C (3,290 °F)
Density	8.9 g/cm3 at 25 °C (77 °F)
Water solubility	insoluble

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
acids, Oxidizing agents, Sulphur compounds, Hydrogen gas, Oxygen, Methanol, organic solvents, Aluminium, Fluorine, Ammonia

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Nickel/nickel oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
May cause allergic skin reaction.

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Nickel, powder [particle diameter < 1 mm])
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be a human carcinogen (Nickel, powder [particle diameter < 1 mm])
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (GHS)
no data available

Specific target organ toxicity - repeated exposure (GHS)
Inhalation - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Additional Information

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 1.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 1 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3089 Class: 4.1 Packing group: II
Proper shipping name: Metal powders, flammable, n.o.s. (Nickel, powder [particle diameter < 1 mm])
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 3089 Class: 4.1 Packing group: II EMS-No: F-G, S-G
Proper shipping name: METAL POWDER, FLAMMABLE, N.O.S. (Nickel, powder [particle diameter < 1 mm])
Marine pollutant: No

IATA
UN-Number: 3089 Class: 4.1 Packing group: II
Proper shipping name: Metal powder, flammable, n.o.s. (Nickel, powder [particle diameter < 1 mm])

15. REGULATORY INFORMATION

OSHA Hazards
Flammable solid, Carcinogen, Target Organ Effect, Skin sensitiser

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Nickel, powder [particle diameter < 1 mm]	7440-02-0	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Nickel, powder [particle diameter < 1 mm]	7440-02-0	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Nickel, powder [particle diameter < 1 mm]	7440-02-0	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Nickel, powder [particle diameter < 1 mm]	7440-02-0	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Nickel, powder [particle diameter < 1 mm]	7440-02-0	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.0
Revision Date 07/28/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Butylbenzene
Product Number	:	B90203
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H226	Flammable liquid and vapour.
H400	Very toxic to aquatic life.

Precautionary statement(s)

P273	Avoid release to the environment.

HMIS Classification

Health hazard:	0
Flammability:	2
Physical hazards:	0

NFPA Rating

Health hazard:	0
Fire:	2
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms	:	1-Phenylbutane
Formula	:	$C_{10}H_{14}$
Molecular Weight	:	134.22 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Butylbenzene			
104-51-8	203-209-7	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-88 °C (-126 °F) - lit.
Boiling point	183 °C (361 °F) - lit.
Flash point	59.0 °C (138.2 °F) - closed cup
Ignition temperature	412 °C (774 °F)
Lower explosion limit	0.8 %(V)
Upper explosion limit	5.8 %(V)
Density	0.86 g/cm3 at 25 °C (77 °F)
Water solubility	insoluble

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: CY9070000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 0.34 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant: No

IATA
UN-Number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 04/08/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Naphthalene
Product Number	:	147141
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable solid, Carcinogen, Highly toxic by inhalation, Toxic by ingestion, Irritant

Target Organs

Eyes, Blood, Kidney, Lungs, Central nervous system, Liver, Heart

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H228	Flammable solid.
H302	Harmful if swallowed.
H315 + H320	Causes skin and eye irritation.
H330	Fatal if inhaled.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P284	Wear respiratory protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/physician.
P501	Dispose of contents/container to an approved waste disposal plant.

HMIS Classification

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	2

NFPA Rating

Health hazard: 4
Fire: 2
Reactivity Hazard: 2

Potential Health Effects

Inhalation May be fatal if inhaled. Causes respiratory tract irritation.
Skin May be harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{10}H_8$
Molecular Weight : 128.17 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Naphthalene			
91-20-3	202-049-5	601-052-00-2	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Naphthalene	91-20-3	TWA	10 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye & Upper Respiratory Tract irritation Hematologic effects Eye damage Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories. Danger of cutaneous absorption				
		STEL	15 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Hematologic effects Eye damage Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories. Danger of cutaneous absorption				
		TWA	10 ppm 50 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	15 ppm 75 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	10 ppm 50 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m3 is approximate.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

pH	no data available
Melting point	80 - 82 °C (176 - 180 °F) - lit.

Boiling point	218 °C (424 °F) - lit.
Flash point	80.0 °C (176.0 °F) - closed cup
Flammability (solid, gas)	The substance or mixture is a flammable solid with the subcategory 1.
Ignition temperature	526 °C (979 °F)
Lower explosion limit	0.9 %(V)
Upper explosion limit	5.9 %(V)
Vapour pressure	1.3 hPa (1.0 mmHg) at 53.0 °C (127.4 °F) 0.04 hPa (0.03 mmHg) at 25.0 °C (77.0 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 3.30

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - 490.0 mg/kg

LC50 Inhalation - rat - 1 h - > 340 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Lacrimation. Behavioral:Somnolence (general depressed activity).

LD50 Dermal - rabbit - 20,000 mg/kg

Skin corrosion/irritation
Serious eye damage/eye irritation
Eyes - rabbit - Mild eye irritation

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Naphthalene)
	2B - Group 2B: Possibly carcinogenic to humans (Naphthalene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen (Naphthalene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (GHS)
no data available

Specific target organ toxicity - repeated exposure (GHS)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be fatal if inhaled. Causes respiratory tract irritation.
Ingestion	Toxic if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer., Naphthalene is retinotoxic and systemic absorption of its vapors above 15ppm, may result in:, cataracts, optic neuritis, corneal injury, Eye irritation, Ingestion may provoke the following symptoms:, hemolytic anemia, hemoglobinuria, Nausea, Headache, Vomiting, Gastrointestinal disturbance, Convulsions, anemia, Kidney injury may occur., Seizures., Coma.

Additional Information
RTECS: QJ0525000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.9 - 9.8 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 1 - 6.5 mg/l - 96.0 h
	NOEC - other fish - 1.8 mg/l - 3.0 d
	LOEC - other fish - 3.2 mg/l - 3.0 d
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 1.00 - 3.40 mg/l - 48 h
Toxicity to algae	EC50 - No information available. - 33.00 mg/l - 24 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 28 d Bioconcentration factor (BCF): 13,000

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1334 Class: 4.1 Packing group: III
Proper shipping name: Naphthalene, refined
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1334 Class: 4.1 Packing group: III EMS-No: F-A, S-G
Proper shipping name: NAPHTHALENE, REFINED
Marine pollutant: No

IATA
UN-Number: 1334 Class: 4.1 Packing group: III
Proper shipping name: Naphthalene, refined

15. REGULATORY INFORMATION

OSHA Hazards
Flammable solid, Carcinogen, Highly toxic by inhalation, Toxic by ingestion, Irritant

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Naphthalene	91-20-3	1990-01-01

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 04/07/2011
Print Date 09/29/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Methyl *tert*-butyl ether
Product Number	:	48027
Brand	:	Supelco
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Irritant, Carcinogen

Target Organs

Kidney, Central nervous system

GHS Classification
Flammable liquids (Category 2)
Acute toxicity, Oral (Category 5)
Skin irritation (Category 2)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H303	May be harmful if swallowed.
H315	Causes skin irritation.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	3

Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : MTBE
tert-Butyl methyl ether
Methyl *tert*-butyl ether

Formula : $C_5H_{12}O$

Molecular Weight : 88.15 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
tert-Butyl methyl ether			
1634-04-4	216-653-1	603-181-00-X	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
tert-Butyl methyl ether	1634-04-4	TWA	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Upper Respiratory Tract irritation Kidney damage Confirmed animal carcinogen with unknown relevance to humans: The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.			

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	no data available

Safety data

pH	no data available

Melting point/freezing point	no data available
Boiling point	55 - 56 °C (131 - 133 °F) - lit.
Flash point	-33.0 °C (-27.4 °F) - closed cup
Ignition temperature	374 °C (705 °F)
Autoignition temperature	374.0 °C (705.2 °F)
Lower explosion limit	1.6 %(V)
Upper explosion limit	15.1 %(V)
Vapour pressure	1,018.7 hPa (764.1 mmHg) at 55.0 °C (131.0 °F) 279.2 hPa (209.4 mmHg) at 20.0 °C (68.0 °F)
Density	0.74 g/cm3 at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 1.77 log Pow: 0.94
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
Oxidizing agents, Strong acids

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 4,000 mg/kg

Inhalation LC50
LC50 Inhalation - rat - 4 h - 23576 ppm

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Skin irritation

Serious eye damage/eye irritation
Eyes - rabbit - No eye irritation

Respiratory or skin sensitization
Will not occur

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (tert-Butyl methyl ether)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
Nausea, Vomiting, Dizziness, Central nervous system depression, Aspiration or inhalation may cause chemical pneumonitis., MTBE (methyl-tert-butyl ether) is reported to metabolize to tert-butyl alcohol and formaldehyde by microsomal demethylation, MTBE (methyl-tert-butyl ether) should be considered a "potential human carcinogen" due to an increase in leydig interstitial cell tumors of testes in male rats and an increase in lymphomas, leukemias, and uterine sarcomas in female rats., In another unpublished study MTBE was shown to be carcinogenic due to "increased incidence of a rare type of kidney tumor" in male rats and an "increase in the incidence of hepatocellular adenomas" in female mice., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: KN5250000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 672.00 mg/l - 96 h

LC50 - other fish - > 1,000.00 mg/l - 96 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2398 Class: 3 Packing group: II
Proper shipping name: Methyl tert-butyl ether
Reportable Quantity (RQ): 1000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 2398 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHYL BUTYL ETHER
Marine pollutant: No

IATA
UN number: 2398 Class: 3 Packing group: II
Proper shipping name: Methyl tert-butyl ether

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Irritant, Carcinogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
tert-Butyl methyl ether	1634-04-4	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
tert-Butyl methyl ether	1634-04-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date

tert-Butyl methyl ether	1634-04-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
tert-Butyl methyl ether	1634-04-4	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MSDS Safety Information

TOP

FSC: 6550 **MSDS Date:** 06/02/1992 **MSDS Num:** BWJFX

Submitter: F BT **LIIN:** 00F037505 **Tech Review:** 12/09/1994 **Status CD:** C

Product ID: F44 METHYLENE CHLORIDE **MFN:** 01

Article: N **Kit Part:** N

Responsible Party **Cage:** 84898

Name: CHEM SERVICE INC

Address: 660 TOWER LN **Box:** 3108

City: WEST CHESTER **State:** PA **Zip:** 19381−3108

Country: US

Info Phone Number: 215−692−3026/800−452−9994

Emergency Phone Number: 215−692−3026/800−452−9994

Preparer's Name: N/P

Proprietary Ind: N Review Ind: Y

Published: Y Special Project CD: N

Preparer Co. when other than Responsible Party Co.

TOP

Cage: 84898 **Assigned Ind:** N

Name: CHEM SERVICE INC

Address: N/K **Box:** 3108

City: WEST CHESTER **State:** PA **Zip:** 19381

Contractor Summary

TOP

Cage: 84898 **Name:** CHEM SERVICE INC

Address: N/K **Box:** 3108

City: WEST CHESTER **State:** PA **Zip:** 19381

Country: US **Phone:** 215−692−3026

Cage: 8Y898 **Name:** CHEM SERVICE, INC

Address: 660 TOWER LN **Box:** 599

City: WEST CHESTER **State:** PA **Zip:** 19381

Country: US **Phone:** 610−692−3026, 610−692−3026

Ingredients

TOP

Cas: 75−09−2 Code: M RTECS #: PA8050000 Code: M

Name: **DICHLOROMETHANE (METHYLENE CHLORIDE) (SUSP HUMAN CARC BY ACGIH, SUSP ANIM CARC BY IARC; NTP − IARC GROUP 2B) *94−4***

% Text: N/K Environmental Wt:

Other REC Limits: N/K

OSHA PEL:	500 PPM	Code: M	OSHA STEL:		Code:
ACGIH TLV:	50 PPM	Code: M	ACGIH STEL:	N/P	Code:
EPA Rpt Qty:	1000 LBS		DOT Rpt Qty:	1000 LBS	

Ozone Depleting Chemical: N

========== Health Hazards Data ========== TOP

LD50 LC50 Mixture ORAL LD50 (RAT/MOUSE): 2136 MG/KG

Route Of Entry Inds − Inhalation:	YES	Skin: YES	Ingestion: YES
Carcinogenicity Inds − NTP:	YES	IARC: YES	OSHA: NO

Health Hazards Acute And Chronic

SKIN: HARMFUL IF ABSORBED, IRRITATION. INHALATION: HARMFUL, IRRITATION TO RESPIRATORY TRACT & MUCOUS MEMBRANES. INGESTION: HARMFUL, LIVER DAMAGE. EYES: IRRITATION. COMPOUND IS CONSIDERED TO BE SLIGHTL Y TOXIC.

Explanation Of Carcinogenicity

SEE INGREDIENTS

Signs And Symptions Of Overexposure

IRRITATION.

Medical Cond Aggravated By Exposure

N/K

First Aid

EYES: FLUSH W/WATER FOR 15−20 MINS. SKIN: FLUSH W/WATER FOR 15−20 MINS. IF NOT BURNED, WASH W/SOAP & WATER TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED & CONTINUE UNTIL MEDIC AL ASSISTANCE ARRIVES. KEEP WARM & QUIET. INGESTION: DON'T GIVE LIQUIDS/INDUCE VOMITING IF UNCONSCIOUS/CONVULSING. IF VOMITING, WATCH CLOSELY TO AVOID AIRWAY OBSTRUCTION. (SEE SUPP)

Spill Release Procedures

EVACUATE AREA. WEAR APPRORPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP & PLACE IN APPROPRIATE CONTAINER/HOLD FOR DISPOSAL. WASH CONTAMINATED SURFAC ES TO REMOVE ANY RESIDUES.

Neutralizing Agent

N/K

Waste Disposal Methods

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS.

Handling And Storage Precautions

STORE IN A COOL DRY PLACE ONLY W/COMPATIBLE CHEMICALS. KEEP TIGHTLY CLOSED. STORE UNDER REFRIGERATION.

Other Precautions

AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATH VAPORS. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS. AVOID DIRECT

PHYSICAL CONTACT. DON'T USE M AGNESIUM/ALLUMINUM/ALLOYS AS CONTAINERS.

Fire and Explosion Hazard Information

TOP

Flash Point Method: N/P

Flash Point:

Flash Point Text: NON−FLAMMABLE

Autoignition Temp:

Autoignition Temp Text: N/A

Lower Limits: 12

Upper Limits: 19

Extinguishing Media

CO2, DRY CHEMICAL POWDER/SPRAY.

Fire Fighting Procedures

N/K

Unusual Fire/Explosion Hazard

VOLATILE. SENSITIVE TO HEAT. DECOMPOSITION PRODUCTS ARE CORROSIVE.

Control Measures

TOP

Respiratory Protection

WEAR APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

Ventilation

CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.

Protective Gloves

N/K

Eye Protection

EYE SHIELDS

Other Protective Equipment

N/K

Work Hygienic Practices

REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.

Supplemental Safety and Health

FIRST AID CONT'D: OBTAIN MEDICAL ATTENTION IN ALL CASES.

Physical/Chemical Properties

TOP

HCC:

NRC/State LIC No:

Net Prop WT For Ammo:
Boiling Point: B.P. Text: 103.55F

Melt/Freeze Pt: M.P/F.P Text: −139F
Decomp Temp: Decomp Text: N/K

Vapor Pres: 350 Vapor Density: 2.9
Volatile Org Content %: Spec Gravity: N/K

VOC Pounds/Gallon: PH: N/K
VOC Grams/Liter: Viscosity: N/P

Evaporation Rate & Reference: (BU AC =1): 27.5
Solubility in Water: SLIGHT
Appearance and Odor: COLORLESS LIQUID W/ETHER LIKE ODOR.

Percent Volatiles by Volume: N/K Corrosion Rate: N/K

Reactivity Data

TOP

Stability Indicator: YES

Stability Condition To Avoid: HEAT.

Materials To Avoid: STRONG BASES/OXIDIZING AGENTS, MAGNESIUM, ALUMINUM.

Hazardous Decomposition Products: TOXIC FUMES.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization N/K

:

Toxicological Information

TOP

Toxicological Information: N/P

Ecological Information

TOP

Ecological: N/P

MSDS Transport Information

TOP

Transport Information: N/P

Regulatory Information

TOP

Sara Title III Information: N/P

Federal Regulatory Information: N/P

State Regulatory Information: N/P

========== Other Information ==========

TOP

Other Information: N/P

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Material Safety Data Sheet

Version 4.2
Revision Date 10/26/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Mercury
Product Number	:	261017
Brand	:	Sigma-Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Highly toxic by inhalation, Respiratory sensitiser, Teratogen, Reproductive hazard

Target Organs

Kidney

GHS Classification
Acute toxicity, Inhalation (Category 1)
Respiratory sensitization (Category 1)
Reproductive toxicity (Category 1A)
Specific target organ toxicity - repeated exposure, Inhalation (Category 1)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H330	Fatal if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P284	Wear respiratory protection.
P310	Immediately call a POISON CENTER or doctor/ physician.

P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 4
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be fatal if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Hg
Molecular Weight : 200.59 g/mol

Component		Concentration
Mercury		
CAS-No.	7439-97-6	-
EC-No.	231-106-7	
Index-No.	080-001-00-0	

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Mercury/mercury oxides.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Mercury	7439-97-6	C	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits
Remarks	Potential for dermal absorption			
		CEIL	1.0mg/10m3	USA. Occupational Exposure Limits (OSHA) - Table Z2
		TWA	0.05 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Skin notation			
		TWA	0.025 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Central Nervous System impairment Kidney damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories. Danger of cutaneous absorption			
		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
	Potential for dermal absorption			

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -38.87 °C (-37.97 °F) - lit.
Boiling point	356.6 °C (673.9 °F)
Flash point	not applicable
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	< 0.01 hPa (< 0.01 mmHg) at 20 °C (68 °F) 1 hPa (1 mmHg) at 126 °C (259 °F)
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	6.93 - (Air = 1.0)
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents, Ammonia, Azides, Nitrates, Chlorates, Copper

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Mercury/mercury oxides.
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Mercury)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Teratogenicity

Presumed human reproductive toxicant

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
no data available

Potential health effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Mercury accumulates in almost all tissues, especially in the:, Kidney, Effects due to ingestion may include:, Nausea, Vomiting, Diarrhoea, intestinal bleeding

Synergistic effects
no data available

Additional Information
RTECS: OV4550000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Labeo rohita - 0.018 mg/l - 96.0 h

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Carassius auratus (goldfish) - 1,789 d Bioconcentration factor (BCF): 155,986

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

IMDG
UN number: 2809 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: MERCURY
Marine pollutant: No

IATA
UN number: 2809 Class: 8 Packing group: III
Proper shipping name: Mercury

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Highly toxic by inhalation, Respiratory sensitiser, Teratogen, Reproductive hazard

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Mercury	7439-97-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Mercury	7439-97-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Mercury	7439-97-6	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Mercury	7439-97-6	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

material safety data sheet

Section 1. IDENTIFICATION

Trade Name:

2−Butanone (Methyl Ethyl Ketone), Natural

Synonyms: Butan−2−one

Product Number: 0217000NAT FEMA Number: 2170

Section 2. COMPOSITION / INFORMATION ON INGREDIENT

Ingredient: 2−Butanone (Methyl Ethyl Ketone), Natural

CAS Number: 78−93−3
Molecular Formula: C4 H8 O

Section 3. HAZARDS IDENTIFICATION

Harmful if Swallowed
Irritating to Eyes, Respiratory System and Skin
Flammable
Risk of Serious Damage to Eyes

Section 4. FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with water for at least 15 minutes. Get medical attention. SKIN CONTACT: Immediately wash skin with soap and copius amounts of water. INHALATION: Immediately remove to FRESH AIR. If not breathing, give artificial respiration. If breathing difficult, give oxygen. Get medical attention.

Section 5. FIRE FIGHTING MEASURES

MEANS OF EXTINCTION: Carbon dioxide, dry chemical powder, or appropriate foam. Water: if water must be used, spray only. UNUSUAL FIRE/EXPLOSION HAZARDS: Avoid heat, sparks, and open flames. Hazardous Combustion Products Carbon dioxide, carbon monoxide, acrid fumes.

Section 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Refer to Section 8. CLEANUP PROCEDURES: Small spills should be adsorbed by dirt, sand or other suitable adsorbent. Large spills may be diked with earth and pumped to closed containers for recovery or disposal. At temperatures less than 15 C, material may crystallize and form a solid mass. Ventilate area and wash spill site after material pickup is complete.

Section 7. HANDLING AND STORAGE

HANDLING − USER EXPORESURE: Do not breathe vapor. Avoid contact with eyes,. skin and clothing. Wear safety glasses or goggles and rubber gloves, and apron when handling. SUGGESTED STORAGE CONDITIONS: Store in tightly sealed original containers with minimum head space. Avoid prolonged exposure to light, heat, cold, and air.

SUGGESTED STORAGE CONDITIONS: Store at 40−70F in tightly sealed original containers with minimum head space. Avoid prolonged exposure to light, heat and air.
SHELF LIFE: 6 months under suggested storage conditions unless otherwise noted.

Section 8. EXPOSURE AND PROTECTION CONTROLS

Safety shower and eye bath. Mechanical exhaust may be needed. Government approved respirator. Compatible chemical resistant gloves. Chemical safety goggles. Wash contaminated clothing thoroughly before reuse. Clean contaminated equipment thoroughly with soap and water.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: colorless translucent liquid
Sensory Properties: fragrant mint−like moderatly sharp odor
Molecular Weight: 72.1066
Purity (by G.C.): 98% Min.
Specific Gravity @ 25 C: 0.8072 − 0.8572
Refractive Index @ 20 C: 1.3763 − 1.3843
Optical Rotation: N/A
Acid Value: N/A
Melting Point/Melting Point Range (C): −86.3
Boiling Point/Boiling Point Range (C): 79.6
Flash Point (C) (Tag Closed Cup): −7
Flammability: N/A
Vapor Pressure: 78

Vapor Density (air = 1): 2.5

Evaporation Rate (Butyl Acetate = 1): 5.7
Viscosity: N/A
Partition Coefficient (n−Octanol/Water): N/A
Solubility in Water (%): N/A

Solubility in Alcohol (%): N/A

Additional Data:

Section 10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Prolonged or excessive heat may cause decomposition. MATERIALS TO AVOID: Strong oxidizing agents, strong reducing agents. HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide, acrid fumes.

Section 11. TOXILOGICAL INFORMATION

MULTIPLE ROUTES OF EXPOSURE: May be harmful by inhalation, ingestion or skin absorption. Vapor or mist is irritating to eyes, mucous membranes and other upper respiratory tract. MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. For information, contact physician.

Section 12. ECOLOGICAL INFORMATION

No data available.

Section 13. DISPOSAL CONSIDERATIONS

Do not discharge to lakes, streams, ponds, or public waters. Observe all federal, state, and local environment regulations.

Section 14. TRANSPORT INFORMATION

DOT
Proper Shipping Name: METHYL ETHYL KETONE
UN#: 1193
Hazard Class:
Class 3 − Flammable Liquids
Packing Group: II
Hazard Label:
Flammable Liquid

IATA
Proper Shipping Name: METHYL ETHYL KETONE
IATA UN#: 1193
Hazard Class:

Class 3 − Flammable Liquids

Packing Group: II

Section 15. TRANSPORT INFORMATION

US and EU Additional Classification

Indication/Symbol of Danger: Xi

Indication of Danger:

Irritating to Eyes, Respiratory System and Skin

Risk Statements:

R 10 Flammable R 22 Harmful if swallowed R 34 Causes burns R 36/37/38: Irritating to eyes, respiratory system and skin. R 36/38 Irritating to eyes and skin R 36/37 Irritating to respiratory system and skin R 41 Risk of serious damage to eyes R 42 May cause sensitization by inhalation R 43 May cause sensitization by skin contact

Safety Statements:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice S 36 Wear protective clothing S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible) S26 36/37/39 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing gloves, and eye/face protection. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

TSCA (USA) Status: REGISTERED

EINECS (EC) Status: LISTED

DSL (Canada) Status: LISTED

AICS (Australia) Status: LISTED

MITI (Japan) Status: LISTED

Section 16. OTHER INFORMATION

Disclaimer

The information above is believed to be accurate and represents the best information currently available to us. We make no warranty, express or implied, about the information and assume no liability resulting from its use. Users should make their own investigations to determine suitability. We shall not be liable for any claims, losses, or damages of any nature whatsoever related to usage.

This product record was created by Mike Horvat on 7/15/03 1:49:17 PM, and has not been modified.

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 06/14/2004 Reviewed on 05/28/2004

- **1 Identification of substance:**

  - **Product details:**

  - **Product name: m-Cresol**

  - **Stock number:** A10733

  - **Manufacturer/Supplier:**

    Alfa Aesar, A Johnson Matthey Company
    Johnson Matthey Catalog Company, Inc.
    30 Bond Street
    Ward Hill, MA 01835-8099
    Emergency Phone: (978) 521-6300
    CHEMTREC: (800) 424-9300
    Web Site: www.alfa.com

  - **Information Department:** Health, Safety and Environmental Department

  - **Emergency information:**

During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

- **2 Composition/Data on components:**

  - **Chemical characterization:**

    Description: (CAS#)
    m-Cresol (CAS# 108-39-4), 100%
  - **Identification number(s):**

  - **EINECS Number:** 203-577-9

  - **EU Number:** 604-004-00-9

- **3 Hazards identification**

  - **Hazard description:** T Toxic

  - **Information pertaining to particular dangers for man and environment**

    R 24/25 Toxic in contact with skin and if swallowed.
    R 34 Causes burns.
  - **Classification system**

  - **HMIS ratings (scale 0-4)**

(Hazardous Materials Identification System)
Health (acute effects) = 3
Flammability = 1
Reactivity = 1

- **4 First aid measures**

♦ **General information**

Immediately remove any clothing soiled by the product.
In case of irregular breathing or respiratory arrest provide artificial respiration.

♦ **After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

♦ **After skin contact**

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

♦ **After eye contact**

Rinse opened eye for several minutes under running water. Then consult a doctor.

♦ **After swallowing**

Do not induce vomiting; immediately call for medical help.
Seek immediate medical advice.

- **5 Fire fighting measures**

♦ **Suitable extinguishing agents**

Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

♦ **Special hazards caused by the material, its products of combustion or resulting gases:**

In case of fire, the following can be released:
Carbon monoxide and carbon dioxide

♦ **Protective equipment:**

Wear self−contained respirator.
Wear fully protective impervious suit.

- **6 Accidental release measures**

♦ **Person−related safety precautions:**

Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation

♦ **Measures for environmental protection:**

Do not allow material to be released to the environment without proper governmental permits.

♦ **Measures for cleaning/collecting:**

Absorb with liquid−binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

♦ **Additional information:**

See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

- **7 Handling and storage**

♦ **Handling**

♦ **Information for safe handling:**

Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.

♦ **Information about protection against explosions and fires:**

Keep ignition sources away.

♦ **Storage**

♦ **Requirements to be met by storerooms and receptacles:**

No special requirements.

♦ **Information about storage in one common storage facility:**

Store away from oxidizing agents.
Do not store together with alkalies (caustic solutions).

♦ **Further information about storage conditions:**

Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Store under lock and key and with access restricted to technical experts or their assistants only.

- **8 Exposure controls and personal protection**

♦ **Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

♦ **Components with limit values that require monitoring at the workplace:**

Cresol (all isomers)

	ppm
ACGIH TLV	5 (skin)
Belgium TWA	5 (skin)
Denmark TWA	5 (skin)
Finland TWA	5; 10-STEL (skin)
France TWA	5 (skin)
Germany TWA	5
Hungary TWA	5; 10-STEL
Ireland TWA	5 (skin)
Netherlands TWA	5 (skin)
Poland TWA	5 mg/m3
Russia TWA	5; 0.5-STEL (skin)
Switzerland TWA	5; 10-STEL (skin)
United Kingdom TWA	5 (skin)
USA PEL	5 (skin)

Components with limit values that require monitoring at the workplace:

♦ **Additional information:** No data

♦ **Personal protective equipment**

♦ **General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.

♦ **Breathing equipment:**

Use suitable respirator when high concentrations are present.

♦ **Protection of hands:** Impervious gloves

♦ **Eye protection:**

Safety glasses
Full face protection

♦ **Body protection:** Protective work clothing.

- **9 Physical and chemical properties:**

♦ **General Information**

♦ **Form:** Liquid

♦ **Color:**

Colorless
Light yellow

♦ **Odor:** Phenol−like

♦	Value/Range	Unit	Method
♦ **Change in condition**			
♦ **Melting point/Melting range:**	11−12	° C	
♦ **Boiling point/Boiling range:**	202−204	° C	
♦ **Sublimation temperature / start:**	Not determined		
♦ **Flash point:**	86	° C	
♦ **Ignition temperature:**	Not determined		
♦ **Decomposition temperature:**	Not determined		

♦ **Danger of explosion:**

Product does not present an explosion hazard.

- **Explosion limits:**
- **Lower:** 1.1 Vol %
- **Upper:** 1.4 Vol %
- **Vapor pressure:** Not determined
- **Density:** at 20 ° C 1.034 g/cm³
- **Solubility in / Miscibility with**
- **Water:** Not determined

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.
- **Materials to be avoided:**

Bases
Oxidizing agents
- **Dangerous reactions** No dangerous reactions known
- **Dangerous products of decomposition:** Carbon monoxide and carbon dioxide

11 Toxicological information

- **Acute toxicity:**

LD/LC50 values that are relevant for classification:
Oral: LD50: 828 mg/kg (mus)
LD50: 242 mg/kg (rat)
LDLo: 1400 mg/kg (rbt)
Dermal: LD50: 1000 mg/kg (rat)
LD50: 2050 mg/kg (rbt)
Irritation of skin: severe: 517 mg/24H (rbt)
Irritation of eyes: severe: 103 mg (rbt)
- **Primary irritant effect:**
- **on the skin:**

Corrosive effect on skin and mucous membranes.
Irritant to skin and mucous membranes.
- **on the eye:**

Strong corrosive effect.
Irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Other information (about experimental toxicology):**

Mutagenic effects have been observed with humans.

♦ **Subacute to chronic toxicity:**

Cresol is toxic by ingestion and skin contact. Corrosive to skin, eyes and mucous membranes. Aborption mnay cause damage to the liver, kidneys and central nervous system.

♦ **Additional toxicological information:**

Danger through skin absorption.
Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

- **12 Ecological information:**

♦ **General notes:**

Do not allow material to be released to the environment without proper governmental permits.

- **13 Disposal considerations**

♦ **Product:**

♦ **Recommendation**

Consult state, local or national regulations to ensure proper disposal.

♦ **Uncleaned packagings:**

♦ **Recommendation:**

Disposal must be made according to official regulations.

- **14 Transport information**

♦ **DOT regulations:**

♦ **Hazard class:** 6.1

♦ **Identification number:** UN2076

♦ **Packing group:** II

♦ **Proper shipping name (technical name):**

Cresols

♦ **Land transport ADR/RID (cross-border)**

♦ **ADR/RID class:** 6.1 Toxic substances

♦ **Item:** 27b

- **Danger code (Kemler):** 68
- **UN-Number:** 2076
- **Description of goods:** Cresols

- **Maritime transport IMDG:**
- **IMDG Class:** 6.1
- **UN Number:** 2076
- **Packaging group:** II
- **Proper shipping name:** Cresols

- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** 6.1
- **UN/ID Number:** 2076
- **Packaging group:** II
- **Proper shipping name:** Cresols, liquid

15 Regulations

- **Product related hazard informations:**

- **Hazard symbols:** T Toxic

- **Risk phrases:**

24/25	Toxic in contact with skin and if swallowed.
34	Causes burns.

- **Safety phrases:**

36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
45	In case of accident or if you feel unwell, seek medical advice immediately.

- **National regulations**

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

- **Information about limitation of use:**

For use only by technically qualified individuals.
This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

- **16 <u>Other information:</u>**

  Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

  ♦ **Department issuing MSDS:** Health, Safety and Environmental Department.

  ♦ **Contact:** Darrell R. Sanders

Material Safety Data Sheet

Version 4.0
Revision Date 03/13/2010
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Manganese
Product Number	:	463728
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Water Reactive, Target Organ Effect, Reproductive hazard

Target Organs

Nerves., Lungs

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H260	In contact with water releases flammable gases which may ignite spontaneously.
H316	Causes mild skin irritation.
H320	Causes eye irritation.
H402	Harmful to aquatic life.

Precautionary statement(s)

P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232	Handle under inert gas. Protect from moisture.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378	In case of fire: Use .? for extinction.

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical hazards:	2

NFPA Rating

Health hazard:	0
Fire:	0
Reactivity Hazard:	2
Special hazard.:	W

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Mn
Molecular Weight : 54.94 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Manganese			
7439-96-5	231-105-1	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Carbon dioxide (CO2) Dry powder

Extinguishing media which shall not be used for safety reasons
Water

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Do not flush with water. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Store in cool place.
Never allow product to get in contact with water during storage.

Moisture sensitive. Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Manganese	7439-96-5	TWA	0.2 mg/m3	2009-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC 2009 Revision or addition to the notice of intended changes See Notice of Intended Changes (NIC)				
		C	5 mg/m3	2006-02-28	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Ceiling limit is to be determined from breathing-zone air samples.				
		TWA	1 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	3 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses with side-shields conforming to EN166

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	grey

Safety data

pH	no data available
Melting point	1,244 °C (2,271 °F) - lit.
Boiling point	1,962 °C (3,564 °F) - lit.
Flash point	not applicable
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	7.3 g/mL at 25 °C (77 °F)

Water solubility	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks. Exposure to moisture.

Materials to avoid
acids, Halogens, Bases, Phosphorus, Sulphur oxides, Peroxides

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Manganese/manganese oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - 9,000 mg/kg

Skin corrosion/irritation
Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Mild eye irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Carcinogenicity - rat - Intramuscular
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure (GHS)
no data available

Specific target organ toxicity - repeated exposure (GHS)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.

Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.

Additional Information
RTECS: OO9275000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)
Marine pollutant: No

IATA
UN-Number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

OSHA Hazards
Water Reactive, Target Organ Effect, Reproductive hazard

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

SARA 311/312 Hazards
Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 4.1
Revision Date 06/02/2011
Print Date 12/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Zinc
Product Number	:	14409
Brand	:	Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
No known OSHA hazards

GHS Classification
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P273 Avoid release to the environment.
P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification
Health hazard: 0
Flammability: 0
Physical hazards: 0

NFPA Rating
Health hazard: 0
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.

Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Zn
Molecular Weight : 65.39 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Zinc powder (stabilized)			
7440-66-6	231-175-3	030-001-01-9	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Zinc/zinc oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	grey

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 420 °C (788 °F) - lit.
Boiling point	907 °C (1,665 °F) - lit.
Flash point	not applicable
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	7.133 g/mL at 25 °C (77 °F)
Water solubility	insoluble
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	odourless
Odour Threshold	no data available

Evaporation rate no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents, Acids and bases

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Zinc/zinc oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Did not cause sensitization on laboratory animals.

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: ZG8600000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 450 µg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	LC50 - Daphnia magna (Water flea) - 0.068 mg/l - 48 h
	mortality NOEC - Daphnia - 0.101 - 0.14 mg/l - 7 d

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Algae - 7 d at 16 °C Bioconcentration factor (BCF): 466

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc powder (stabilized))
Marine pollutant: Marine pollutant

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Zinc powder (stabilized))

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Zinc powder (stabilized)	7440-66-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Zinc powder (stabilized)	7440-66-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Zinc powder (stabilized)	7440-66-6	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Appendix J

OSHA CERTIFICATES

Furnished upon request

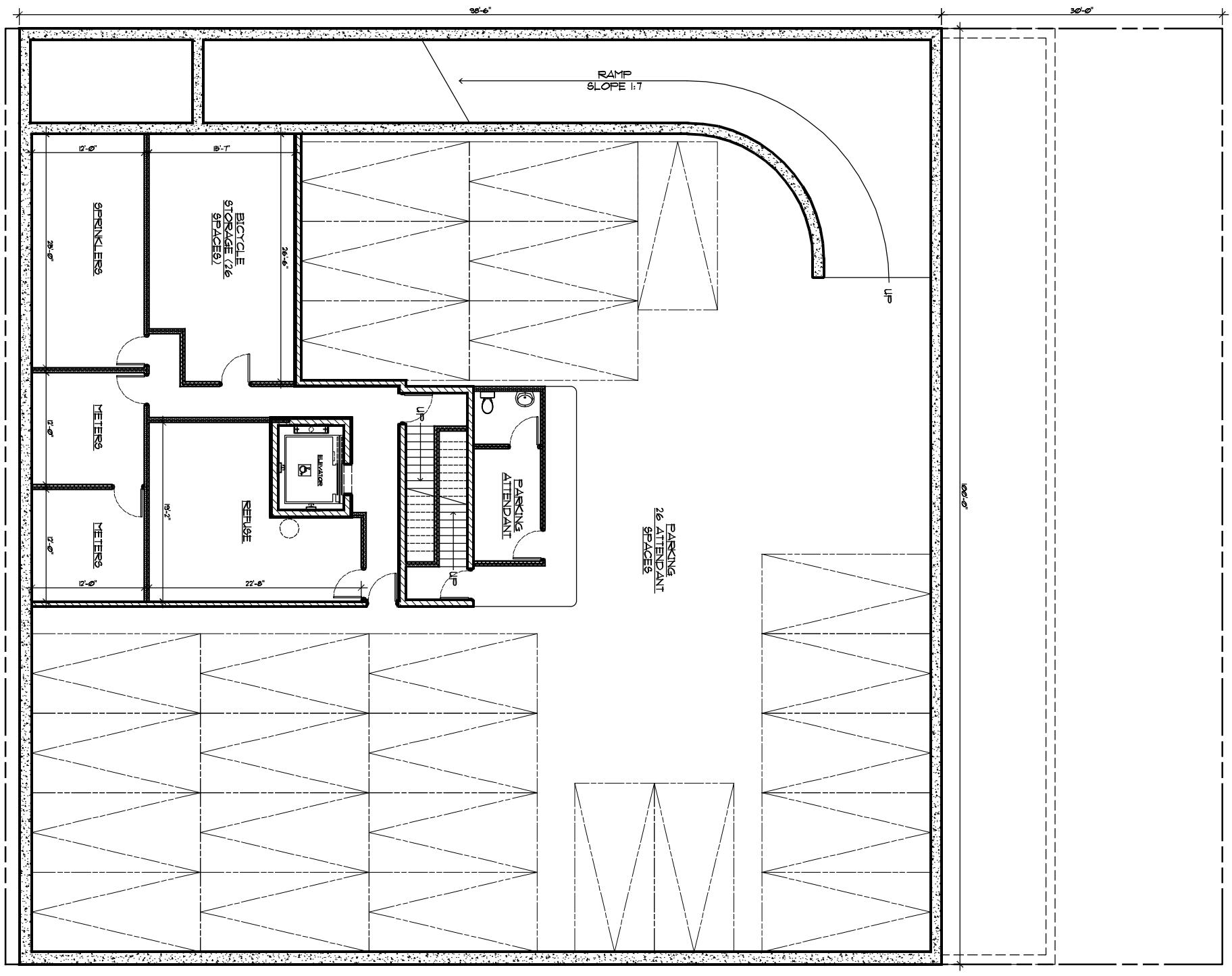
Associated Environmental Services, Ltd.

APPENDIX 3

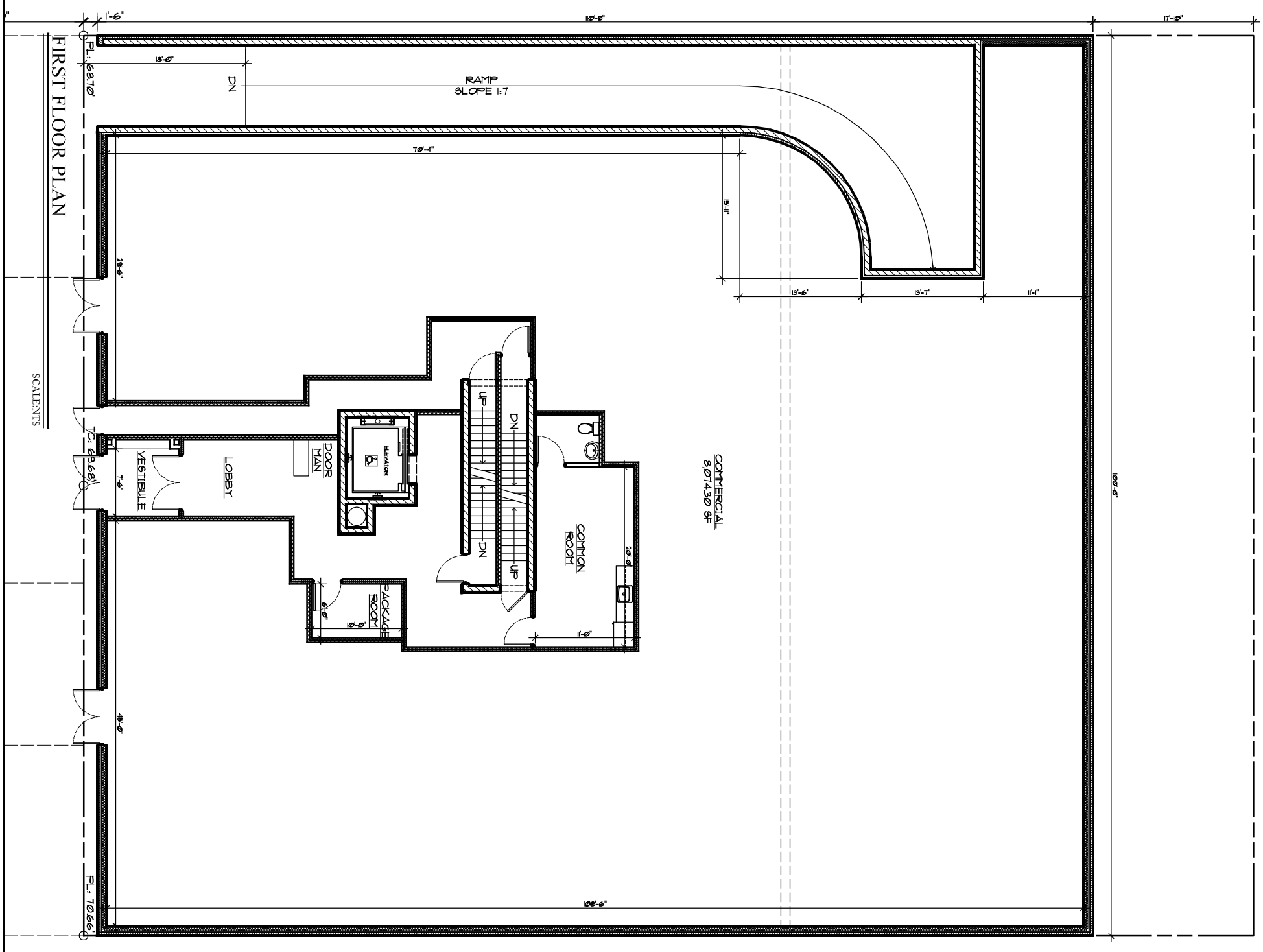
PROPOSED DRAWINGS

CELLAR FLOOR PLAN

SCALE: 3/32" = 1'-0"



SCALE: AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571 Design Studio Associates Design | Zoning | Code Consultants	2
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study		OF



LOT AREA: 13,000.0 SF
FAR: 4.09 = 53,170.0 SF

1ST FL:	9,749.3 SF
2ND FL:	7,412.27 SF
3RD FL:	7,412.27 SF
4TH FL:	7,412.27 SF
5TH FL:	7,412.27 SF
6TH FL:	7,412.27 SF
7TH FL:	6,216.65 SF
ROOF:	142.5 SF
TOTAL FA:	53,169.8 SF

SCALE:AS NOTED | DATE: -

ZONING & SITE
Proposal For:

109-17 7ND RD
QUEENS, NY

DRAWN BY: name

PRELIMINARY
NOT FOR CONSTRUCTION
For Design purposes only

Title - Zoning Study

info@dsany.com
ph:718.569.2112
fax:718.360-4571

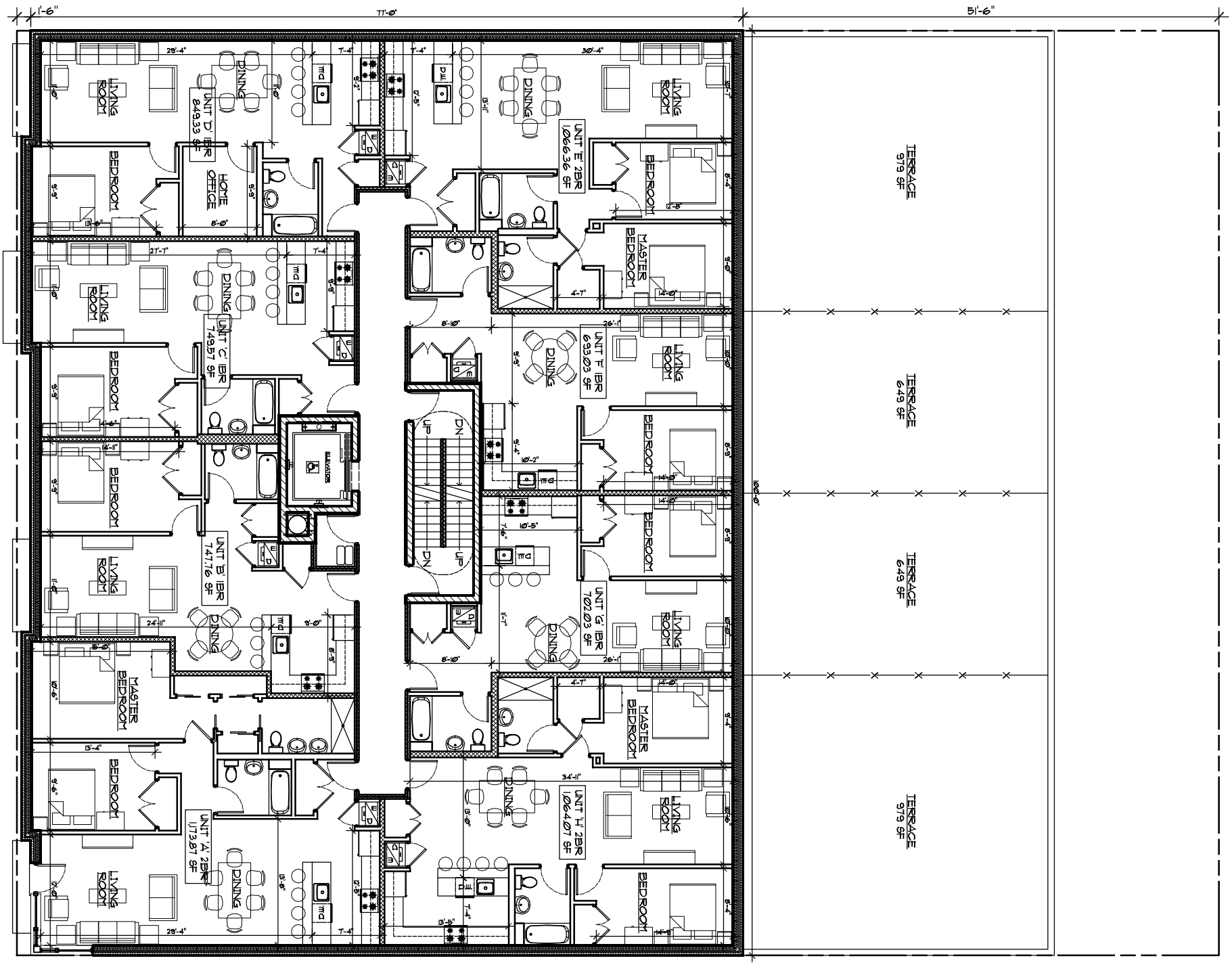
Design Studio Associates
Design | Zoning | Code Consultants

3

OF

SECOND FLOOR PLAN

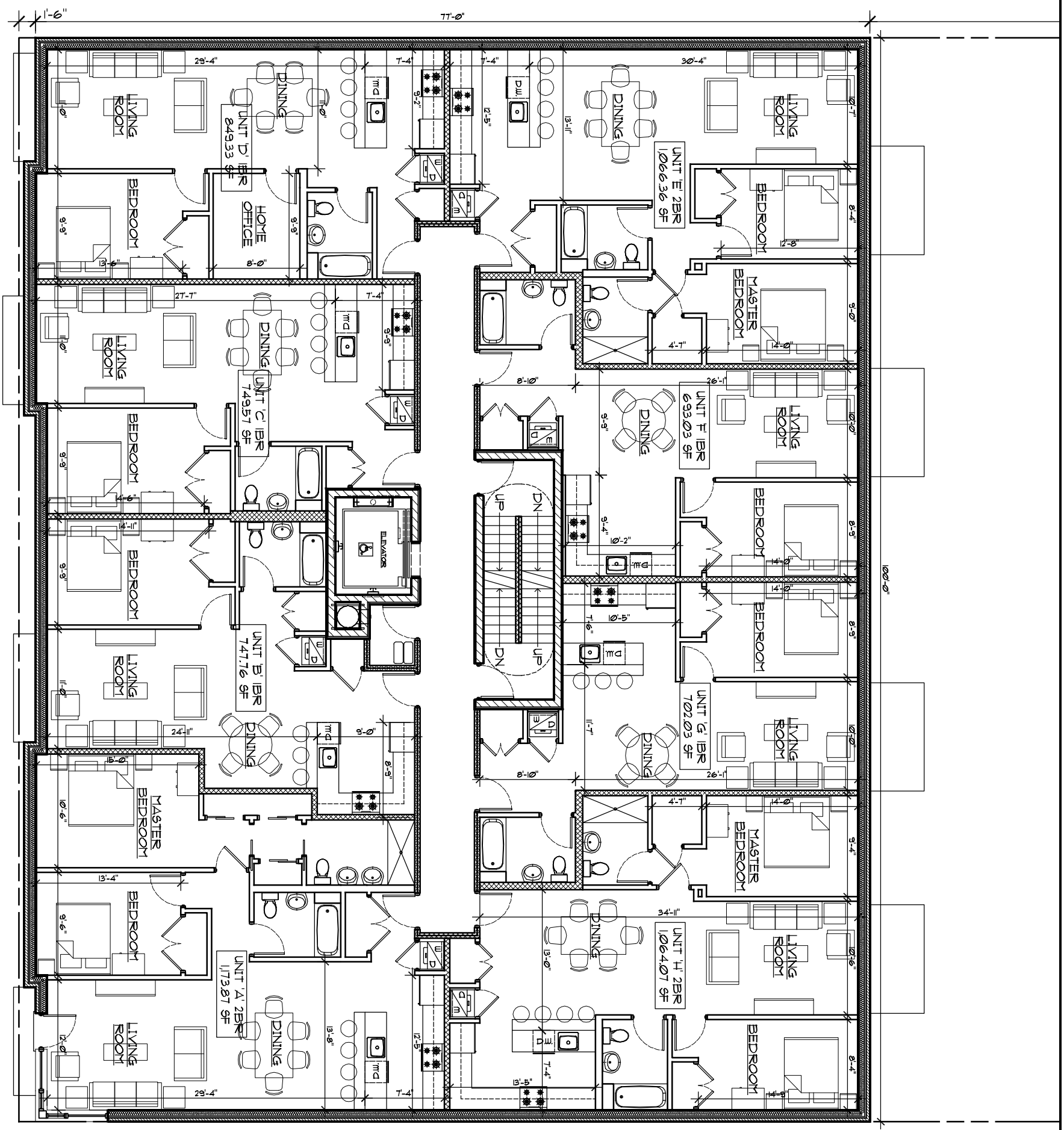
SCALE:3/32" = 1'-0"



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571 Design Studio Associates Design | Zoning | Code Consultants	4
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study		OF

TYPICAL 3RD - 6TH FLOOR PLAN

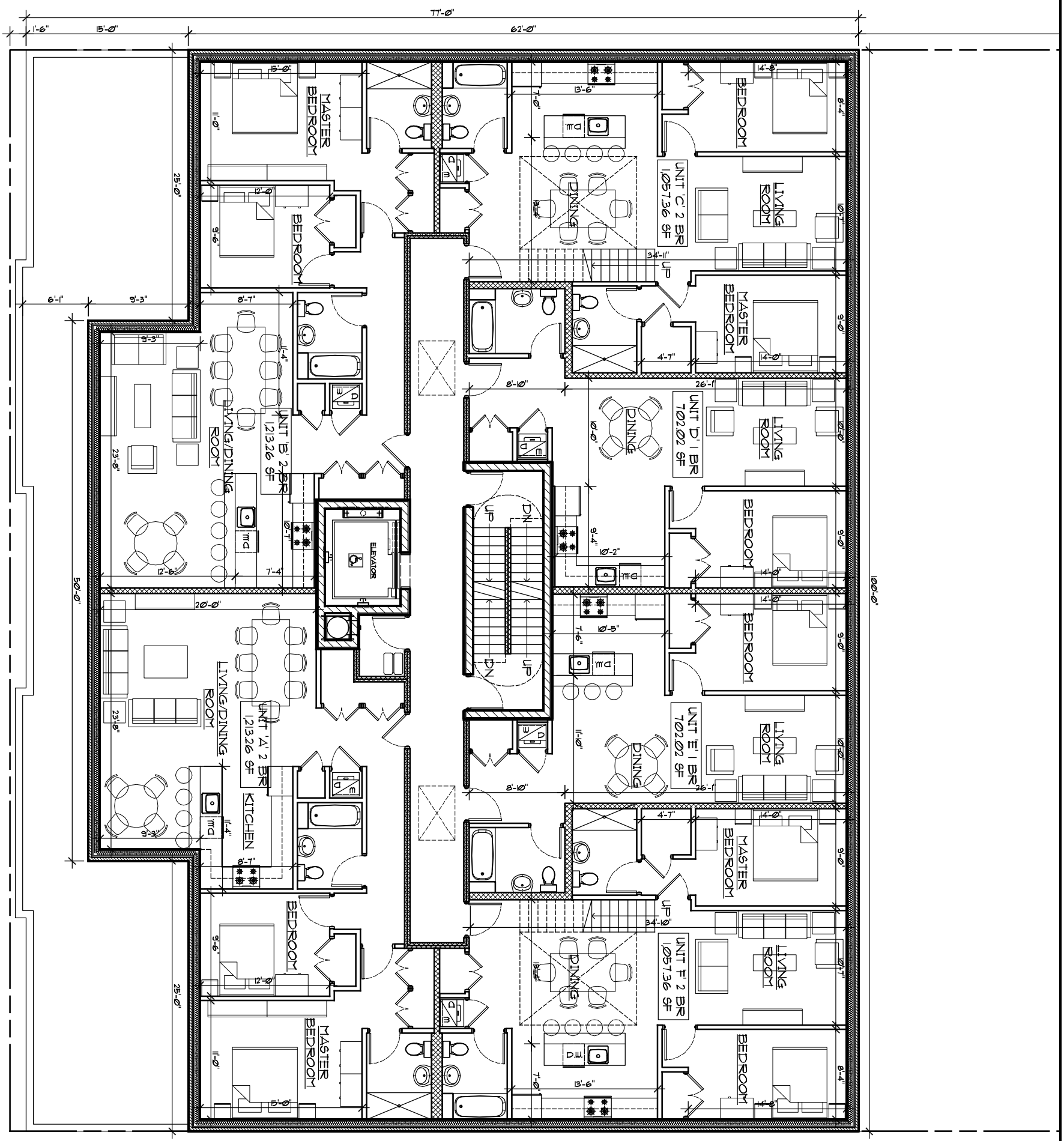
SCALE:3/32" = 1'-0"



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571 Design Studio Associates Design | Zoning | Code Consultants
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study	5 OF

7TH FLOOR PLAN

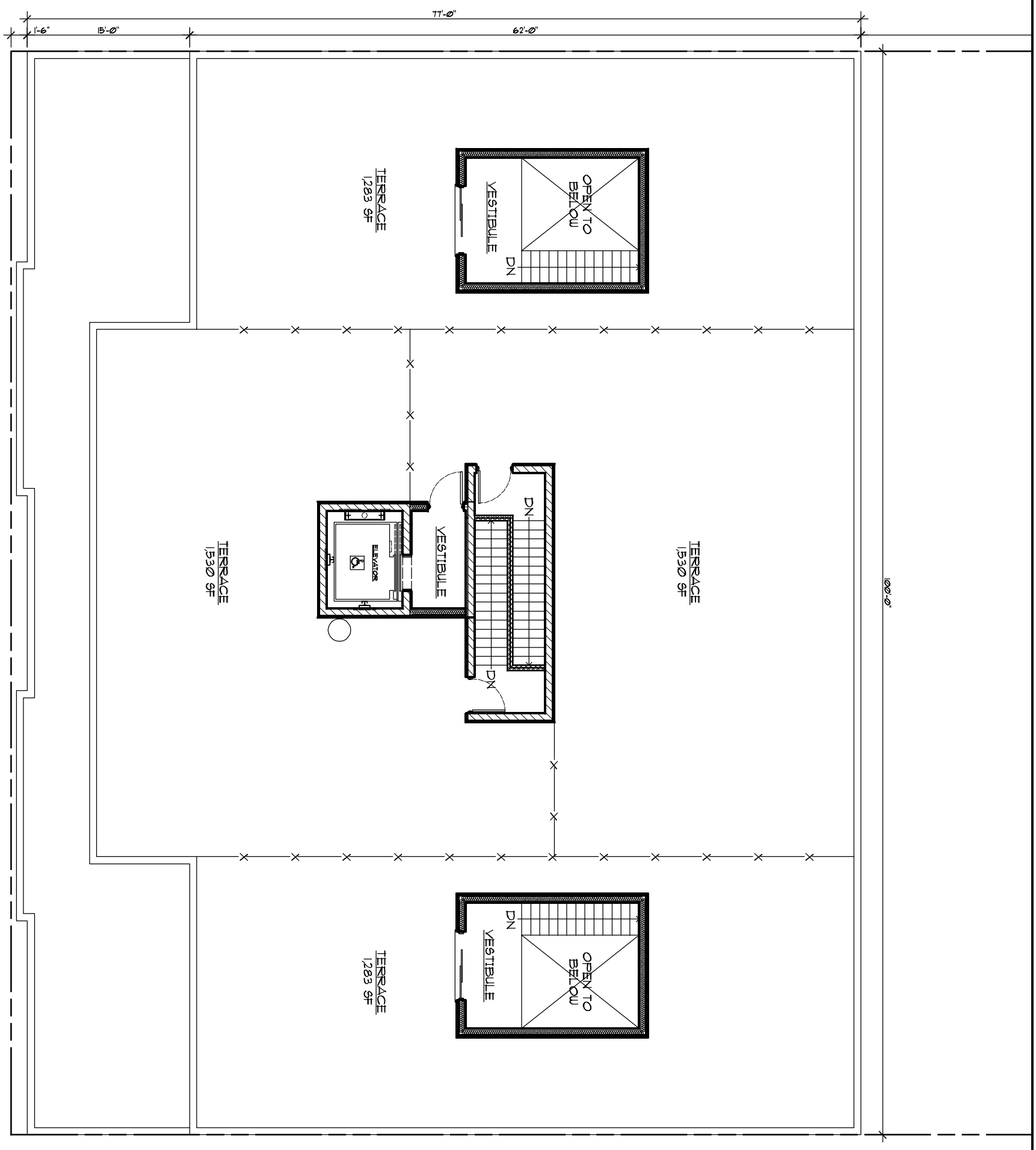
SCALE:3/32" = 1'-0"



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study	Design Studio Associates Design | Zoning | Code Consultants

ROOF PLAN

SCALE:3/32" = 1'-0"

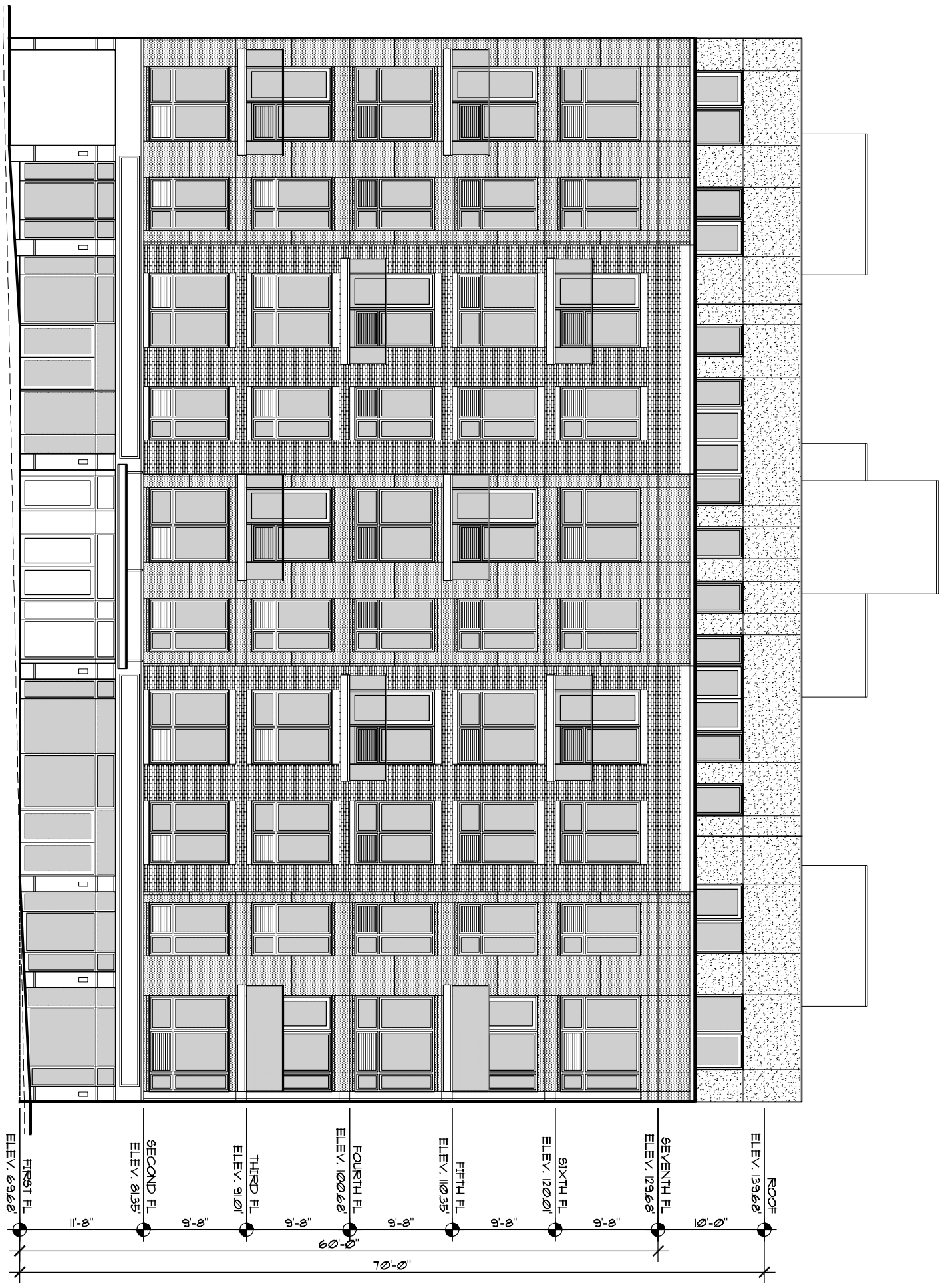


SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	7
ZONING & SITE Proposal For:			
109-17 72ND RD QUEENS, NY		Title - Zoning Study	OF

info@dsany.com
ph:718.569.2112
fax:718.360-4571
Design Studio Associates
Design | Zoning | Code Consultants

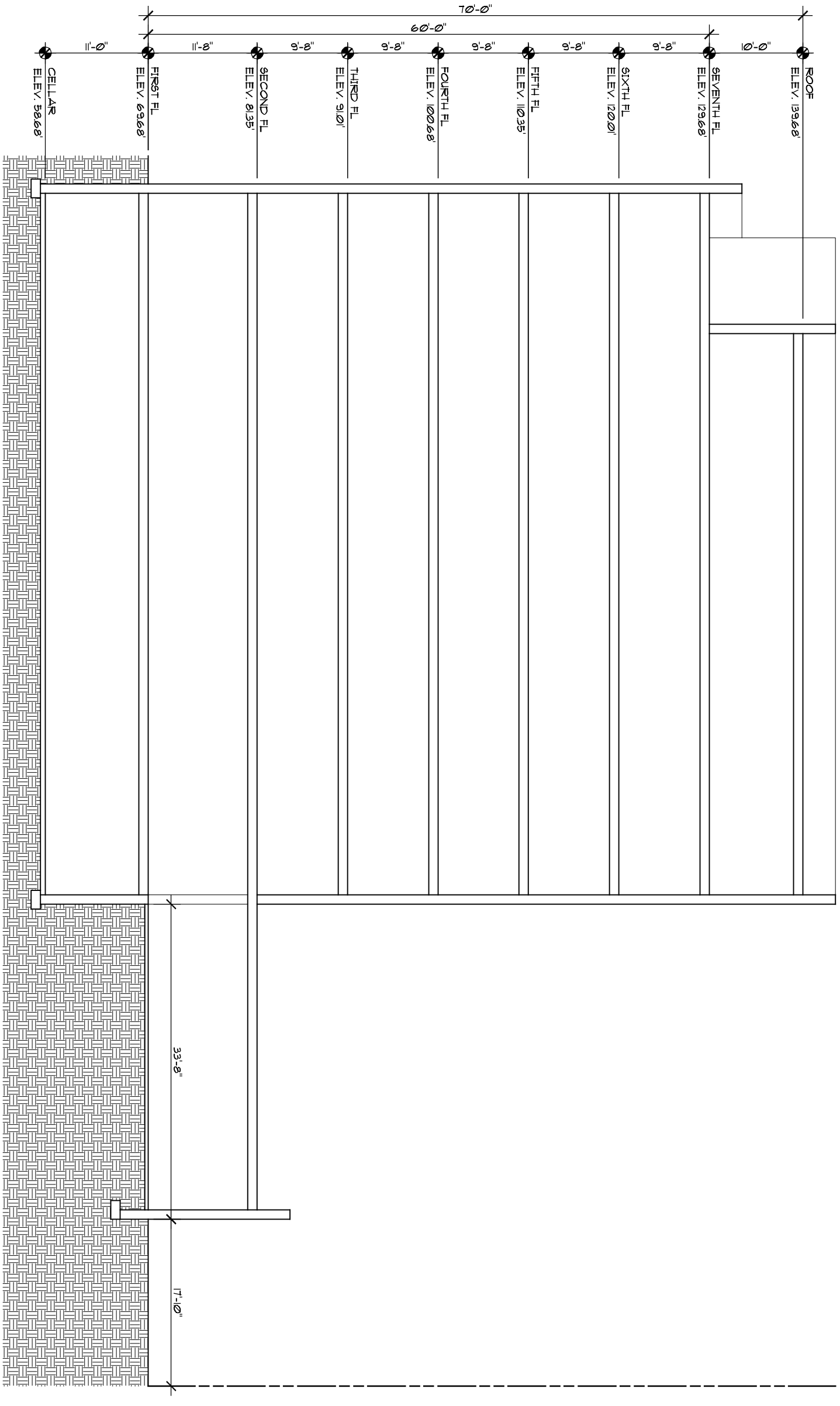
FRONT ELEVATION

SCALE:1/8" = 1'-0"



SCALE:AS NOTED | DATE: -	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571	7
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY	Title - Zoning Study	DSA Design Studio Associates Design | Zoning | Code Consultants	OF

DRAWN BY: name



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571	8
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study	Design Studio Associates Design | Zoning | Code Consultants	OF

APPENDIX 4

ENVIRONMENTAL REPORTS

109-17 to 109-23 72nd Road

QUEENS NEW YORK

Remedial Investigation Report

OER Number: 16EHAN123Q

E-Designation 222

CEQR Number 09DCP013Q

Special Forest Hills District

Prepared for:

PSRS REALTY

109-17 72ND ROAD, SUITE 6R

QUEENS, NEW YORK 11375

Prepared by:

ASSOCIATED ENVIRONMENTAL SERVICES, LTD.

25 CENTRAL AVENUE

HAUPPAUGE, NEW YORK 11788

(631) 234-4280

johns@assocenvsvcs.com

NOVEMBER 2015

REMEDIAL INVESTIGATION REPORT

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Appendix 1 – Preliminary Construction Diagrams

Appendix 2 – Phase I Report

Appendix 3 – Soil Boring Logs

Appendix 4 – Soil Laboratory Analytical Report

Appendix 5 – Groundwater Laboratory Analytical Report

Appendix 6 – Soil Vapor Laboratory Analytical Report

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
CAMP	Community Air Monitoring Plan
COC	Contaminant of Concern
CPP	Citizen Participation Plan
CSM	Conceptual Site Model
DER-10	New York State Department of Environmental Conservation Technical Guide 10
FID	Flame Ionization Detector
GPS	Global Positioning System
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRM	Interim Remedial Measure
NAPL	Non-aqueous Phase Liquid
NYC VCP	New York City Voluntary Cleanup Program
NYC DOHMH	New York City Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYS DOH ELAP	New York State Department of Health Environmental Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
QEP	Qualified Environmental Professional
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCO	Soil Cleanup Objective
SPEED	Searchable Property Environmental Electronic Database

CERTIFICATION

I, ____John Schretzmayer_____, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the Remedial Investigation for the Site name Site, (NYC VCP Site No. site number). I am responsible for the content of this Remedial Investigation Report (RIR), have reviewed its contents and certify that this RIR is accurate to the best of my knowledge and contains all available environmental information and data regarding the property.

John Schretzmayer 11/21/2015

Qualified Environmental Professional Date Signature

EXECUTIVE SUMMARY

The Remedial Investigation Report (RIR) provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy pursuant to RCNY§ 43-1407(f). The remedial investigation (RI) described in this document is consistent with applicable guidance.

Site Location and Current Usage

The Site is located at 109-17, 109-19, 109-21, 109-23 72nd Road in the Forest Hills section in Queens, New York and is identified as Block 3258 and Lots 14, 16, 17, and 18 on the New York City Tax Map. Figure 1number shows the Site location. The Site is 13,000-square feet and is bounded by a multi-unit residential building to the north, a vacant lot to the south, multi-unit residential buildings to the east, and 72nd Road to the west. A map of the site boundary is shown in Figure 1. Currently, the Site is used for two (2) 2-2½ story buildings with eight (8) commercial tenant spaces and eight (8) residential units on four (4) tax lots. All buildings have full basements.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of the demolition of the existing structures and a new construction consisting of a seven (7) story mixed-use condominium. A 30 foot setback is proposed at the northwestern border of the property. The foundation area for the new building will measure 98.5 feet by 100 feet. The basement area for this portion of the building will be developed to a depth of approximately ten (10) feet below grade. A terrace area will be constructed off the rear of the building on the first floor that measures 33 feet 8 inches by 100 feet. The new building will utilize the basement for storage, refuse, parking garage for 26 cars, utility rooms and an elevator. Excavation will be to 10 feet across 76 percent for the basement of the building and to 10 feet in the area of the terrace. The first floor will be developed for commercial use. The second through seventh floors will be developed for residential. As part of development, the referenced lot(s) are expected to be merged. The water table was observed at approximately 60 feet below grade surface (bgs).

Summary of Past Uses of Site and Areas of Concern

According to NYC Oasis Information, the Property is currently owned by 72nd Forest Hills Ass. On October 22, 2015, Jessica Ferngren, a QEP, inspected the subject site. According to NYC Oasis information, these buildings were built in 1931. According to Certificate of Occupancy dated 2004@109-19 72nd Street: Computer Training Scholl, Two Family Dwelling. According to Property Shark Phone Records the following tenants were located on site: NY General Contracting Corp-2007, Pratima Inc-1998, PSRS Realty-2006, Sarva Ramesh PC-1991, Soft Tech Source-2006, Stern Harold DDS-2006, Stern Harold DDS-2006, Tammy Agency-2007, Universal Family Practice Pc-2010-109-17 72nd Road, Ace Computers-2000, DME Creations-2005-109-19 72nd Road, First Resource-1991, Maison LA Jolie-2014-109-21 72nd Road, Sisco Tek-2012, Sonya European Tailoring-1993-109-23 72nd Road. According to Sanborn History Maps, the subject property is depicted as dwellings from the 1930's to the 1970's, commercial from the 1960's to the 1990's. No Dry Cleaners is listed on the Sanborn History Maps. A City Directory Abstract Search was conducted for the historical tenants. No evidence of potential or suspect areas or items indicative of generating impacts to the subsurface were observed. As specified in the Phase I the only AOC identified was the potential for groundwater and vapor impacts from an upgradient dry cleaner.

Summary of the Work Performed under the Remedial Investigation

PSRS Realty performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed eight soil borings across the entire project Site, and collected twelve soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed one temporary groundwater sampling port on-site and collected one groundwater sample for chemical analysis to evaluate groundwater quality;
4. Installed five soil vapor probes around Site perimeter and collected five samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property ranges from 75 to 80 feet above sea level.

2. Depth to groundwater was observed at approximately 60 feet below grade at the Site.

3. Groundwater flow is generally from southwest to northeast beneath the Site.

4. The stratigraphy of the site, from the surface down, consists of approximately 15 feet of silty sand with clay. Depths below 15 feet were not observed.

5. Soil/fill samples collected during the remedial investigations were compared to the 6NYCRR Part 375 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) as well as Track 2 Restricted Commercial Use SCOs. Soil/fill samples collected during the RI showed no evidence of impacts. Soil analytical results reported concentrations of VOCs, SVOCs, Pesticides, PCBs, and metals below Unrestricted Use SCOs. Overall, soil chemistry is unremarkable and does not indicate any disposal of waste.

6. Groundwater samples were compared to NYSDEC Part 375 Groundwater quality Standards (GQSs). Groundwater samples collected during the RI showed no evidence of impacts. Groundwater analytical results reported concentrations of VOCs, SVOCs, Pesticides, PCBs, and metals below their respective GQSs.

7. Soil vapor results collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Data collected during the RI indicated petroleum related VOCs were present at low concentrations. Total maximum concentrations of petroleum-related VOCs (BTEX) was at 305 $\mu g/m^3$. The chlorinated VOC Trichloroethene (TCE) was not detected in any soil gas samples. Tetrachloroethylene (PCE) was detected at maximum concentration of 8.13 $\mu g/m^3$. Soil vapor samples collected during the RI showed that all chlorinated VOCs were detected at trace concentrations and below NYSDOH AGVs.

REMEDIAL INVESTIGATION REPORT

1.0 SITE BACKGROUND

PSRS Realty has completed a remedial investigation to investigate and remediate a 0.30-acre site located at 109-17, 109-19, 109-21, 109-23 72nd Road in the Forest Hills section of Queens, New York. Mixed commercial residential use is proposed for the property. The RI work was performed between October 22 and 23, 2015. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY§ 43-1407(f).

1.1 Site Location and Current Usage

The Site is located at 109-17, 109-19, 109-21, 109-23 72nd Road in the Forest Hills section in Queens, New York and is identified as Block 3258 and Lots 14, 16, 17, and 18on the New York City Tax Map. Figure 1number shows the Site location. The Site is 13,000-square feet and is bounded by a multi-unit residential building to the north, a vacant lot to the south, multi-unit residential buildings to the east, and 72nd Road to the west. A map of the site boundary is shown in Figure 1. Currently, the Site is used for two (2) 2-2½ story buildings with eight (8) commercial tenant spaces and eight (8) residential units on four (4) tax lots. All buildings have full basements.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of the demolition of the existing structures and a new construction consisting of a seven (7) story mixed-use condominium. A 30 foot setback is proposed at the northwestern border of the property. The foundation area for the new building will measure 98.5 feet by 100 feet. The basement area for this portion of the building will be developed to a depth of approximately ten (10) feet below grade. A terrace area will be constructed off the rear of the building on the first floor that measures 33 feet 8 inches by 100 feet. The new building will utilize the basement for storage, refuse, parking garage for 26 cars, utility rooms and an elevator. The first floor will be developed for commercial use. The second through seventh floors will be developed for residential. As part of development, the referenced lot(s) are expected to be merged. The water table was observed at approximately 60 feet below grade surface (bgs). Layout of the proposed site development is presented in Appendix 1.

According to the NYC Department of Buildings (DOB), this property is known as 109-17, 109-19, 109-21, 109-23 72nd Road with a block and lots of 3258, 14, 16, 17, 18. The DOB has a zoning of "Office" building use (109-17 & 109-19) and "Residence-Multi" building use (109-21 & 109-23). According to NYC Oasis Information, the zoning is C4-4A.. The proposed use is consistent with existing zoning for the property.

1.3 Description of Surrounding Property

The property is bounded by a multi-unit residential building to the north, a vacant lot to the south (slated for development), multi-unit residential buildings to the east, and 72nd Road to the west with a church with a school beyond 72nd Road. No public schools, hospitals, or day care facilities were identified within a 500-foot radius, as observed on OER's SPEED application.

According to historic Sanborn Maps, the property located to the north is depicted as apartments from the 1930's to the 1990's, the property located to the south is depicted as dwelling from the 1930's to the 1990's, the property located to the west is depicted as apartments from the 1930's to the 1990's, the property located to the east is depicted as a church from the 1930's to the 1990's.

Figure 2 shows the surrounding land usage.

2.0 SITE HISTORY

2.1 Past Uses and Ownership

According to NYC Oasis Information, the Property is currently owned by 72nd Forest Hills Ass.

2.2 Previous Investigations

No previous investigations have been identified or reviewed.

2.3 Site Inspection

On October 22, 2015, Jessica Ferngren, a QEP, inspected the subject site. No evidence of potential or suspect areas or items indicative of generating impacts to the subsurface were observed.

2.4 Areas of Concern

The AOCs identified for this site include:

1. As specified in the Phase I, the potential for groundwater and vapor impacts from an up-gradient dry cleaner.

Phase 1 Report is presented in Appendix 2. No on-site areas of concern were identified.

3.0 PROJECT MANAGEMENT

3.1 Project Organization

The Qualified Environmental Profession (QEP) responsible for preparation of this RIR is John Schretzmayer.

3.2 Health and Safety

All work described in this RIR was performed in full compliance with applicable laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements.

3.3 Materials Management

All material encountered during the RI was managed in accordance with applicable laws and regulations.

4.0 REMEDIAL INVESTIGATION ACTIVITIES

PSRS Realty performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed eight soil borings across the entire project Site, and collected twelve soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed one temporary groundwater sampling port on-site and collected one groundwater sample for chemical analysis to evaluate groundwater quality;
4. Installed five soil vapor probes around Site perimeter and collected five samples for chemical analysis.

4.1 Geophysical Investigation

A geophysical survey was not performed as part of this investigation.

4.2 Borings and Monitoring Wells

Drilling and Soil Logging

Eight soil borings were advanced utilizing direct push technology (Geprobe®) or by manual methods by Associated Environmental Services, LTD of Hauppauge, New York.

Soil was sampled continuously in each boring. Borings SB01, SB04, SB07 and SB08 were advanced via direct push technology to 15 feet below grade. Borings SB02, SB03, SB05 and SB06 were advanced by hand within the basements of the existing buildings to 2 feet below basement grade. All soil was field screened with a photoionization detector (PID) for the presence of volatile organic compounds (VOCs). Soil encountered consisted of silty sand with some clay. No evidence of visual or olfactory impacts were observed.

Boring logs were prepared by a geologist are attached in Appendix 3. A map showing the location of soil borings and the temporary groundwater sample point is included as in Figure 4.

Groundwater Monitoring Well Construction

Groundwater monitoring wells were not installed during this investigation. One groundwater sample was collected using direct push technology (Geoprobe®) and a discreet sampler screened

six inches into the groundwater table. Groundwater was encountered at approximately 60 feet below grade.

The groundwater sampling location is shown in Figure 4 .

Survey

A survey was not conducted as part of this assessment.

4.3 Sample Collection and Chemical Analysis

Sampling performed as part of the field investigation was conducted for all Areas of Concern and also considered other means for bias of sampling based on professional judgment, area history, discolored soil, stressed vegetation, drainage patterns, field instrument measurements, odor, or other field indicators. All media including soil, groundwater and soil vapor have been sampled and evaluated in the RIR. Discrete (grab) samples have been used for final delineation of the nature and extent of contamination and to determine the impact of contaminants on public health and the environment. The sampling performed and presented in this RIR provides sufficient basis for evaluation of remedial action alternatives, establishment of a qualitative human health exposure assessment, and selection of a final remedy.

Soil Sampling

Twelve soil samples were collected for chemical analysis during this RI. Data on soil sample collection for chemical analyses, including dates of collection and sample depths, is reported in Table 3. Figure 4 shows the location of samples collected in this investigation. Laboratories and analytical methods are shown below.

One blind duplicate soil sample was analyzed for QA/QC purposes. All soil samples were collected into laboratory supplied glassware/bottleware and stored in an ice-filled cooler under chain of custody until delivered to the laboratory.

Groundwater Sampling

One groundwater sample was collected for chemical analysis during this RI. One groundwater sample was collected using direct push technology (Geoprobe®) and a discreet

sampler screened six inches into the groundwater table. Groundwater was encountered at approximately 60 feet below grade. Several attempts were made to collect groundwater samples at the areas of SB07 and SB04, but refusal was encountered at various depth ranging from 20 to 30 feet below grade. Groundwater sample collection data is reported in Table 4. S. Figure 4 shows the location of groundwater sampling. Laboratories and analytical methods are shown below.

A groundwater sample was collected utilizing a stainless steel check valve and dedicated disposal poly tubing from the discreet sampler. The groundwater samples was collected into laboratory supplied glassware/bottleware and stored in an ice-filled cooler under chain of custody until delivered to the laboratory. QA/QC samples were not collected for the one groundwater sample analyzed.

Soil Vapor Sampling

Five soil vapor probes were installed and five soil vapor samples were collected for chemical analysis during this RI. Soil vapor points SV01 and SV04 were installed by direct push technology. Each point was installed with a 6-inch stainless steel vapor point at the base and a poly tubing riser to the surface. The annular space surrounding the stainless steel point and two feet above was filled with course sand. The remaining annular space was filled with bentonite to the surface. Soil vapor points SV02, SV03, and SV05 were set as subslab vapor points set approximately 6 inches below the basement slab. Each subslab point was fitted with poly tubing to the surface and sealed with bentonite.

Tracer testing was conducted on each point prior to sampling. Helium trace results ranged from 0 ppm to 100 ppm, confirming the seal at the surface. Each soil vapor point was purged of ambient air prior to sample collection and PID readings were collected. PID readings were observed at 0.0 ppm in all vapor sample locations. Vapor samples were collected in 2-liter summa canisters fitted with 2-hour flow control regulators. Vapor samples were delivered to the laboratory under chain of custody. Soil vapor sampling locations are shown in Figure 4. Soil vapor sample collection data is reported in Table 5. . Methodologies used for soil vapor assessment conform to the *NYS DOH Final Guidance on Soil Vapor Intrusion, October 2006.*

Chemical Analysis

Chemical analytical work presented in this RIR has been performed in the following manner:

Factor	Description
Quality Assurance Officer	The chemical analytical quality assurance is directed by John Schretzmayer
Chemical Analytical Laboratory	Chemical analytical laboratory(s) used in the RI is NYS ELAP certified and were Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut and Long Island Analytical Laboratories Inc. of Holbrook, New York.
Chemical Analytical Methods	Soil analytical methods: • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); Groundwater analytical methods: • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); Soil vapor analytical methods: • VOCs by TO-15 VOC parameters.

Results of Chemical Analyses

Laboratory data for soil, groundwater and soil vapor are summarized in Tables 3, 4, and 5, respectively. Laboratory data deliverables for all samples evaluated in this RIR are provided in digital form in Appendices 4, 5, and 6.

5.0 ENVIRONMENTAL EVALUATION

5.1 Geological and Hydrogeological Conditions

Stratigraphy

Soil encountered consisted of silty sand with some clay. Bedrock was not observed during this investigation.

Hydrogeology

Groundwater monitoring wells were not installed. Based on the USGS Long Island Depth to Water Viewer (http://ny.water.usgs.gov/maps/li-dtw10/), groundwater flow is estimated to flow from southwest to northeast.

5.2 Soil Chemistry

Data collected during the RI is sufficient to delineate the vertical and horizontal distribution of contaminants in soil/fill at the Site. A summary table of data for chemical analyses performed on soil samples is included in Table 3. All soil sample analytical results reported concentrations of VOCs, SVOCs, PCBs, Pesticides, and Metals below Unrestricted Use SCOs or as non-detect.

5.3 Groundwater Chemistry

Data collected during the RI is sufficient to delineate the distribution of contaminants in groundwater at the Site. A summary table of data for chemical analyses performed on groundwater samples is included in Table 5. The groundwater analytical results reported concentrations of VOCs, SVOCs, PCBs, Pesticides, and Metals below New York State 6NYCRR Part 703.5 Class GA or as non-detect.

5.4 Soil Vapor Chemistry

In the absence of soil vapor standards or guidelines, concentrations of VOCs detected in the soil gas samples were conservatively compared to indoor air criteria published in the 2006 NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, specifically to NYSDOH Indoor Air Guideline Values (AGVs).

VOCs associated with petroleum (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,2,4-trimethylpentane, 4-ethyltoluene, 4-methyl 2-pentanone, benzene, ethylbenzene, ethanol,

isopropylbenzene, xylenes, and toluene) were reported at concentrations ranging from 1.13 ug/m^3 to 872 ug/m^3.

VOCs typically associated with solvents (1,1,1-trichlorethane, tetrachloroethene, trichloroethene, 2-hexanone, heptane, hexane, isopropyl alcohol, carbon disulfide, carbon tetrachloride, chloroform, cyclohexane, tetrahydrofuran, propylene) were reported at concentrations ranging from 1.34 ug/m^3 to 147 ug/m^3.

Dichlorodifluoromethane and trichlorofluoromethane, commonly associated with refrigerants, were reported at concentrations ranging from 22.1 ug/m^3 to 131 ug/m^3.

Acetone, which may be associated with solvents or fill materials and is also a common laboratory contaminant, was reported at concentrations ranging from 131 ug/m^3 to 15,600 ug/m^3.

Methylene chloride which may be associated with solvents and common laboratory contaminant was reported at concentrations ranging from 1.29 ug/m^3 to 3.17 ug/m^3.

No VOCs were reported in exceedance of NYSDOH AGVs. The reported VOCs are likely attributable to fill materials and/or off-site sources.

Data collected during the RI is sufficient to delineate the distribution of contaminants in soil vapor at the Site. A summary table of data for chemical analyses performed on soil vapor samples is included in Table 6.

Figure 5 shows the location and posts the values for soil vapor samples with detected concentrations.

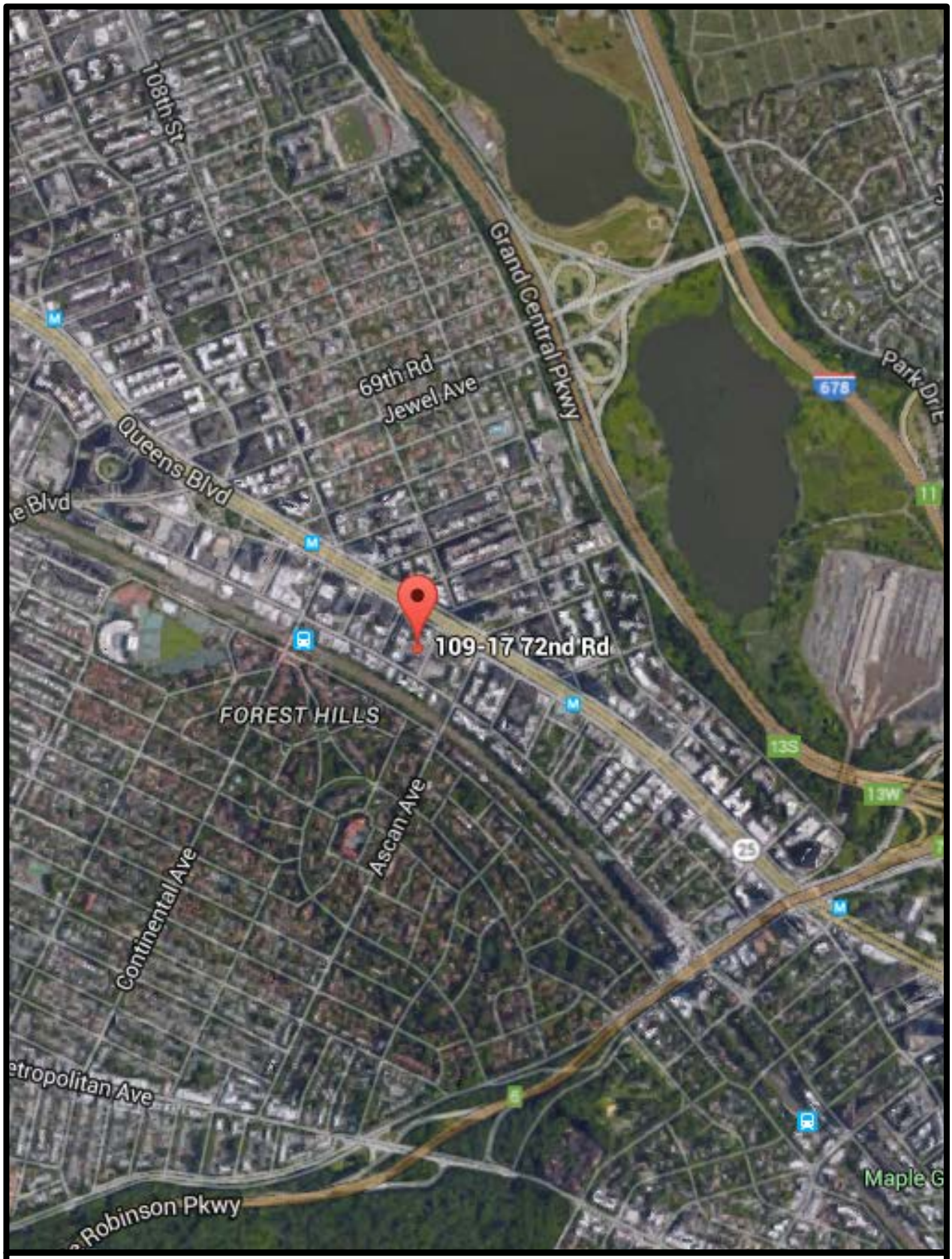
5.5 Prior Activity

Based on an evaluation of the data and information from the RIR, disposal of significant amounts of hazardous waste is not suspected at this site.

5.6 Impediments to Remedial Action

There are no known impediments to remedial action at this property.

FIGURES



0 500 1000 1500 2000
(FEET)

FIGURE 1 – VICINITY MAP
109-17 – 109-23 72ND ROAD
QUEENS, NEW YORK

Associated Environmental Services, Ltd.

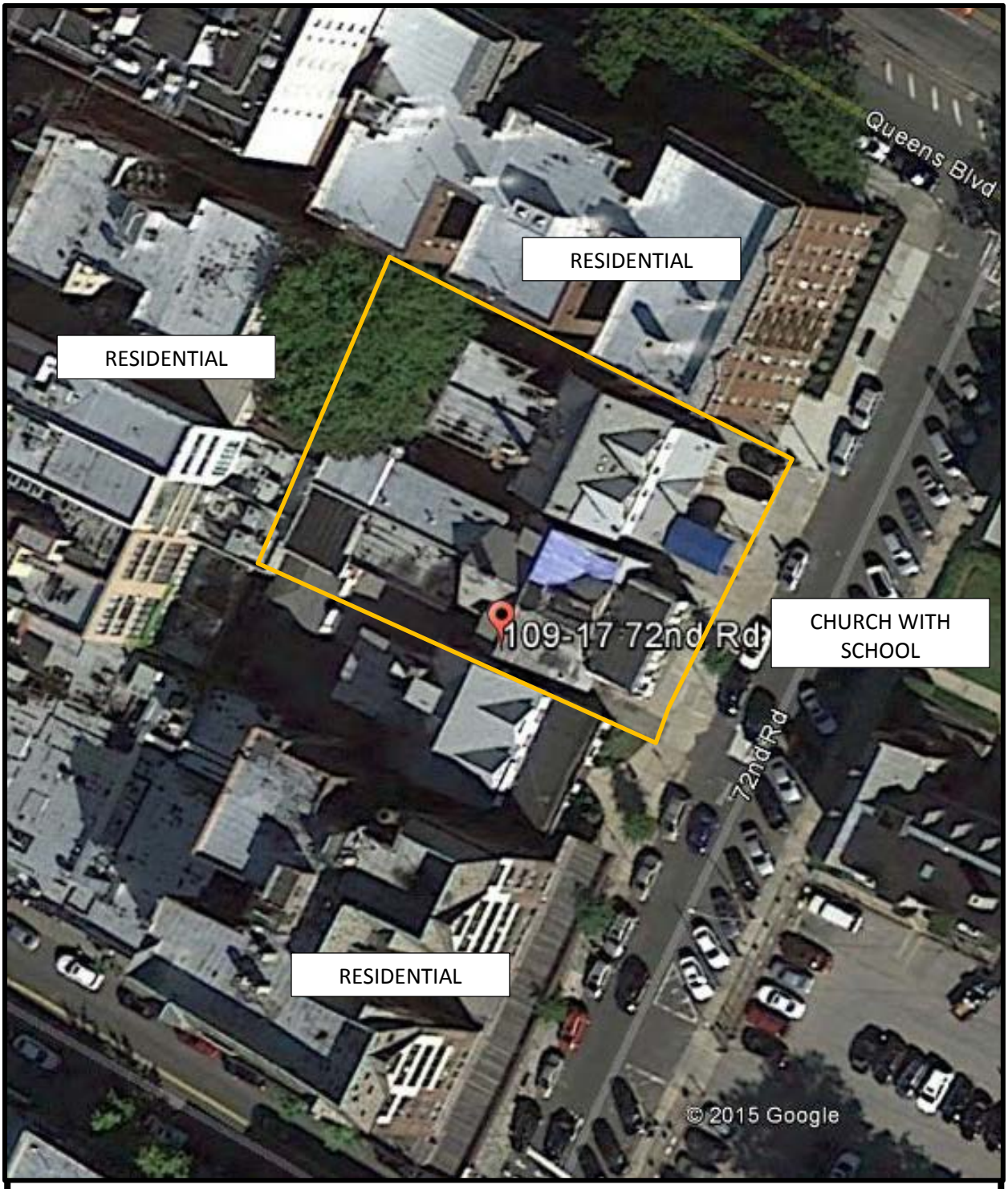
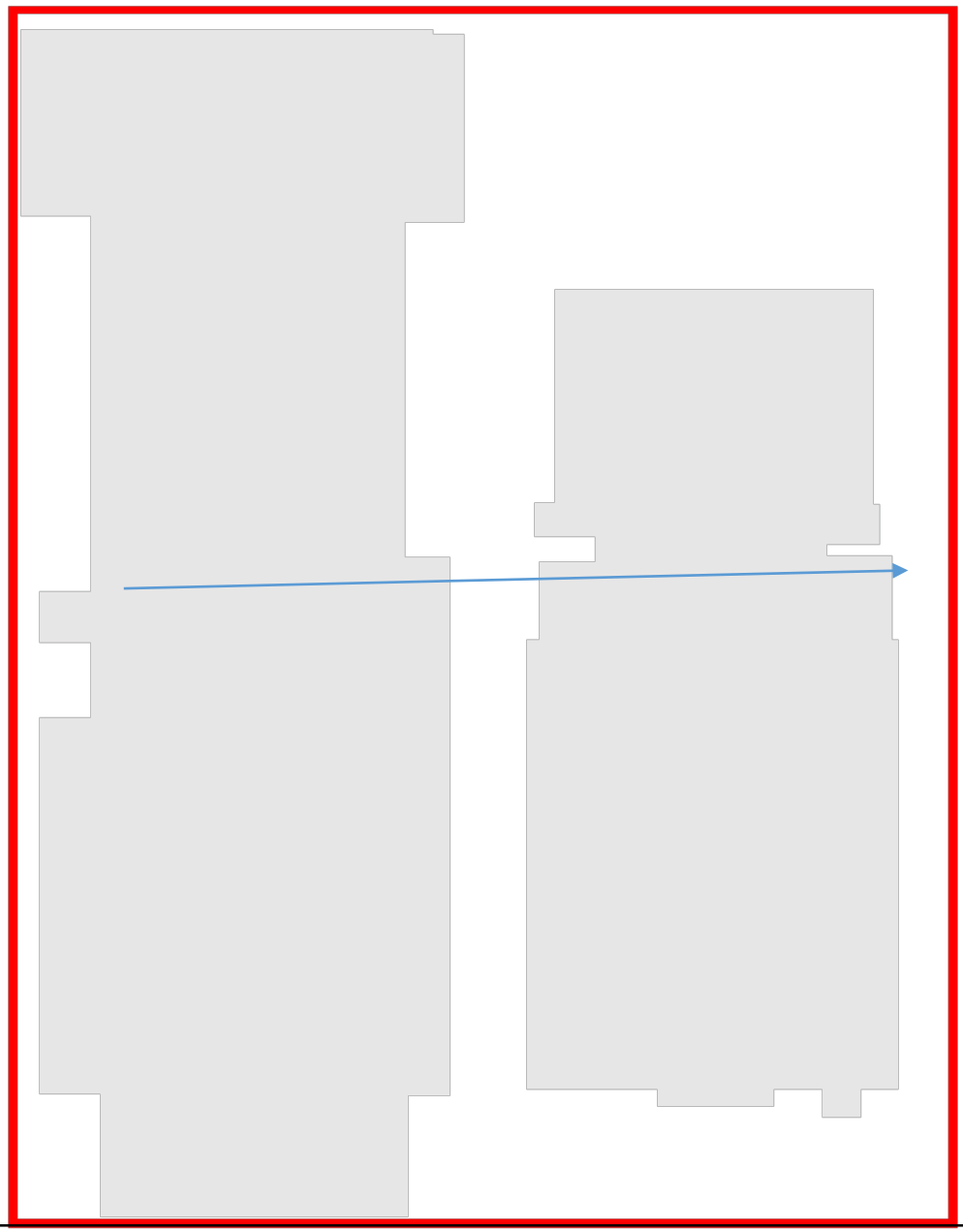


FIGURE 2 – SURROUNDING PROPERTIES USE MAP
109-17 – 109-23 72ND ROAD
QUEENS, NEW YORK

PROPERTY BOUNDARY

Associated Environmental Services, Ltd.



0 10 20 30 40
(FEET)

SIDEWALK

72ND ROAD

LEGEND:

PROPERTY BOUNDARY

APPROXIMATE GROUNDWATER FLOW DIRECTION

FIGURE 3
SITE PLAN

109-17 – 109-23 72ND ROAD
QUEENS, NEW YORK

Associated Environmental Services, Ltd.

LEGEND:

- PROPERTY BOUNDARY
- SOIL BORING
- SOIL BORING/GROUNDWATER MONITORING WELL
- SUB-SLAB VAOPR POINT
- APPROXIMATE GROUNDWATER FLOW DIRECTION

FIGURE 4
SAMPLING LOCATIONS

109-17 – 109-23 72ND ROAD
QUEENS, NEW YORK

Associated Environmental Services, Ltd.

	SV05 ug/m3	SV04 ug/m3	SV03 ug/m3	SV02 ug/m3	SV01 ug/m3
1,1,1-Trichloroethane	ND	ND	ND	2.22	ND
Tetrachloroethene	0.46	8.13	0.92	1.57	2.77
Trichloroethene	ND	ND	0.26	ND	ND
2-Hexanone(MBK)	95	23.9	49.5	44.6	147
Heptane	19.9	14.7	17.5	9.22	14.6
Hexane	21.8	10.7	27.1	7.4	12.4
Isopropylalcohol	ND	ND	ND	1.57	ND
Carbon Disulfide	6.5	2.37	2.4	1.34	4.48
Carbon Tetrachloride	0.49	0.82	0.43	ND	0.49
Chloroform	2.34	38.5	30.9	7.51	ND
Cyclohexane	5.3	2.43	5.81	1.79	2.49
Tetrahydrofuran	2.64	1.62	1.93	1.6	ND
Propylene	88.8	27	63.6	53.1	112
Acetone	58.6	79.8	22.1	54.6	131
Methylene Chloride	1.29	ND	3.17	ND	ND
1,2,4-Trimethylbenzene	4.74	27.7	17	2.28	3.63
1,3,5-Trimethylbenzene	1.8	9.19	5.55	ND	1.48
4-Ethyltoluene	2.41	8.45	6.09	1.13	1.64
4-Methyl-2-pentanone(MIBK)	ND	4.02	ND	1.03	2.37
Benzene	9	5.68	20.3	3.96	5.3
Ethanol	48.6	3.9	10.1	12.4	49.9
Ethylbenzene	21.7	28.9	28.5	16.4	18.1
Isopropylbenzene	1.17	2.72	2.13	ND	1.04
m,p-Xylene	75.1	112	101	53.8	58.1
o-Xylene	33.8	45.1	40.8	21.1	23.8
Methyl Ethyl Ketone	392	73.4	122	181	872
Toluene	145	127	134	82.5	116
Trichlorofluoromethane	1.26	1.26	1.26	1.59	1.56
Dichlorodifluoromethane	1.7	1.74	1.74	1.51	1.84

LEGEND:

- PROPERTY BOUNDARY
- SOIL BORING
- SOIL BORING/GROUNDWATER MONITORING WELL
- SUB-SLAB VAOPR POINT
- APPROXIMATE GROUNDWATER FLOW DIRECTION

ND: NOT DETECTED

FIGURE 5
SOIL VAPOR ANALYTICAL SUMMARY

109-17 – 109-23 72ND ROAD
QUEENS, NEW YORK

Associated Environmental Services, Ltd.

TABLES

Table 1
Construction Details for Soil Borings

109-17 to 109-23 72nd Road
Forest Hills, New York

	Identification Number	Date of construction	Total Depth	Diameter (inches)	Screened interval (feet bgs)	Construction Material (PVC, steel, etc)	GPS Coordinates (Lat/Long)
Soil Borings	SB01	10/22/2015	15	2	Not Applicable	Not Applicable	40.431069N/73.502875W
	SB02	10/22/2015	2	2	Not Applicable	Not Applicable	40.431043N/73.502991W
	SB03	10/22/2015	2	2	Not Applicable	Not Applicable	40.431026N/73.502942W
	SB04	10/22/2015	15	2	Not Applicable	Not Applicable	40.431100N/43.502999W
	SB05	10/22/2015	2	2	Not Applicable	Not Applicable	40.431078N/73.502936W
	SB06	10/22/2015	2	2	Not Applicable	Not Applicable	40.431065N/73.502900W
	SB07	10/22/2015	15	2	Not Applicable	Not Applicable	40.431027N/73.503017W
	SB08	10/22/2015	15	2	Not Applicable	Not Applicable	40.430996N/73.502929W

Table 2
Analytical Methods Summary Table

109-17 to 109-23 72nd Road
Forest Hills, New York

Matrix	Number of Samples	Analytical parameters measured	Analytical methods
Soil	Twelve	• TAL Metals • VOCs • SVOCs • Pesticides • PCBs	• TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000);
Groundwater	One	• TAL Metals • VOCs • SVOCs • Pesticides • PCBs	• TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000);
Soil Vapor	Five	• VOCs by TO-15 VOC parameters	• VOCs by TO-15 VOC parameters

TABLE 3A
SOIL ANALYTICAL SUMMARY
VOLATILE ORGANIC COMPOUNDS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

SAMPLE ID:								SB01(0-2)	SB01 (10-12)	SB02 (0-2)	SB03 (0-2)	SB04 (2-4)	SB04 (10-12)	SB05 (0-2)	SB06 (0-2)	SB07 (0-2)	SB07 (10-12)	SB08 (0-2)	SB08 (10-12)
DATE SAMPLED:								10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015
LABORATORY ID:	CAS NO.	NY-CP51	NY-UNRES	NY-RESR	NY-RESRR	NY-RESC	NY-RESI	5102716-01	5102716-02	5102716-03	5102716-04	5102716-05	5102716-06	5102716-07	5102716-08	5102716-09	5102716-10	5102716-11	5102716-12
VOLATILE ORGANIC COMPOUNDS (UG/KG)																			
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,1,1-Trichloroethane	71-55-6	NS	680	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	35000	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,1,2-Trichloroethane	79-00-5	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,1-Dichloroethane	75-34-3	NS	270	19000	26000	240000	480000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,1-Dichloroethylene	75-35-4	NS	330	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,1-Dichloropropylene	563-58-6	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2,3-Trichlorobenzene	87-61-6	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2,3-Trichloropropane	96-18-4	NS	NS	80000	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2,4-Trimethylbenzene	95-63-6	3600	3600	47000	52000	190000	380000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2-Dibromo-3-chloropropane	96-12-8	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2-Dibromoethane	106-93-4	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2-Dichlorobenzene	95-50-1	NS	1100	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2-Dichloroethane	107-06-2	NS	20	2300	3100	30000	60000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,2-Dichloropropane	78-87-5	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,3,5-Trimethylbenzene	108-67-8	8400	8400	47000	52000	190000	380000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,3-Dichlorobenzene	541-73-1	NS	2400	17000	49000	280000	560000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,3-Dichloropropane	142-28-9	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,4-Dichlorobenzene	106-46-7	NS	1800	9800	13000	130000	250000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,4-Diethylbenzene	105-05-5	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
1,4-Dioxane	123-91-1	NS	100	9800	13000	130000	250000	<51.5	<44.7	<60.1	<55.8	<53.7	<50.9	<50.2	<52.1	<56.6	<47.4	<82.1	<85.8
2,2-Dichloropropane	594-20-7	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
2-Chlorotoluene	95-49-8	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
4-Chlorotoluene	106-43-4	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
4-Ethyltoluene	622-96-8	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
4-Isopropyltoluene	99-87-6	10000	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
4-Methyl-2-Pentanone	108-10-1	NS	NS	NS	NS	NS	NS	<10.3	<8.95	<12.0	<11.2	<10.7	<10.2	<10.0	<10.4	<11.3	<9.48	<16.4	<17.2
Acetone	67-64-1	NS	50	100000	100000	500000	1000000	<51.5	<44.7	<60.1	<55.8	<53.7	<50.9	<50.2	<52.1	<56.6	<47.4	<82.1	<85.8
Acrylonitrile	107-13-1	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Benzene	71-43-2	60	60	2900	4800	44000	89000	<5.15	<4.47	31.2	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Bromobenzene	108-86-1	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Bromochloromethane	74-97-5	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Bromodichloromethane	75-27-4	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Bromoform	75-25-2	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Bromomethane	74-83-9	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Carbon disulfide	75-15-0	NS	NS	100000	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Carbon Tetrachloride	56-23-5	NS	760	1400	2400	22000	44000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Chlorobenzene	108-90-7	NS	1100	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Chlorodifluoromethane	75-45-6	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Chloroethane	75-00-3	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Chloroform	67-66-3	NS	370	10000	49000	350000	700000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Chloromethane	74-87-3	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
cis-1,2-Dichloroethylene	156-59-2	NS	250	59000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
cis-1,3-Dichloropropylene	10061-01-5	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Dibromochloromethane	124-48-1	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Dibromomethane	74-95-3	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Dichlorodifluoromethane	75-71-8	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Ethylbenzene	100-41-4	1000	1000	30000	41000	390000	780000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Hexachlorobutadiene	87-68-3	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Isopropylbenzene (Cumene)	98-82-8	2300	NS	100000	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
m,p-Xylenes	108-38-3/106-42-3	260	NS	NS	NS	NS	NS	<10.3	<8.95	<12.0	<11.2	<10.7	<10.2	<10.0	<10.4	<11.3	<9.48	<16.4	<17.2
Methyl Butyl Ketone (2-Hexanone)	591-78-6	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Methyl Ethyl Ketone (2-Butanone)	78-93-3	NS	120	100000	100000	500000	1000000	<10.3	<8.95	<12.0	<11.2	<10.7	<10.2	<10.0	<10.4	<11.3	<9.48	<16.4	<17.2
Methylene Chloride	75-09-2	NS	50	51000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Methyl-tert-Butyl Ether	1634-04-4	930	930	62000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Naphthalene	91-20-3	12000	12000	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
n-Butylbenzene	104-51-8	12000	12000	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
n-Propylbenzene	103-65-1	3900	3900	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
o-Xylene	95-47-6	260	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
sec-Butylbenzene	135-98-8	11000	11000	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Styrene	100-42-5	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
tert-Butyl alcohol	75-65-0	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
tert-Butylbenzene	98-06-6	5900	5900	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Tetrachloroethylene	127-18-4	NS	1300	5500	19000	150000	300000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Toluene	108-88-3	700	700	100000	100000	500000	1000000	<5.15	<4.47	8.66	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
trans-1,2-Dichloroethylene	156-60-5	NS	190	100000	100000	500000	1000000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
trans-1,3-Dichloropropylene	10061-02-6	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Trichloroethylene	79-01-6	NS	470	10000	21000	200000	400000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Trichlorofluoromethane	75-69-4	NS	NS	NS	NS	NS	NS	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58
Vinyl chloride	75-01-4	NS	20	210	900	13000	27000	<5.15	<4.47	<6.01	<5.58	<5.37	<5.09	<5.02	<5.21	<5.66	<4.74	<8.21	<8.58

NOTES:
NY-CP51: NYSDEC CP-51 SOIL CLEANUP GUIDANCE
NY-UNRES: NYSDEC PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
NY-RESR: NYSDEC PART 375 RESTRICTED USE-RESIDENTIAL SOIL CLEANUP OBJECTIVES
NY-RESRR: NYSDEC PART 375 RESTRICTED USE -RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVES
NY-RESC: NYSDEC PART 375 RESTRICTED USE-COMMERCIAL SOIL CLEANUP OBJECTIVES
NY-RESI: NYSDEC PART 375 RESTRICTED USE-INDUSTRIAL SOIL CLEANUP OBJECTIVES
NS: NO STANDARD

TABLE 3B
SOIL ANALYTICAL SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

SAMPLE ID:								SB01(0-2)	SB01 (10-12)	SB02 (0-2)	SB03 (0-2)	SB04 (2-4)	SB04 (10-12)	SB05 (0-2)	SB06 (0-2)	SB07 (0-2)	SB07 (10-12)	SB08 (0-2)	SB08 (10-12)
DATE SAMPLED:								10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015
LABORATORY ID:	CAS NO.	NY-CP51	NY-UNRES	NY-RESR	NY-RESRR	NY-RESC	NY-RESI	5102716-01	5102716-02	5102716-03	5102716-04	5102716-05	5102716-06	5102716-07	5102716-08	5102716-09	5102716-10	5102716-11	5102716-12
SEMI-VOLATILE ORGANIC COMPOUNDS (UG/KG)																			
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
1,2-Dichlorobenzene	95-50-1	NS	1100	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
1,3-Dichlorobenzene	541-73-1	NS	2400	17000	49000	280000	560000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
1,4-Dichlorobenzene	106-46-7	NS	1800	9800	13000	130000	250000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2,2'-0xybis(1-Chloropropane)	108-60-1	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2,4,5-Trichlorophenol	95-95-4	NS	NS	100000	NS	NS	NS	<106	<97.1	<99.5	<98.6	<96.1	<93.8	<97.6	<102	<114	<99.0	<111	<95.5
2,4,6-Trichlorophenol	88-06-2	NS	NS	NS	NS	NS	NS	<106	<97.1	<99.5	<98.6	<96.1	<93.8	<97.6	<102	<114	<99.0	<111	<95.5
2,4-Dichlorophenol	120-83-2	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2,4-Dimethylphenol	105-67-9	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2,4-Dinitrophenol	51-28-5	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2,4-Dinitrotoluene	121-14-2	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2,6-Dinitrotoluene	606-20-2	NS	NS	1030	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2-Chloronaphthalene	91-58-7	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2-Chlorophenol	95-57-8	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2-Methylnaphthalene	91-57-6	NS	NS	410	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2-Methylphenol	95-48-7	NS	330	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2-Nitroaniline	88-74-4	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
2-Nitrophenol	88-75-5	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
3,3'-Dichlorobenzidine	91-94-1	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
3/4-Methylphenol	108-39-4/106-44-5	NS	330	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
3-Nitroaniline	99-09-2	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
4,6-Dinitro-2-methylphenol	534-52-1	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
4-Bromophenyl phenyl ether	101-55-3	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
4-Chloro-3-methylphenol	59-50-7	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
4-Chloroaniline	106-47-8	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
4-Chlorophenyl phenyl ether	7005-72-3	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
4-Nitroaniline	100-01-6	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
4-Nitrophenol	100-02-7	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Acenaphthene	83-32-9	20000	20000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Acenaphthylene	208-96-8	100000	100000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Aniline	62-53-3	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Anthracene	120-12-7	100000	100000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzidine	92-87-5	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzo(a)anthracene	56-55-3	1000	1000	1000	1000	5600	11000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzo(a)pyrene	50-32-8	1000	1000	1000	1000	1000	1100	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzo(b)fluoranthene	205-99-2	1000	1000	1000	1000	5600	11000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzo(g,h,i)perylene	191-24-2	100000	100000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzo(k)fluoranthene	207-08-9	800	800	1000	3900	56000	110000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzoic Acid	65-85-0	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Benzyl alcohol	100-51-6	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
bis(2-Chloroethoxy)methane	111-91-1	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Bis(2-Chloroethyl)ether	111-44-4	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Bis(2-Ethylhexyl)phthalate	117-81-7	NS	NS	50000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Butyl benzyl phthalate	85-68-7	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	184	<191	<165	<186	<159
Carbazole	86-74-8	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Chrysene	218-01-9	1000	1000	1000	3900	56000	110000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Dibenzo(a,h)anthracene	53-70-3	330	330	330	330	560	1100	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Dibenzofuran	132-64-9	NS	7000	14000	59000	350000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Diethyl phthalate	84-66-2	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Dimethyl phthalate	131-11-3	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Di-n-butyl phthalate	84-74-2	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Di-n-octyl phthalate	117-84-0	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Fluoranthene	206-44-0	100000	100000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Fluorene	86-73-7	30000	30000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Hexachlorobenzene	118-74-1	NS	330	410	1200	6000	12000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Hexachlorobutadiene	87-68-3	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Hexachlorocyclopentadiene	77-47-4	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Hexachloroethane	67-72-1	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Indeno(1,2,3-cd)pyrene	193-39-5	500	500	500	500	5600	11000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Isophorone	78-59-1	NS	NS	100000	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Naphthalene	91-20-3	12000	12000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Nitrobenzene	98-95-3	NS	NS	3700	15000	69000	140000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
N-Nitrosodimethylamine	62-75-9	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
N-Nitroso-di-n-propylamine	621-64-7	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
N-Nitrosodiphenylamine	86-30-6	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Parathion (ethyl)	56-38-2	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Pentachlorophenol	87-86-5	NS	800	2400	6700	6700	55000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Phenanthrene	85-01-8	100000	100000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Phenol	108-95-2	NS	330	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Pyrene	129-00-0	100000	100000	100000	100000	500000	1000000	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159
Pyridine	110-86-1	NS	NS	NS	NS	NS	NS	<176	<162	<166	<164	<160	<156	<163	<170	<191	<165	<186	<159

NOTES:
NY-CP51: NYSDEC CP-51 SOIL CLEANUP GUIDANCE
NY-UNRES: NYSDEC PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
NY-RESR: NYSDEC PART 375 RESTRICTED USE-RESIDENTIAL SOIL CLEANUP OBJECTIVES
NY-RESRR: NYSDEC PART 375 RESTRICTED USE -RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVES
NY-RESC: NYSDEC PART 375 RESTRICTED USE-COMMERCIAL SOIL CLEANUP OBJECTIVES
NY-RESI: NYSDEC PART 375 RESTRICTED USE-INDUSTRIAL SOIL CLEANUP OBJECTIVES
NS: NO STANDARD

TABLE 3C
SOIL ANALYTICAL SUMMARY
PESTICIDES/PCBS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

SAMPLE ID:							SB01(0-2)	SB01 (10-12)	SB02 (0-2)	SB03 (0-2)	SB04 (2-4)	SB04 (10-12)	SB05 (0-2)	SB06 (0-2)	SB07 (0-2)	SB07 (10-12)	SB08 (0-2)	SB08 (10-12)
DATE SAMPLED:							10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015
LABORATORY ID:	CAS NO.	NY-UNRES	NY-RESR	NY-RESRR	NY-RESC	NY-RESI	5102716-01	5102716-02	5102716-03	5102716-04	5102716-05	5102716-06	5102716-07	5102716-08	5102716-09	5102716-10	5102716-11	5102716-12
PESTICIDES (UG/KG)																		
4,4'-DDD	72-54-8	92000	180000	2600	13000	3.3	<3.53	<3.24	<3.32	<3.29	<3.20	<3.13	<3.25	<3.40	<3.81	<3.30	<3.72	<3.18
4,4'-DDE	72-55-9	62000	120000	1800	8900	3.3	<3.53	<3.24	<3.32	<3.29	<3.20	<3.13	<3.25	<3.40	<3.81	<3.30	<3.72	<3.18
4,4'-DDT	50-29-3	47000	94000	1700	7900	3.3	<3.53	<3.24	<3.32	<3.29	<3.20	<3.13	<3.25	<3.40	<3.81	<3.30	<3.72	<3.18
Aldrin	309-00-2	680	1400	19	97	5	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
alpha-BHC	319-84-6	3400	6800	97	480	20	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
beta-BHC	319-85-7	3000	14000	72	360	36	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Chlordane	12789-03-6	NS	NS	NS	NS	NS	<17.6	<16.2	<16.6	<16.4	<16.0	<15.6	<16.3	<17.0	<19.1	<16.5	<18.6	<15.9
cis-Chlordane	5103-71-9	24000	47000	910	4200	94	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
delta-BHC	319-86-8	500000	1000000	100000	100000	40	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Dieldrin	60-57-1	1400	2800	39	200	5	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Endosulfan I	959-98-8	200000	920000	4800	24000	2400	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Endosulfan II	33213-65-9	200000	920000	4800	24000	2400	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Endosulfan Sulfate	1031-07-8	200000	920000	4800	24000	2400	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Endrin	72-20-8	89000	410000	2200	11000	14	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Endrin Aldehyde	7421-93-4	NS	NS	NS	NS	NS	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	18.4	14.8	<6.36	<5.50	<6.19	<5.30
Endrin Ketone	53494-70-5	NS	NS	NS	NS	NS	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
gamma-BHC	58-89-9	9200	23000	280	1300	100	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Heptachlor	76-44-8	15000	29000	420	2100	42	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Heptachlor Epoxide	1024-57-3	NS	NS	77	NS	NS	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Methoxychlor	72-43-5	NS	NS	100000	NS	NS	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Mirex	2385-85-5	NS	NS	NS	NS	NS	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
Toxaphene	8001-35-2	NS	NS	NS	NS	NS	<118	<108	<111	<110	<107	<104	<108	<113	<127	<110	<124	<106
trans-Chlordane	5103-74-2	NS	NS	540	NS	NS	<5.88	<5.39	<5.53	<5.48	<5.34	<5.21	<5.42	<5.66	<6.36	<5.50	<6.19	<5.30
PCBs (UG/KG)																		
Aroclor 1016	12674-11-2	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1221	11104-28-2	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1232	11141-16-5	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1242	53469-21-9	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1248	12672-29-6	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1254	11097-69-1	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1260	11096-82-5	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1262	37324-23-5	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6
Aroclor 1268	11100-14-4	1000	25000	1000	1000	100	<11.8	<10.8	<11.1	<11.0	<10.7	<10.4	<10.8	<11.3	<12.7	<11.0	<12.4	<10.6

NOTES:
NY-UNRES: NYSDEC PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
NY-RESR: NYSDEC PART 375 RESTRICTED USE-RESIDENTIAL SOIL CLEANUP OBJECTIVES
NY-RESRR: NYSDEC PART 375 RESTRICTED USE -RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVES
NY-RESC: NYSDEC PART 375 RESTRICTED USE-COMMERCIAL SOIL CLEANUP OBJECTIVES
NY-RESI: NYSDEC PART 375 RESTRICTED USE-INDUSTRIAL SOIL CLEANUP OBJECTIVES
NS: NO STANDARD

TABLE 3D
SOIL ANALYTICAL SUMMARY
METALS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

SAMPLE ID:							SB01(0-2)	SB01 (10-12)	SB02 (0-2)	SB03 (0-2)	SB04 (2-4)	SB04 (10-12)	SB05 (0-2)	SB06 (0-2)	SB07 (0-2)	SB07 (10-12)	SB08 (0-2)	SB08 (10-12)
DATE SAMPLED:							10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015	10/22/2015
LABORATORY ID:	CAS NO.	NY-UNRES	NY-RESR	NY-RESRR	NY-RESC	NY-RESI	5102716-01	5102716-02	5102716-03	5102716-04	5102716-05	5102716-06	5102716-07	5102716-08	5102716-09	5102716-10	5102716-11	5102716-12
METALS (MG/KG)																		
Aluminum	7429-90-5	NS	NS	NS	NS	NS	12700	6550	5990	6640	10900	5510	9790	7590	6970	4060	15400	5810
Antimony	7440-36-0	NS	NS	NS	NS	NS	<1.67	<1.67	<1.80	<1.67	<1.67	<1.67	<1.67	<1.93	<2.02	<1.71	<1.99	<1.67
Arsenic	7440-38-2	13	16	16	16	16	2.47	<1.67	<1.80	<1.67	3.6	<1.67	<1.67	<1.93	2.8	<1.71	<1.99	<1.67
Barium	7440-39-3	350	350	400	400	10000	51.8	60.9	37.3	46.7	51.9	36.5	47.5	42.1	57.1	35.5	51.4	56.5
Beryllium	7440-41-7	7.2	14	72	590	2700	<1.67	<1.67	<1.80	<1.67	<1.67	<1.67	<1.67	<1.93	<2.02	<1.71	<1.99	<1.67
Cadmium	7440-43-9	2.5	2.5	4.3	9.3	60	<1.65	<1.65	<1.80	<1.66	<1.65	<1.65	<1.65	<1.93	<2.02	<1.71	<1.99	<1.65
Calcium	7440-70-2	NS	NS	NS	NS	NS	1340	1020	2030	1850	1530	556	40300	38200	2610	957	1980	1900
Chromium	7440-47-3	30	36	180	1500	6800	18.4	20.6	15	16.4	16.8	14.6	16.6	13.3	24.9	14.5	23.1	12.3
Cobalt	7440-48-4	NS	30	NS	NS	NS	6.88	8.22	7	8.63	6.95	5.5	6.17	4.96	9.44	5.49	6.71	6.08
Copper	7440-50-8	50	270	270	270	10000	13.6	17.3	11.7	13.7	16.1	10.8	10.1	8.21	19.1	8.26	13.6	71.2
Iron	7439-89-6	NS	NS	NS	NS	NS	15800	18500	12500	14200	14500	13400	12900	11600	10100	11500	19000	21800
Lead	7439-92-1	63	400	400	1000	3900	18.5	4	3.71	3.77	27.7	2.47	4.84	4.49	14.2	2.58	7.78	7.96
Magnesium	7439-95-4	NS	NS	NS	NS	NS	2210	2330	1810	2160	1880	1490	3230	3070	3280	1550	3150	1140
Manganese	7439-96-5	1600	2000	2000	10000	10000	236	432	250	312	301	221	261	184	229	246	78	448
Nickel	7440-02-0	30	140	310	310	10000	12.3	19.7	11.3	14	10.9	9.94	9.27	7.68	14.3	9.93	11.9	11.2
Potassium	7440-09-7	NS	NS	NS	NS	NS	1100	948	757	1130	602	629	1250	861	1610	602	986	1140
Selenium	7782-49-2	3.9	36	180	1500	6800	<1.67	<1.67	<1.80	<1.67	<1.67	<1.67	<1.67	<1.93	<2.02	<1.71	<1.99	<1.67
Silver	7440-22-4	2	36	180	1500	6800	<1.67	<1.67	<1.80	<1.67	<1.67	<1.67	<1.67	<1.93	<2.02	<1.71	<1.99	<1.67
Sodium	7440-23-5	NS	NS	NS	NS	NS	98.9	94.6	60	111	103	78.6	303	237	630	67.1	279	132
Thallium	7440-28-0	NS	NS	NS	NS	NS	<1.67	<1.67	<1.80	<1.67	<1.67	<1.67	<1.67	<1.93	<2.02	<1.71	<1.99	<1.67
Vanadium	7440-62-2	NS	100	NS	NS	NS	26.2	25.7	20.2	23.5	22.8	18.6	18.7	15.5	28.3	19.6	22.9	15
Zinc	7440-66-6	109	2200	10000	10000	10000	34.8	33.7	23.8	26.6	205	19.5	27.8	25.8	45.9	20	37.2	31.7
Mercury	7439-97-6	0.18	0.81	0.81	2.8	5.7	0.09	<0.01	<0.02	<0.01	0.14	<0.01	0.03	0.02	0.13	<0.02	<0.02	<0.01
Cyanide	57-12-5	27	27	27	27	10000	<0.24	<0.22	<0.22	<0.22	<0.21	<0.21	<0.22	<0.23	<0.25	<0.22	<0.25	<0.21

NOTES:
NY-UNRES: NYSDEC PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
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NY-RESC: NYSDEC PART 375 RESTRICTED USE-COMMERCIAL SOIL CLEANUP OBJECTIVES
NY-RESI: NYSDEC PART 375 RESTRICTED USE-INDUSTRIAL SOIL CLEANUP OBJECTIVES
NS: NO STANDARD

TABLE 4A
GROUNDWATER ANALYTICAL SUMMARY
VOLATILE ORGANIC COMPOUNDS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

LOCATION			GW01
SAMPLING DATE			10/22/2015
LAB SAMPLE ID			5102714-01
Volatile Organic Compounds - ug/L			
	CasNum	**NY-AWQS**	
1,1,1-Trichloroethane	71-55-6	5	<5.00
1,1,2,2-Tetrachloroethane	79-34-5	5	<5.00
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NS	<5.00
1,1,2-Trichloroethane	79-00-5	1	<5.00
1,1-Dichloroethane	75-34-3	5	<5.00
1,1-Dichloroethylene	75-35-4	5	<5.00
1,1-Dichloropropylene	563-58-6	5	<5.00
1,2,3-Trichlorobenzene	87-61-6	5	<5.00
1,2,3-Trichloropropane	96-18-4	0.04	<5.00
1,2,4,5-Tetramethylbenzene	95-93-2	5	<5.00
1,2,4-Trichlorobenzene	120-82-1	5	<5.00
1,2,4-Trimethylbenzene	95-63-6	5	<5.00
1,2-Dibromo-3-chloropropane	96-12-8	0.04	<5.00
1,2-Dibromoethane	106-93-4	0.0006	<5.00
1,2-Dichlorobenzene	95-50-1	3	<5.00
1,2-Dichloroethane	107-06-2	0.6	<5.00
1,2-Dichloropropane	78-87-5	1	<5.00
1,3,5-Trimethylbenzene	108-67-8	5	<5.00
1,3-Dichlorobenzene	541-73-1	3	<5.00
1,3-Dichloropropane	142-28-9	5	<5.00
1,4-Dichlorobenzene	106-46-7	3	<5.00
1,4-Diethylbenzene	105-05-5	NS	<5.00
2,2-Dichloropropane	594-20-7	5	<5.00
2-Chloroethyl Vinyl Ether	110-75-8	NS	<5.00
2-Chlorotoluene	95-49-8	5	<5.00
4-Chlorotoluene	106-43-4	5	<5.00
4-Ethyltoluene	622-96-8	NS	<5.00
4-Isopropyltoluene	99-87-6	5	<5.00
4-Methyl-2-Pentanone	108-10-1	NS	<5.00
Acetone	67-64-1	50	<10.0
Acrolein	107-02-8	NS	<5.00
Acrylonitrile	107-13-1	5	<5.00
Benzene	71-43-2	1	<0.700
Bromobenzene	108-86-1	5	<5.00
Bromochloromethane	74-97-5	5	<5.00
Bromodichloromethane	75-27-4	50	<5.00
Bromoform	75-25-2	50	<5.00
Bromomethane	74-83-9	5	<5.00
Carbon disulfide	75-15-0	60	<5.00
Carbon Tetrachloride	56-23-5	5	<5.00
Chlorobenzene	108-90-7	5	<5.00
Chlorodifluoromethane	75-45-6	NS	<5.00
Chloroethane	75-00-3	5	<5.00
Chloroform	67-66-3	7	<5.00
Chloromethane	74-87-3	NS	<5.00
cis-1,2-Dichloroethylene	156-59-2	5	<5.00
cis-1,3-Dichloropropylene	10061-01-5	0.4	<5.00
Dibromochloromethane	124-48-1	50	<5.00
Dibromomethane	74-95-3	5	<5.00
Dichlorodifluoromethane	75-71-8	5	<5.00
Ethylbenzene	100-41-4	5	<5.00
Hexachlorobutadiene	87-68-3	0.5	<5.00
Isopropylbenzene (Cumene)	98-82-8	5	<5.00
m,p-Xylenes	179601-23-1	5	<10.0
Methyl Acetate	79-20-9	NS	<5.00
Methyl Butyl Ketone (2-Hexanone)	591-78-6	50	<10.0
Methyl Ethyl Ketone (2-Butanone)	78-93-3	50	<10.0
Methylene Chloride	75-09-2	5	<5.00
Methyl-tert-Butyl Ether	1634-04-4	10	<5.00
Naphthalene	91-20-3	10	<5.00
n-Butylbenzene	104-51-8	5	<5.00
n-Propylbenzene	103-65-1	5	<5.00
o-Xylene	95-47-6	5	<5.00
sec-Butylbenzene	135-98-8	5	<5.00
Styrene	100-42-5	5	<5.00
tert-Butyl alcohol	75-65-0	NS	<5.00
tert-Butylbenzene	98-06-6	5	<5.00
Tetrachloroethylene	127-18-4	5	<5.00
Toluene	108-88-3	5	<5.00
trans-1,2-Dichloroethylene	156-60-5	5	<5.00
trans-1,3-Dichloropropylene	10061-02-6	0.4	<5.00
Trichloroethylene	79-01-6	5	<5.00
Trichlorofluoromethane	75-69-4	5	<5.00
Vinyl acetate	108-05-4	NS	<5.00
Vinyl chloride	75-01-4	2	<5.00

NOTES:
NY AWQS: NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS
NS: NO STANDARD

TABLE 4B
GROUNDWATER ANALYTICAL SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

LOCATION			**GW01**
SAMPLING DATE			**10/22/2015**
LAB SAMPLE ID			**5102714-01**
Semivolatile Organic Compounds- ug/L			
	CasNum	**NY-AWQS**	
1,2,4-Trichlorobenzene	120-82-1	5	<5.00
1,2-Dichlorobenzene	95-50-1	3	<5.00
1,3-Dichlorobenzene	541-73-1	3	<5.00
1,4-Dichlorobenzene	106-46-7	3	<5.00
2,2'-0xybis(1-Chloropropane)	108-60-1	5	<5.00
2,4,5-Trichlorophenol	95-95-4	NS	<5.00
2,4,6-Trichlorophenol	88-06-2	NS	<5.00
2,4-Dichlorophenol	120-83-2	1	<5.00
2,4-Dimethylphenol	105-67-9	50	<5.00
2,4-Dinitrophenol	51-28-5	10	<10.0
2,4-Dinitrotoluene	121-14-2	5	<5.00
2,6-Dinitrotoluene	606-20-2	5	<5.00
2-Chloronaphthalene	91-58-7	10	<5.00
2-Chlorophenol	95-57-8	NS	<5.00
2-Methylnaphthalene	91-57-6	NS	<5.00
2-Methylphenol	95-48-7	NS	<5.00
2-Nitroaniline	88-74-4	5	<5.00
2-Nitrophenol	88-75-5	NS	<5.00
3,3'-Dichlorobenzidine	91-94-1	5	<5.00
3/4-Methylphenol	108-39-4	NS	<5.00
3-Nitroaniline	99-09-2	5	<5.00
4,6-Dinitro-2-methylphenol	534-52-1	NS	<10.0
4-Bromophenyl phenyl ether	101-55-3	NS	<5.00
4-Chloro-3-methylphenol	59-50-7	NS	<5.00
4-Chloroaniline	106-47-8	5	<5.00
4-Chlorophenyl phenyl ether	7005-72-3	NS	<5.00
4-Nitroaniline	100-01-6	5	<5.00
4-Nitrophenol	100-02-7	NS	<5.00
Acenaphthene	83-32-9	20	<5.00
Acenaphthylene	208-96-8	NS	<5.00
Aniline	62-53-3	NS	<5.00
Anthracene	120-12-7	50	<5.00
Benzo(a)anthracene	56-55-3	0.002	<5.00
Benzo(a)pyrene	50-32-8	0	<5.00
Benzo(b)fluoranthene	205-99-2	0.002	<5.00
Benzo(g,h,i)perylene	191-24-2	NS	<5.00
Benzo(k)fluoranthene	207-08-9	0.002	<5.00
Benzoic Acid	65-85-0	NS	<10.0
Benzyl alcohol	100-51-6	NS	<5.00
bis(2-Chloroethoxy)methane	111-91-1	5	<5.00
Bis(2-Chloroethyl)ether	111-44-4	1	<5.00
Bis(2-Ethylhexyl)phthalate	117-81-7	5	<5.00
Butyl benzyl phthalate	85-68-7	50	<5.00
Carbazole	86-74-8	NS	<5.00
Chrysene	218-01-9	0.002	<5.00
Dibenzo(a,h)anthracene	53-70-3	NS	<5.00
Dibenzofuran	132-64-9	NS	<5.00
Diethyl phthalate	84-66-2	50	<5.00
Dimethyl phthalate	131-11-3	50	<5.00
Di-n-butyl phthalate	84-74-2	50	<5.00
Di-n-octyl phthalate	117-84-0	50	<5.00
Fluoranthene	206-44-0	50	<5.00
Fluorene	86-73-7	50	<5.00
Hexachlorobenzene	118-74-1	0.04	<5.00
Hexachlorobutadiene	87-68-3	0.5	<5.00
Hexachlorocyclopentadiene	77-47-4	5	<5.00
Hexachloroethane	67-72-1	5	<5.00
Indeno(1,2,3-cd)pyrene	193-39-5	0.002	<5.00
Isophorone	78-59-1	50	<5.00
Naphthalene	91-20-3	10	<5.00
Nitrobenzene	98-95-3	0.4	<5.00
N-Nitrosodimethylamine	62-75-9	NS	<5.00
N-Nitroso-di-n-propylamine	621-64-7	NS	<5.00
N-Nitrosodiphenylamine	86-30-6	50	<5.00
Pentachlorophenol	87-86-5	1	<5.00
Phenanthrene	85-01-8	50	<5.00
Phenol	108-95-2	1	<5.00
Pyrene	129-00-0	50	<5.00
Pyridine	110-86-1		<10.0

NOTES:
NY AWQS: NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS
NS: NO STANDARD

TABLE 4C
GROUNDWATER ANALYTICAL SUMMARY
PESTICIDES/PCBS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

LOCATION			GW01
SAMPLING DATE			10/22/2015
LAB SAMPLE ID			5102714-01
Organochlorine Pesticides by GC - ug/L			
	CasNum	**NY-AWQS**	
4,4'-DDD	72-54-8	0.3	<2.00
4,4'-DDE	72-55-9	0.2	<2.00
4,4'-DDT	50-29-3	0.2	<2.00
Aldrin	309-00-2	0.002	<2.00
alpha-BHC	319-84-6	0.01	<2.00
beta-BHC	319-85-7	0.04	<2.00
Chlordane	12789-03-6	0.05	<2.00
cis-Chlordane	5103-71-9	NS	<2.00
delta-BHC	319-86-8	0.04	<2.00
Dieldrin	60-57-1	0.004	<2.00
Endosulfan I	959-98-8	NS	<2.00
Endosulfan II	33213-65-9	NS	<2.00
Endosulfan Sulfate	1031-07-8	NS	<2.00
Endrin	72-20-8	0.001	<2.00
Endrin Aldehyde	7421-93-4	NS	<2.00
Endrin Ketone	53494-70-5	5	<2.00
gamma-BHC	58-89-9	0.05	<2.00
Heptachlor	76-44-8	0.04	<2.00
Heptachlor Epoxide	1024-57-3	0.03	<2.00
Methoxychlor	72-43-5	35	<2.00
Toxaphene	8001-35-2	0.06	<2.00
trans-Chlordane	5103-74-2	NS	<2.00
Polychlorinated Biphenyls by GC - ug/L			
Aroclor 1016	106-46-7	0.09	<0.0500
Aroclor 1221	123-91-1	0.09	<0.0500
Aroclor 1232	594-20-7	0.09	<0.0500
Aroclor 1242	78-93-3	0.09	<0.0500
Aroclor 1248	591-78-6	0.09	<0.0500
Aroclor 1254	108-10-1	0.09	<0.0500
Aroclor 1260	67-64-1	0.09	<0.0500

NOTES:
NY AWQS: NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS
NS: NO STANDARD
U: NOT DETECTED AT THE REPORTING LIMIT
J: ESTIMATED VALUE

TABLE 4D
GROUNDWATER ANALYTICAL SUMMARY
DISSOLVED METALS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

LOCATION			**GW01**
SAMPLING DATE			**10/22/2015**
LAB SAMPLE ID			**5102714-01**
Dissolved Metals - ug/L			
	CasNum	**NY-AWQS**	
Aluminum, Dissolved	7429-90-5	NS	<0.05
Antimony, Dissolved	7440-36-0	3	<0.05
Arsenic, Dissolved	7440-38-2	25	<0.05
Barium, Dissolved	7440-39-3	1000	<1.00
Beryllium, Dissolved	7440-41-7	3	<0.02
Cadmium, Dissolved	7440-43-9	5	<0.05
Calcium, Dissolved	7440-70-2	NS	74.4
Chromium, Dissolved	7440-47-3	50	<0.05
Cobalt, Dissolved	7440-48-4	NS	<0.05
Copper, Dissolved	7440-50-8	200	<0.05
Iron, Dissolved	7439-89-6	300	<0.20
Lead, Dissolved	7439-92-1	25	<0.05
Magnesium, Dissolved	7439-95-4	35000	32.7
Manganese, Dissolved	7439-96-5	300	0.48
Nickel, Dissolved	7440-02-0	100	<0.05
Potassium, Dissolved	7440-09-7	NS	2.56
Selenium, Dissolved	7782-49-2	10	<0.05
Silver, Dissolved	7440-22-4	50	<0.05
Sodium, Dissolved	7440-23-5	20000	33.4
Thallium, Dissolved	7440-28-0	0.5	<0.05
Vanadium, Dissolved	7440-62-2	NS	<0.05
Zinc, Dissolved	7440-66-6	2000	<0.05
Mercury, Dissolved	7439-97-6	0.7	<0.002

NOTES:
NY AWQS: NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS
NS: NO STANDARD
U: NOT DETECTED AT THE REPORTING LIMIT
J: ESTIMATED VALUE

TABLE 4E
GROUNDWATER ANALYTICAL SUMMARY
TOTAL METALS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

LOCATION			**GW01**
SAMPLING DATE			**10/22/2015**
LAB SAMPLE ID			**5102714-01**
Total Metals - ug/L			
	CasNum	**NY-AWQS**	
Aluminum, Dissolved	7429-90-5	NS	27.5
Antimony, Dissolved	7440-36-0	3	<0.05
Arsenic, Dissolved	7440-38-2	25	<0.05
Barium, Dissolved	7440-39-3	1000	<1.00
Beryllium, Dissolved	7440-41-7	3	<0.02
Cadmium, Dissolved	7440-43-9	5	<0.05
Calcium, Dissolved	7440-70-2	NS	133
Chromium, Dissolved	7440-47-3	50	0.6
Cobalt, Dissolved	7440-48-4	NS	0.06
Copper, Dissolved	7440-50-8	200	0.18
Iron, Dissolved	7439-89-6	300	88.2
Lead, Dissolved	7439-92-1	25	<0.050
Magnesium, Dissolved	7439-95-4	35000	73.7
Manganese, Dissolved	7439-96-5	300	2.6
Nickel, Dissolved	7440-02-0	100	0.26
Potassium, Dissolved	7440-09-7	NS	9.99
Selenium, Dissolved	7782-49-2	10	<0.05
Silver, Dissolved	7440-22-4	50	<0.05
Sodium, Dissolved	7440-23-5	20000	35.1
Thallium, Dissolved	7440-28-0	0.5	<0.05
Vanadium, Dissolved	7440-62-2	NS	0.08
Zinc, Dissolved	7440-66-6	2000	0.14
Mercury, Dissolved	7439-97-6	0.7	<0.002

NOTES:
NY AWQS: NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS
NS: NO STANDARD

TABLE 5
SOIL VAPOR ANALYTICAL SUMMARY
VOLATILE ORGANIC COMPOUNDS

109-17 THROUGH 109-23 72ND ROAD
FOREST HILLS, NEW YORK
OCTOBER 2015

LOCATION		SV05	SV04	SV03	SV02	SV01
SAMPLING DATE		10/23/2015	10/23/2015	10/23/2015	10/23/2015	10/23/2015
LAB SAMPLE ID		BK13527	BK13528	BK13529	BK13530	BK13531
Volatile Organics in Air - ug/m3						
1,1,1,2-Tetrachloroethane	630-20-6	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,1-Trichloroethane	71-55-6	< 1.00	< 1.00	< 1.00	2.22	< 1.00
1,1,2,2-Tetrachloroethane	79-34-5	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	79-00-5	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	75-34-3	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	75-35-4	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2,4-Trichlorobenzene	120-82-1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2,4-Trimethylbenzene	95-63-6	4.74	27.7	17	2.28	3.63
1,2-Dibromoethane(EDB)	106-93-4	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichlorobenzene	95-50-1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	107-06-2	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-dichloropropane	78-87-5	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichlorotetrafluoroethan	76-14-2	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,3,5-Trimethylbenzene	108-67-8	1.8	9.19	5.55	< 1.00	1.48
1,3-Butadiene	106-99-0	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,3-Dichlorobenzene	541-73-1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,4-Dichlorobenzene	106-46-7	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,4-Dioxane	123-91-1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
2-Hexanone(MBK)	591-78-6	95	23.9	49.5	44.6	147
4-Ethyltoluene	622-96-8	2.41	8.45	6.09	1.13	1.64
4-Isopropyltoluene	99-87-6	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
4-Methyl-2-pentanone(MIBK	108-10-1	< 1.00	4.02	< 1.00	1.03	2.37
Acetone	67-64-1	58.6	79.8	22.1	54.6	131
Acrylonitrile	107-13-1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Benzene	71-43-2	9	5.68	20.3	3.96	5.3
Benzyl chloride	100-44-7	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Bromodichloromethane	75-27-4	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Bromoform	75-25-2	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Bromomethane	74-83-9	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Carbon Disulfide	75-15-0	6.5	2.37	2.4	1.34	4.48
Carbon Tetrachloride	56-23-5	0.49	0.82	0.43	< 0.25	0.49
Chlorobenzene	108-90-7	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Chloroethane	75-00-3	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Chloroform	67-66-3	2.34	38.5	30.9	7.51	< 1.00
Chloromethane	74-87-3	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Cis-1,2-Dichloroethene	156-59-2	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
cis-1,3-Dichloropropene	10061-01-5	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Cyclohexane	110-82-7	5.3	2.43	5.81	1.79	2.49
Dibromochloromethane	124-48-1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Dichlorodifluoromethane	75-71-8	1.7	1.74	1.74	1.51	1.84
Ethanol	64-17-5	48.6	3.9	10.1	12.4	49.9
Ethyl acetate	141-78-6	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Ethylbenzene	100-41-4	21.7	28.9	28.5	16.4	18.1
Heptane	142-82-5	19.9	14.7	17.5	9.22	14.6
Hexachlorobutadiene	87-68-3	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Hexane	110-54-3	21.8	10.7	27.1	7.4	12.4
Isopropylalcohol	67-63-0	< 1.00	< 1.00	< 1.00	1.57	< 1.00
Isopropylbenzene	98-82-8	1.17	2.72	2.13	< 1.00	1.04
m,p-Xylene	179601-23-1	75.1	112	101	53.8	58.1
Methyl Ethyl Ketone	78-93-3	392	73.4	122	181	872
Methyl tert-butyl ether(MTBE	1634-04-4	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylene Chloride	75-09-2	1.29	< 1.00	3.17	< 1.00	< 1.00
n-Butylbenzene	104-51-8	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
o-Xylene	95-47-6	33.8	45.1	40.8	21.1	23.8
Propylene	115-07-1	88.8	27	63.6	53.1	112
sec-Butylbenzene	135-98-8	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Styrene	100-42-5	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Tetrachloroethene	127-18-4	0.46	8.13	0.92	1.57	2.77
Tetrahydrofuran	109-99-9	2.64	1.62	1.93	1.6	< 1.00
Toluene	108-88-3	145	127	134	82.5	116
Trans-1,2-Dichloroethene	156-60-5	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
trans-1,3-Dichloropropene	10061-02-6	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Trichloroethene	79-01-6	< 0.25	< 0.25	0.26	< 0.25	< 0.25
Trichlorofluoromethane	75-69-4	1.26	1.26	1.26	1.59	1.56
Trichlorotrifluoroethane	76-13-1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Vinyl Chloride	75-01-4	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25

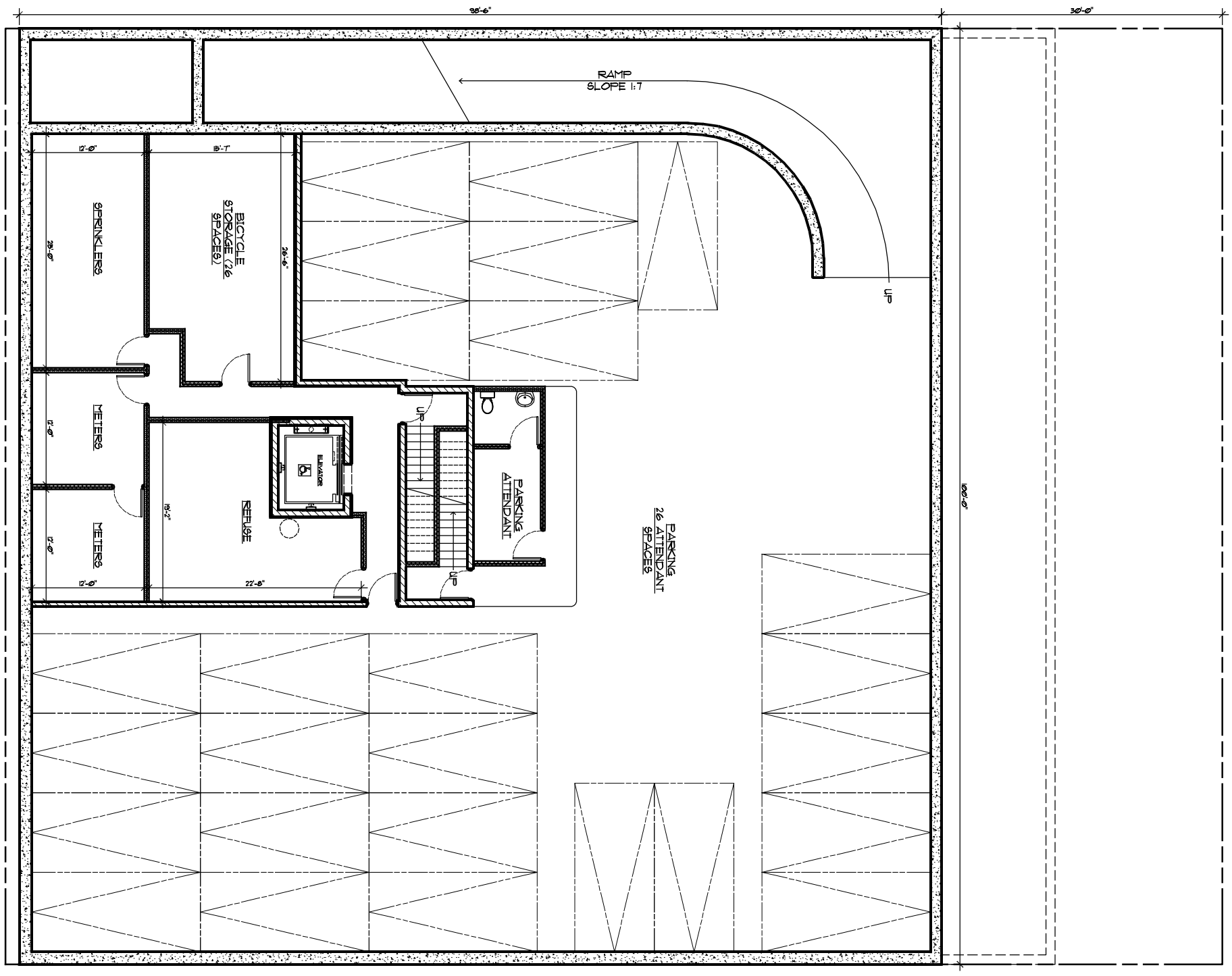
NOTES:
U: NOT DETECTED AT THE REPORTING LIMIT
J: ESTIMATED VALUE

APPENDIX 1

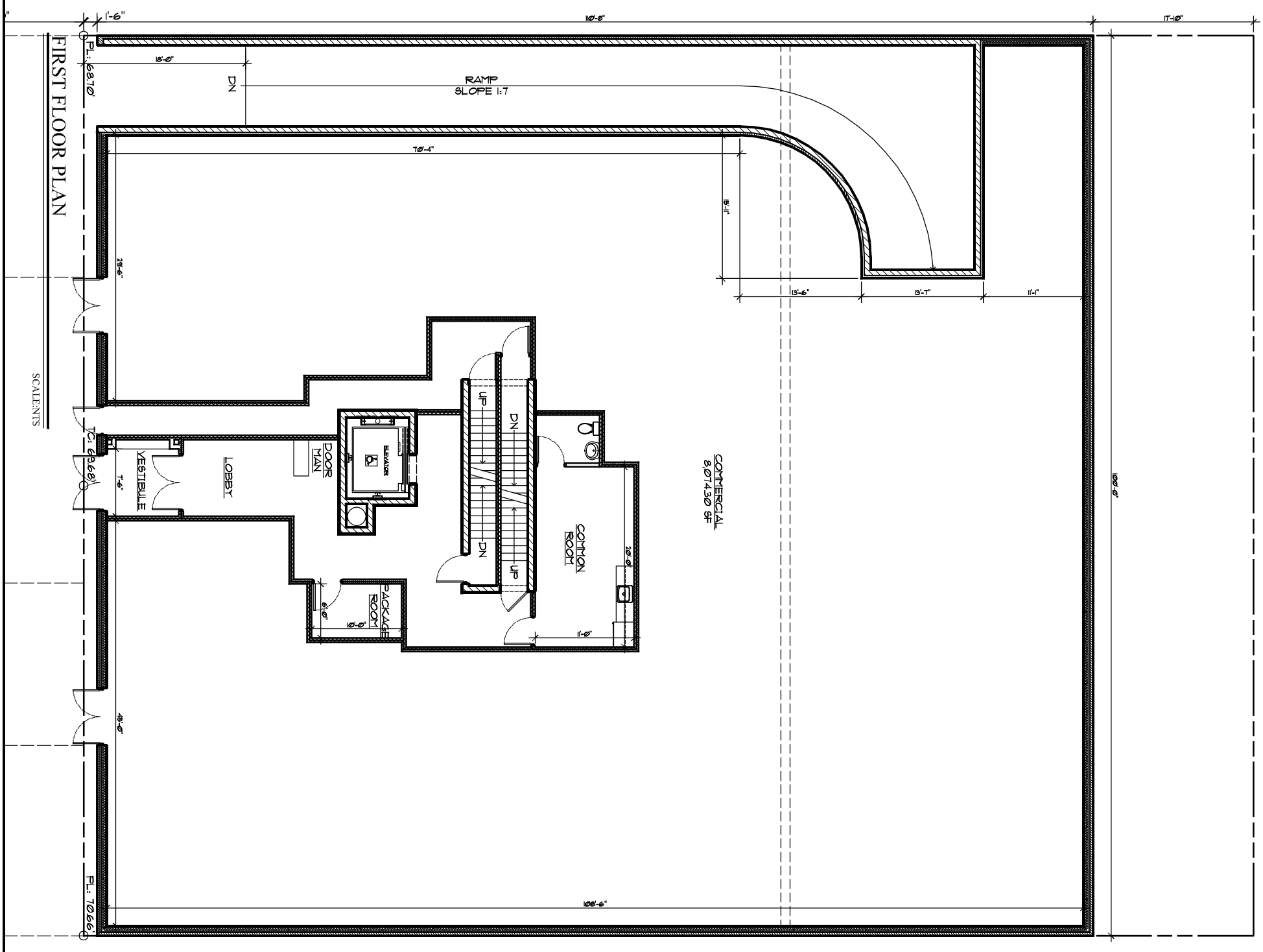
PRELIMINARY CONSTRUCTION DIAGRAMS

CELLAR FLOOR PLAN

SCALE: 3/32" = 1'-0"



SCALE: AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571 Design Studio Associates Design | Zoning | Code Consultants	2
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study		OF



LOT AREA: 13,000.0 SF
FAR: 4.09 = 53,170.0 SF

1ST FL:	9,749.3 SF
2ND FL:	7,412.27 SF
3RD FL:	7,412.27 SF
4TH FL:	7,412.27 SF
5TH FL:	7,412.27 SF
6TH FL:	7,412.27 SF
7TH FL:	6,216.65 SF
ROOF:	142.5 SF
TOTAL FA:	53,169.8 SF

SCALE:AS NOTED | DATE: -

ZONING & SITE
Proposal For:

109-17 7ND RD
QUEENS, NY

DRAWN BY: name

PRELIMINARY
NOT FOR CONSTRUCTION
For Design purposes only

Title - Zoning Study

info@dsany.com
ph:718.569.2112
fax:718.360-4571

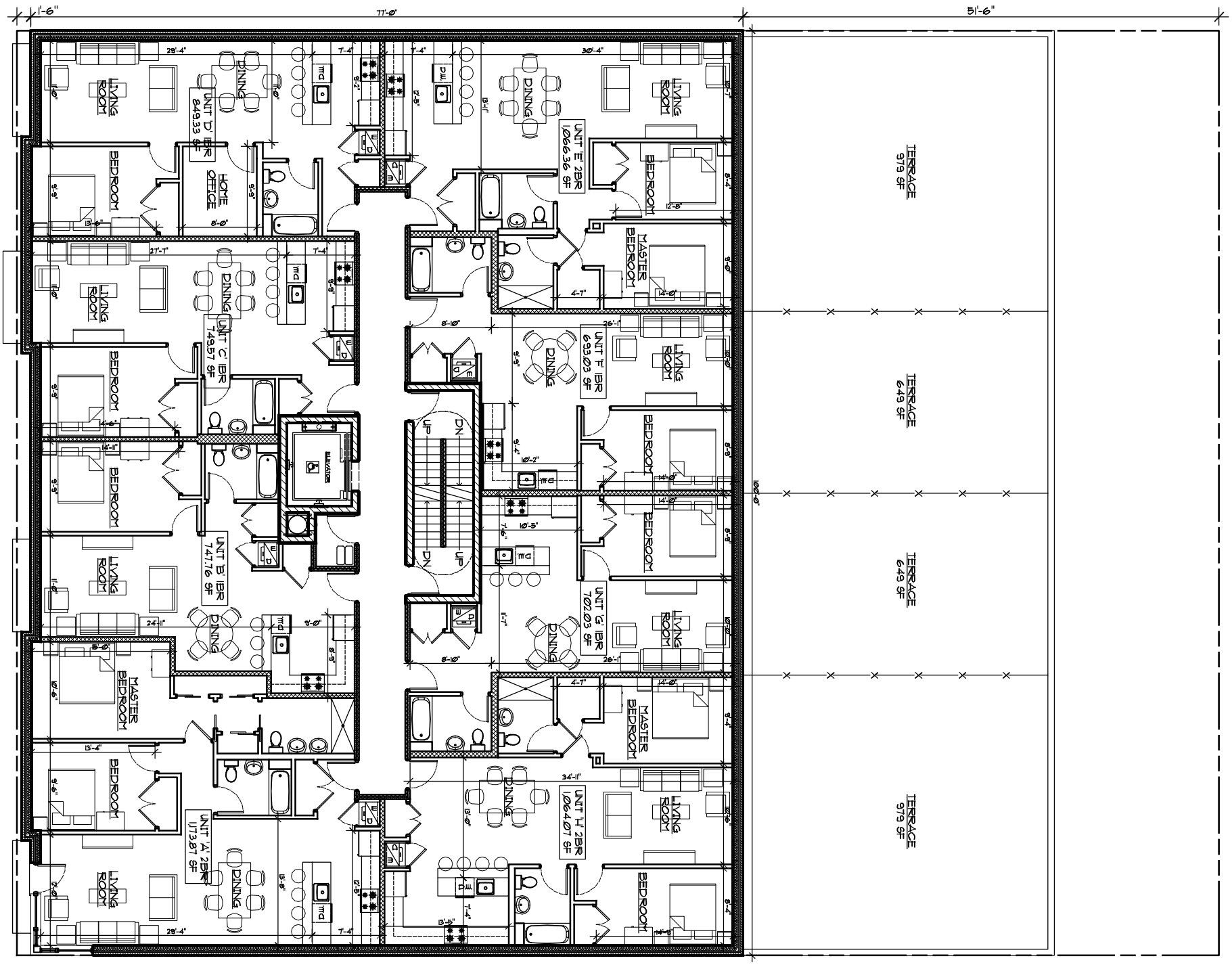
Design Studio Associates
Design | Zoning | Code Consultants

3

OF

SECOND FLOOR PLAN

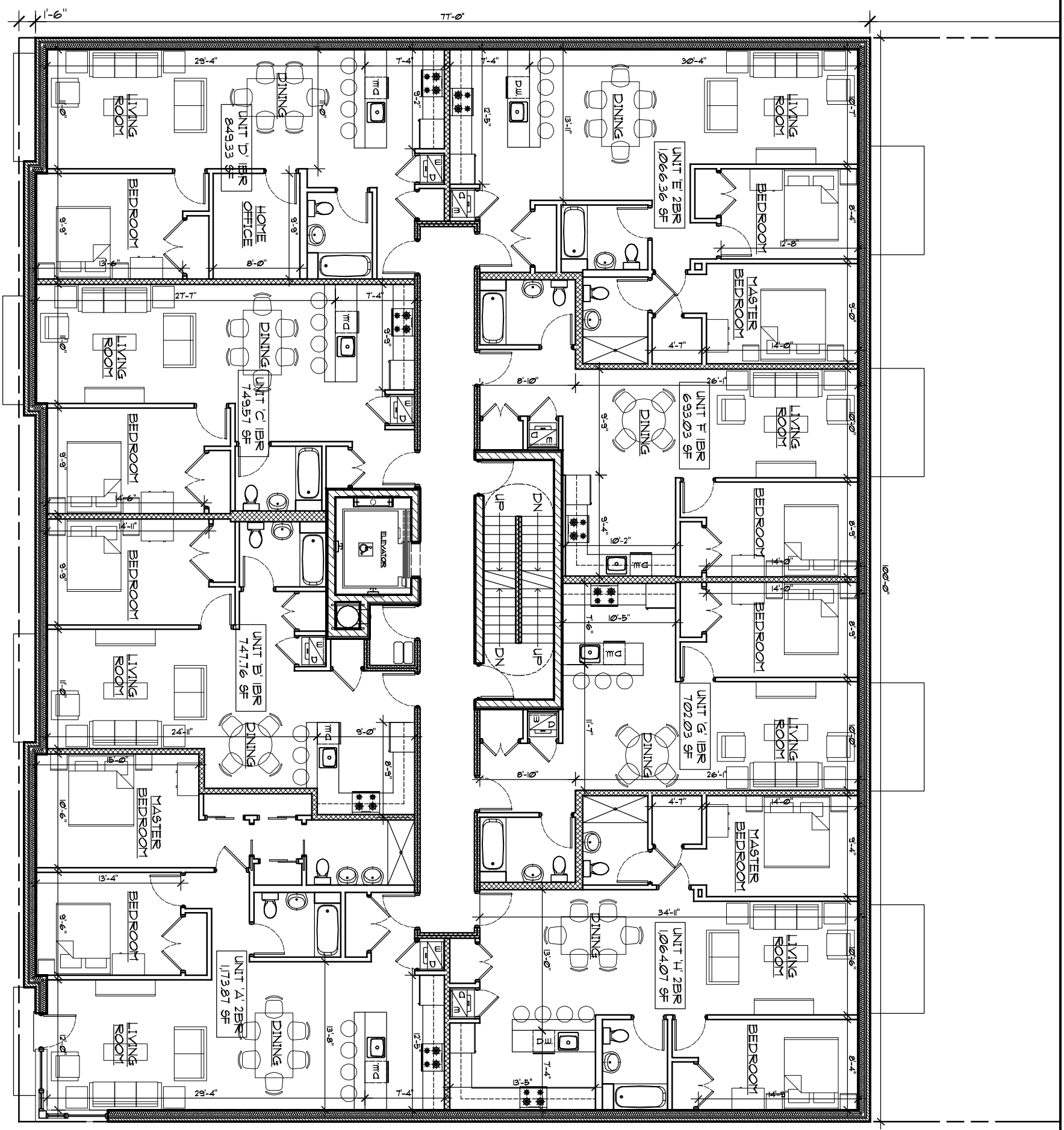
SCALE:3/32" = 1'-0"



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571 Design Studio Associates Design | Zoning | Code Consultants	4
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study		OF

TYPICAL 3RD - 6TH FLOOR PLAN

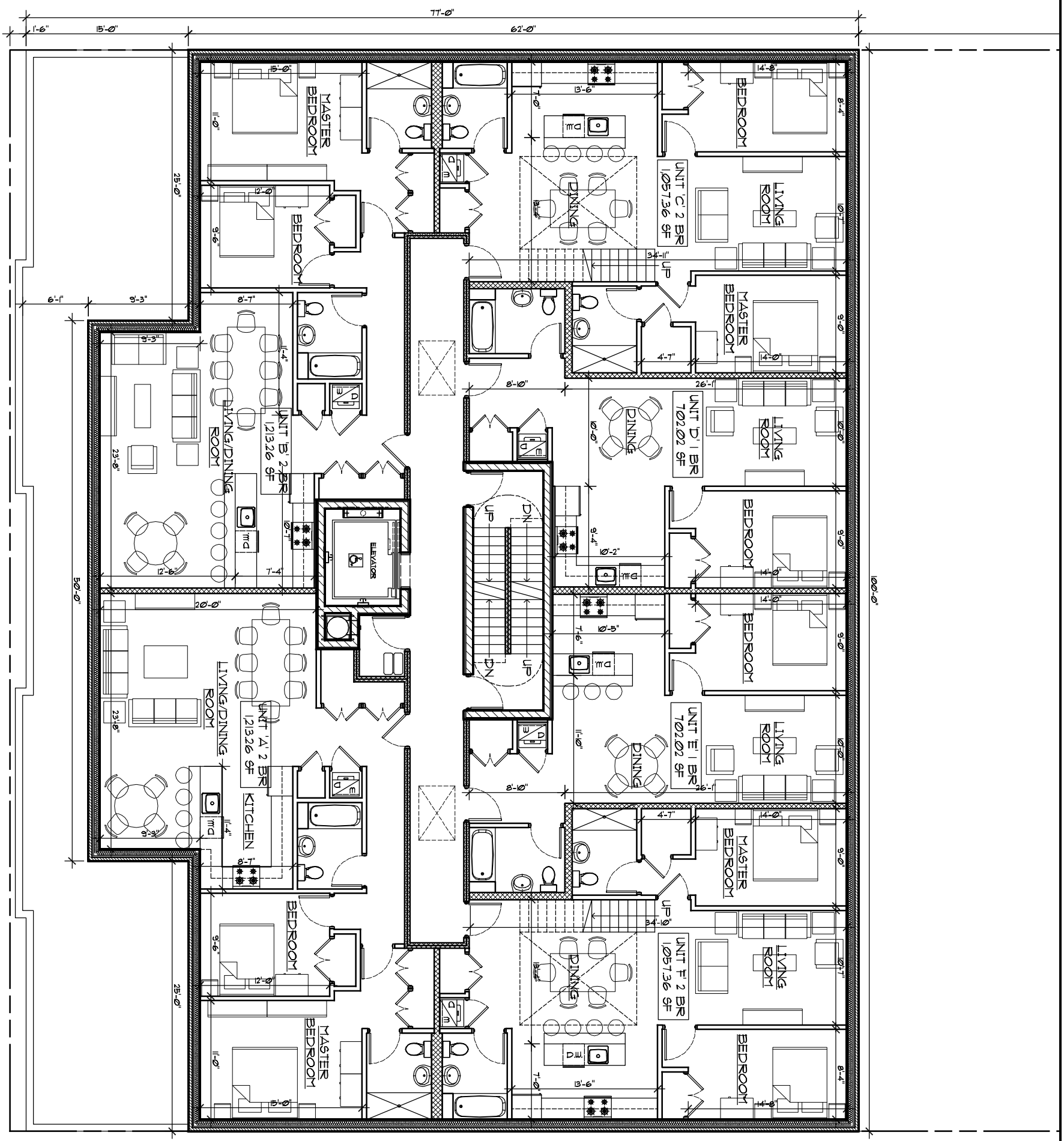
SCALE:3/32" = 1'-0"



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571 Design Studio Associates Design | Zoning | Code Consultants
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study	5 OF

7TH FLOOR PLAN

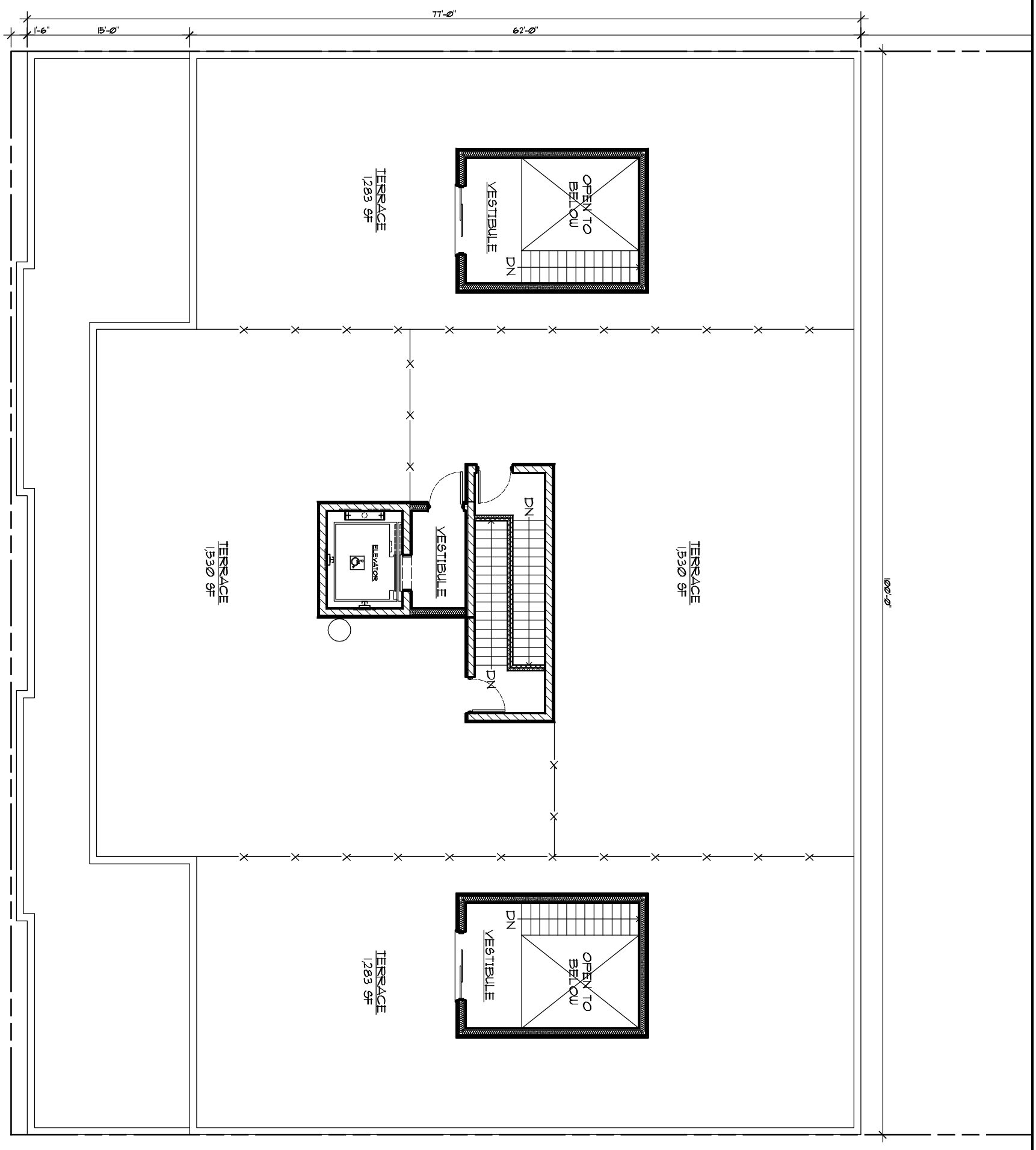
SCALE:3/32" = 1'-0"



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study	Design Studio Associates Design | Zoning | Code Consultants

ROOF PLAN

SCALE:3/32" = 1'-0"

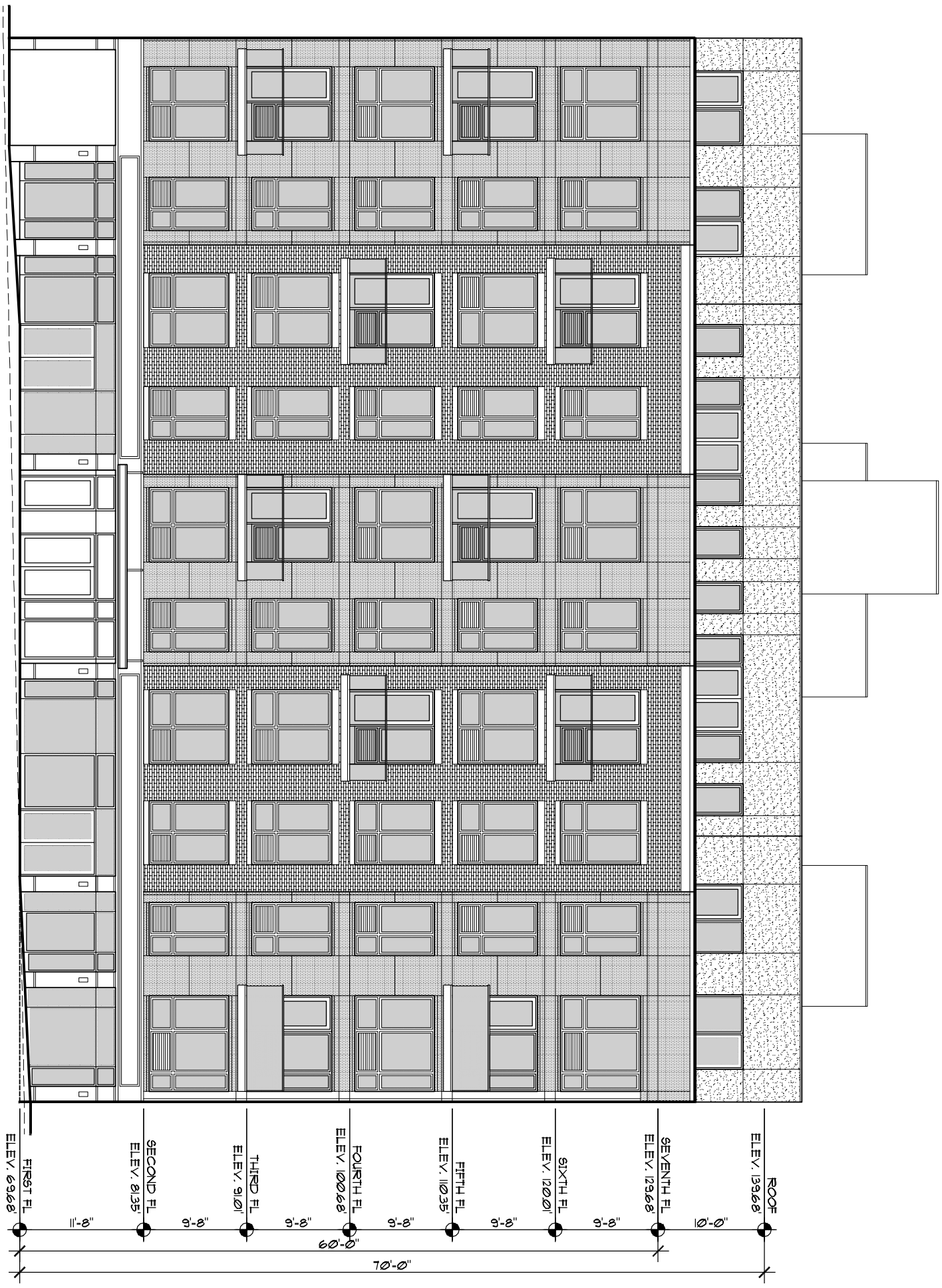


SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	7
ZONING & SITE Proposal For:			
109-17 72ND RD QUEENS, NY		Title - Zoning Study	OF

info@dsany.com
ph:718.569.2112
fax:718.360-4571
Design Studio Associates
Design | Zoning | Code Consultants

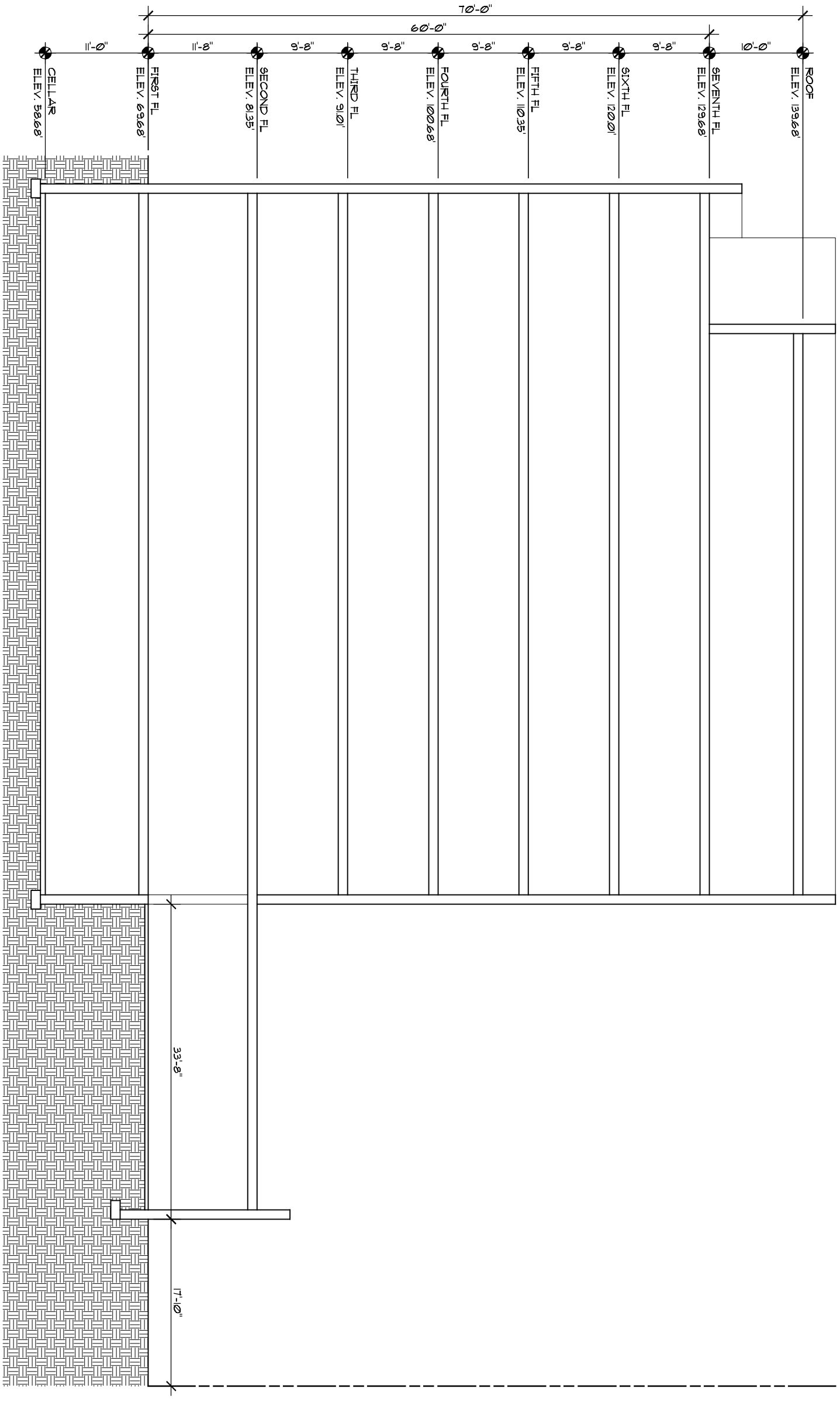
FRONT ELEVATION

SCALE:1/8" = 1'-0"



SCALE:AS NOTED | DATE: -	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571	7
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY	Title - Zoning Study	DSA Design Studio Associates Design | Zoning | Code Consultants	OF

DRAWN BY: name



SCALE:AS NOTED | DATE: -	DRAWN BY: name	PRELIMINARY NOT FOR CONSTRUCTION For Design purposes only	info@dsany.com ph:718.569.2112 fax:718.360-4571	8
ZONING & SITE Proposal For: 109-17 72ND RD QUEENS, NY		Title - Zoning Study	Design Studio Associates Design | Zoning | Code Consultants	OF

APPENDIX 2

PHASE I REPORT

APPENDIX 3

SOIL BORING LOGS

Boring # **SB01**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Geoprobe 6620 macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**15 ft**
START TIME: 09:00		DATE: 10/22/2015				
COMPLETION TIME: 09:30		DATE: 10/22/2015	**Macrocore (2" diameter)**		elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA / Screen depth: NA
0-5 ft	5	1	CONCRETE Brown Clayey SILT, trace fine sand	PID = 0.0 ppm.	
5-10 ft	5	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	
10-15 ft	5	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm. Discreet sampler set at 60-60.5 feet bgs for groundwater sample GW01.	

END OF BORING

Boring # **SB02**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Manual Slide Hammer and Macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**2 ft**
START TIME: 09:30		DATE: 10/22/2015	**Macrocore (2" diameter)**			
COMPLETION TIME: 09:50		DATE: 10/22/2015			elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA Screen depth: NA
0-2 ft	2	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	

END OF BORING

Boring # **SB03**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Manual Slide Hammer and Macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**2 ft**
START TIME: 09:50		DATE: 10/22/2015				
COMPLETION TIME: 10:00		DATE: 10/22/2015	**Macrocore (2" diameter)**		elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA Screen depth: NA
0-2 ft	2	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	

END OF BORING

Boring # **SB04**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Geoprobe 6620 macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**15 ft**
START TIME: 11:50		DATE: 10/22/2015				
COMPLETION TIME: 12:15		DATE: 10/22/2015	**Macrocore (2" diameter)**		elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA / Screen depth: NA
0-5 ft	5	2	CONCRETE (2 FEET) Brown Clayey SILT, trace fine sand	PID = 0.0 ppm.	
5-10 ft	5	4	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	
10-15 ft	5	5	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	

END OF BORING

Boring # **SB05**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Manual Slide Hammer and Macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**2 ft**
START TIME: 12:30		DATE: 10/22/2015				
COMPLETION TIME: 13:00		DATE: 10/22/2015	**Macrocore (2" diameter)**		elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA Screen depth: NA
0-2 ft	2	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	

END OF BORING

Boring # **SB06**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Manual Slide Hammer and Macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**2 ft**
START TIME: 13:00		DATE: 10/22/2015				
COMPLETION TIME: 13:30		DATE: 10/22/2015	**Macrocore (2" diameter)**		elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA Screen depth: NA
0-2 ft	2	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	

END OF BORING

Boring # **SB07**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Geoprobe 6620 macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**15 ft**
START TIME: 13:30		DATE: 10/22/2015				
COMPLETION TIME: 13:50		DATE: 10/22/2015	**Macrocore (2" diameter)**		elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA / Screen depth: NA
0-5 ft	5	2	CONCRETE Brown Clayey SILT, trace fine sand	PID = 0.0 ppm.	
5-10 ft	5	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	
10-15 ft	5	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	

END OF BORING

Boring # **SB08**				MW#	Page 1	of 1
PROJECT: 109-17 to 109-23 72nd Rd, Forest Hills, NY						
LOGGED BY:	JF				PRJ. MNGR.:	JS
DRILLING CONTRACTOR: Envirprobe						
DRILL METHOD: Geoprobe 6620 macrocore						
DRILLER: John Veiss						
HAMMER WT: NA		DROP: NA	Borehole diameter/drill bit type:		total depth	**15 ft**
START TIME: 13:55		DATE: 10/22/2015				
COMPLETION TIME: 14:15		DATE: 10/22/2015	**Macrocore (2" diameter)**		elevation	**NA**
BACKFILL TIME: 15:00		DATE: 10/22/2015				

Sample Depth	Advance (ft)	Recovered (ft)	Soil Description Unified Soil Classification System	Notes	Casing depth: NA / Screen depth: NA
0-5 ft	5	3	CONCRETE Brown Clayey SILT, trace fine sand	PID = 0.0 ppm.	
5-10 ft	5	3	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	
10-15 ft	5	2	Brown Silty fine SAND, some gravel	PID = 0.0 ppm.	

END OF BORING

APPENDIX 4

SOIL LABORATORY ANALYTICAL REPORT

LONG ISLAND ANALYTICAL LABORATORIES INC.
"TOMORROWS ANALYTICAL SOLUTIONS TODAY"

Laboratory Report

NYSDOH ELAP# 11693
USEPA# NY01273
CTDOH# PH-0284
AIHA# 164456
NJDEP# NY012
PADEP# 68-2943

LIAL# 5102716

November 06, 2015

Associated Environmental Services
John Schretzmayer
25 Central Avenue
Hauppauge, NY 11788

Re: 109-17 72nd Rd

Dear John Schretzmayer,

Enclosed please find the laboratory Analysis Report(s) for sample(s) received on October 27, 2015. Long Island Analytical laboratories analyzed the samples on November 04, 2015 for the following:

SAMPLE ID	ANALYSIS
SB01 (0-2)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB01 (10-12)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB02 (0-2)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB03 (0-2)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB04 (2-4)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB04 (10-12)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB05 (0-2)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB06 (0-2)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB07 (0-2)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB07 (10-12)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB08 (0-2)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List
SB08 (10-12)	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List

Duplicate Soil	EPA 8081 B, EPA 8082 A, EPA 8260 C, EPA 8270 D, TAL Target Analyte List

Samples received at 2.7 ° C

If you have any questions or require further information, please call at your convenience. Long Island Analytical Laboratories Inc. is a NELAP accredited laboratory. All reported results meet the requirements of the NELAP standards unless noted. Report shall not be reproduced except in full without the written approval of the laboratory. Results related only to items tested. Long Island Analytical Laboratories would like to thank you for the opportunity to be of service to you.

Best Regards,

Long Island Analytical Laboratories, Inc.

Michael Veraldi - Laboratory Director

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.15	<5.15	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	5.15	<5.15	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	5.15	<5.15	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.15	<5.15	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	5.15	<5.15	ug/kg dry	
1,1-Dichloroethane	75-34-3	5.15	<5.15	ug/kg dry	
1,1-Dichloroethylene	75-35-4	5.15	<5.15	ug/kg dry	
1,1-Dichloropropylene	563-58-6	5.15	<5.15	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	5.15	<5.15	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	5.15	<5.15	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	5.15	<5.15	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	5.15	<5.15	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	5.15	<5.15	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	5.15	<5.15	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	5.15	<5.15	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	5.15	<5.15	ug/kg dry	
1,2-Dichloroethane	107-06-2	5.15	<5.15	ug/kg dry	
1,2-Dichloropropane	78-87-5	5.15	<5.15	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	5.15	<5.15	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	5.15	<5.15	ug/kg dry	
1,3-Dichloropropane	142-28-9	5.15	<5.15	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	5.15	<5.15	ug/kg dry	
1,4-Diethylbenzene	105-05-5	5.15	<5.15	ug/kg dry	2.B
1,4-Dioxane	123-91-1	51.5	<51.5	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	5.15	<5.15	ug/kg dry	
2-Chlorotoluene	95-49-8	5.15	<5.15	ug/kg dry	
4-Chlorotoluene	106-43-4	5.15	<5.15	ug/kg dry	
4-Ethyltoluene	622-96-8	5.15	<5.15	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	5.15	<5.15	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	10.3	<10.3	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	51.5	<51.5	ug/kg dry	4.J
Acrylonitrile	107-13-1	5.15	<5.15	ug/kg dry	
Benzene	71-43-2	5.15	<5.15	ug/kg dry	
Bromobenzene	108-86-1	5.15	<5.15	ug/kg dry	
Bromochloromethane	74-97-5	5.15	<5.15	ug/kg dry	
Bromodichloromethane	75-27-4	5.15	<5.15	ug/kg dry	
Bromoform	75-25-2	5.15	<5.15	ug/kg dry	
Bromomethane	74-83-9	5.15	<5.15	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	5.15	<5.15	ug/kg dry	
Carbon Tetrachloride	56-23-5	5.15	<5.15	ug/kg dry	
Chlorobenzene	108-90-7	5.15	<5.15	ug/kg dry	
Chlorodifluoromethane	75-45-6	5.15	<5.15	ug/kg dry	2.B
Chloroethane	75-00-3	5.15	<5.15	ug/kg dry	
Chloroform	67-66-3	5.15	<5.15	ug/kg dry	
Chloromethane	74-87-3	5.15	<5.15	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	5.15	<5.15	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	5.15	<5.15	ug/kg dry	
Dibromochloromethane	124-48-1	5.15	<5.15	ug/kg dry	
Dibromomethane	74-95-3	5.15	<5.15	ug/kg dry	
Dichlorodifluoromethane	75-71-8	5.15	<5.15	ug/kg dry	
Ethylbenzene	100-41-4	5.15	<5.15	ug/kg dry	
Hexachlorobutadiene	87-68-3	5.15	<5.15	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	5.15	<5.15	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	10.3	<10.3	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	5.15	<5.15	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	10.3	<10.3	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	5.15	<5.15	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	5.15	<5.15	ug/kg dry	
Naphthalene	91-20-3	5.15	<5.15	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	5.15	<5.15	ug/kg dry	
n-Propylbenzene	103-65-1	5.15	<5.15	ug/kg dry	
o-Xylene	95-47-6	5.15	<5.15	ug/kg dry	
sec-Butylbenzene	135-98-8	5.15	<5.15	ug/kg dry	
Styrene	100-42-5	5.15	<5.15	ug/kg dry	
tert-Butyl alcohol	75-65-0	5.15	<5.15	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	5.15	<5.15	ug/kg dry	
Tetrachloroethylene	127-18-4	5.15	<5.15	ug/kg dry	
Toluene	108-88-3	5.15	<5.15	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	5.15	<5.15	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	5.15	<5.15	ug/kg dry	
Trichloroethylene	79-01-6	5.15	<5.15	ug/kg dry	
Trichlorofluoromethane	75-69-4	5.15	<5.15	ug/kg dry	
Vinyl chloride	75-01-4	5.15	<5.15	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	89	74.4-131	
4-Bromofluorobenzene	460-00-4	103	82.3-134	
Dibromofluoromethane	1868-53-7	92	79.4-122	
Toluene-d8	2037-26-5	100	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	92	50-200	
1,4-Difluorobenzene	540-36-3	93	50-200	
Chlorobenzene-d5	3114-55-4	94	50-200	
Pentafluorobenzene	363-72-4	98	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	176	<176	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	176	<176	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	176	<176	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	176	<176	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	176	<176	ug/kg dry	4.J
2,4,5-Trichlorophenol	95-95-4	106	<106	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	106	<106	ug/kg dry	
2,4-Dichlorophenol	120-83-2	176	<176	ug/kg dry	
2,4-Dimethylphenol	105-67-9	176	<176	ug/kg dry	
2,4-Dinitrophenol	51-28-5	176	<176	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	176	<176	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	176	<176	ug/kg dry	
2-Chloronaphthalene	91-58-7	176	<176	ug/kg dry	
2-Chlorophenol	95-57-8	176	<176	ug/kg dry	
2-Methylnaphthalene	91-57-6	176	<176	ug/kg dry	
2-Methylphenol	95-48-7	176	<176	ug/kg dry	
2-Nitroaniline	88-74-4	176	<176	ug/kg dry	
2-Nitrophenol	88-75-5	176	<176	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	176	<176	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	176	<176	ug/kg dry	
3-Nitroaniline	99-09-2	176	<176	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	176	<176	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	176	<176	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	176	<176	ug/kg dry	
4-Chloroaniline	106-47-8	176	<176	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	176	<176	ug/kg dry	
4-Nitroaniline	100-01-6	176	<176	ug/kg dry	
4-Nitrophenol	100-02-7	176	<176	ug/kg dry	
Acenaphthene	83-32-9	176	<176	ug/kg dry	
Acenaphthylene	208-96-8	176	<176	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	176	<176	ug/kg dry	
Anthracene	120-12-7	176	<176	ug/kg dry	
Benzidine	92-87-5	176	<176	ug/kg dry	4.N
Benzo(a)anthracene	56-55-3	176	<176	ug/kg dry	
Benzo(a)pyrene	50-32-8	176	<176	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	176	<176	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	176	<176	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	176	<176	ug/kg dry	
Benzoic Acid	65-85-0	176	<176	ug/kg dry	
Benzyl alcohol	100-51-6	176	<176	ug/kg dry	
bis(2-Chloroethoxy)methane	111-91-1	176	<176	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	176	<176	ug/kg dry	
Bis(2-Ethylhexyl)phthalate	117-81-7	176	<176	ug/kg dry	
Butyl benzyl phthalate	85-68-7	176	<176	ug/kg dry	
Carbazole	86-74-8	176	<176	ug/kg dry	
Chrysene	218-01-9	176	<176	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	176	<176	ug/kg dry	
Dibenzofuran	132-64-9	176	<176	ug/kg dry	
Diethyl phthalate	84-66-2	176	<176	ug/kg dry	
Dimethyl phthalate	131-11-3	176	<176	ug/kg dry	
Di-n-butyl phthalate	84-74-2	176	<176	ug/kg dry	
Di-n-octyl phthalate	117-84-0	176	<176	ug/kg dry	
Fluoranthene	206-44-0	176	<176	ug/kg dry	
Fluorene	86-73-7	176	<176	ug/kg dry	
Hexachlorobenzene	118-74-1	176	<176	ug/kg dry	
Hexachlorobutadiene	87-68-3	176	<176	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	176	<176	ug/kg dry	
Hexachloroethane	67-72-1	176	<176	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	176	<176	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	176	<176	ug/kg dry	
Naphthalene	91-20-3	176	<176	ug/kg dry	
Nitrobenzene	98-95-3	176	<176	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	176	<176	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	176	<176	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	176	<176	ug/kg dry	
Parathion (ethyl)	56-38-2	176	<176	ug/kg dry	
Pentachlorophenol	87-86-5	176	<176	ug/kg dry	
Phenanthrene	85-01-8	176	<176	ug/kg dry	
Phenol	108-95-2	176	<176	ug/kg dry	
Pyrene	129-00-0	176	<176	ug/kg dry	
Pyridine	110-86-1	176	<176	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	68	18.04-120.2	
2-Fluorobiphenyl	321-60-8	43	34.39-110.73	
2-Fluorophenol	367-12-4	41	22.98-107.57	
Nitrobenzene-d5	4165-60-0	39	31-118.25	
Phenol-d6	13127-88-3	42	35.55-111.39	
Terphenyl-d14	1718-51-0	76	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	112	50-200	
Acenaphthene-d10	15067-26-2	99	50-200	
Chrysene-d12	1719-03-5	79	50-200	
Naphthalene-d8	1146-65-2	100	50-200	
Perylene-d12	1520-96-3	74	50-200	
Phenanthrene-d10	1517-22-2	105	50-200	

Date Prepared: 10/29/2015

Preparation Method: EPA 3545 A

Date Analyzed: 10/30/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.53	<3.53	ug/kg dry	
4,4'-DDE	72-55-9	3.53	<3.53	ug/kg dry	
4,4'-DDT	50-29-3	3.53	<3.53	ug/kg dry	
Aldrin	309-00-2	5.88	<5.88	ug/kg dry	
alpha-BHC	319-84-6	5.88	<5.88	ug/kg dry	
beta-BHC	319-85-7	5.88	<5.88	ug/kg dry	
Chlordane	12789-03-6	17.6	<17.6	ug/kg dry	
cis-Chlordane	5103-71-9	5.88	<5.88	ug/kg dry	
delta-BHC	319-86-8	5.88	<5.88	ug/kg dry	
Dieldrin	60-57-1	5.88	<5.88	ug/kg dry	
Endosulfan I	959-98-8	5.88	<5.88	ug/kg dry	
Endosulfan II	33213-65-9	5.88	<5.88	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.88	<5.88	ug/kg dry	
Endrin	72-20-8	5.88	<5.88	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.88	<5.88	ug/kg dry	
Endrin Ketone	53494-70-5	5.88	<5.88	ug/kg dry	
gamma-BHC	58-89-9	5.88	<5.88	ug/kg dry	
Heptachlor	76-44-8	5.88	<5.88	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.88	<5.88	ug/kg dry	
Methoxychlor	72-43-5	5.88	<5.88	ug/kg dry	
Mirex	2385-85-5	5.88	<5.88	ug/kg dry	
Toxaphene	8001-35-2	118	<118	ug/kg dry	
trans-Chlordane	5103-74-2	5.88	<5.88	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	11.8	<11.8	ug/kg dry	
Aroclor-1221	11104-28-2	11.8	<11.8	ug/kg dry	
Aroclor-1232	11141-16-5	11.8	<11.8	ug/kg dry	
Aroclor-1242	53469-21-9	11.8	<11.8	ug/kg dry	
Aroclor-1248	12672-29-6	11.8	<11.8	ug/kg dry	
Aroclor-1254	11097-69-1	11.8	<11.8	ug/kg dry	
Aroclor-1260	11096-82-5	11.8	<11.8	ug/kg dry	
Aroclor-1262	37324-23-5	11.8	<11.8	ug/kg dry	
Aroclor-1268	11100-14-4	11.8	<11.8	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	102	43.5-123	
Tetrachloro-m-xylene	877-09-8	97	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	104	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:35	Sample ID: SB01 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-01 % Solid:85.05
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/29/2015	EPA 6010 C	93.8	12700	mg/kg dry	3.E
Antimony	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.67	2.47	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.57	51.8	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.65	<1.65	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.0	1340	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.67	18.4	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.67	6.88	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.67	13.6	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	46.9	15800	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.67	18.5	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.00	2210	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.67	236	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.67	12.3	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.0	1100	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	4.69	98.9	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.67	26.2	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.67	34.8	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	0.09	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.24	<0.24	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	4.47	<4.47	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	4.47	<4.47	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	4.47	<4.47	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	4.47	<4.47	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	4.47	<4.47	ug/kg dry	
1,1-Dichloroethane	75-34-3	4.47	<4.47	ug/kg dry	
1,1-Dichloroethylene	75-35-4	4.47	<4.47	ug/kg dry	
1,1-Dichloropropylene	563-58-6	4.47	<4.47	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	4.47	<4.47	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	4.47	<4.47	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	4.47	<4.47	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	4.47	<4.47	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	4.47	<4.47	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	4.47	<4.47	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	4.47	<4.47	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	4.47	<4.47	ug/kg dry	
1,2-Dichloroethane	107-06-2	4.47	<4.47	ug/kg dry	
1,2-Dichloropropane	78-87-5	4.47	<4.47	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	4.47	<4.47	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	4.47	<4.47	ug/kg dry	
1,3-Dichloropropane	142-28-9	4.47	<4.47	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	4.47	<4.47	ug/kg dry	
1,4-Diethylbenzene	105-05-5	4.47	<4.47	ug/kg dry	2.B
1,4-Dioxane	123-91-1	44.7	<44.7	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	4.47	<4.47	ug/kg dry	
2-Chlorotoluene	95-49-8	4.47	<4.47	ug/kg dry	
4-Chlorotoluene	106-43-4	4.47	<4.47	ug/kg dry	
4-Ethyltoluene	622-96-8	4.47	<4.47	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	4.47	<4.47	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	8.95	<8.95	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	44.7	<44.7	ug/kg dry	4.J
Acrylonitrile	107-13-1	4.47	<4.47	ug/kg dry	
Benzene	71-43-2	4.47	<4.47	ug/kg dry	
Bromobenzene	108-86-1	4.47	<4.47	ug/kg dry	
Bromochloromethane	74-97-5	4.47	<4.47	ug/kg dry	
Bromodichloromethane	75-27-4	4.47	<4.47	ug/kg dry	
Bromoform	75-25-2	4.47	<4.47	ug/kg dry	
Bromomethane	74-83-9	4.47	<4.47	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	4.47	<4.47	ug/kg dry	
Carbon Tetrachloride	56-23-5	4.47	<4.47	ug/kg dry	
Chlorobenzene	108-90-7	4.47	<4.47	ug/kg dry	
Chlorodifluoromethane	75-45-6	4.47	<4.47	ug/kg dry	2.B
Chloroethane	75-00-3	4.47	<4.47	ug/kg dry	
Chloroform	67-66-3	4.47	<4.47	ug/kg dry	
Chloromethane	74-87-3	4.47	<4.47	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	4.47	<4.47	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	4.47	<4.47	ug/kg dry	
Dibromochloromethane	124-48-1	4.47	<4.47	ug/kg dry	
Dibromomethane	74-95-3	4.47	<4.47	ug/kg dry	
Dichlorodifluoromethane	75-71-8	4.47	<4.47	ug/kg dry	
Ethylbenzene	100-41-4	4.47	<4.47	ug/kg dry	
Hexachlorobutadiene	87-68-3	4.47	<4.47	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	4.47	<4.47	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	8.95	<8.95	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	4.47	<4.47	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	8.95	<8.95	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	4.47	<4.47	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	4.47	<4.47	ug/kg dry	
Naphthalene	91-20-3	4.47	<4.47	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	4.47	<4.47	ug/kg dry	
n-Propylbenzene	103-65-1	4.47	<4.47	ug/kg dry	
o-Xylene	95-47-6	4.47	<4.47	ug/kg dry	
sec-Butylbenzene	135-98-8	4.47	<4.47	ug/kg dry	
Styrene	100-42-5	4.47	<4.47	ug/kg dry	
tert-Butyl alcohol	75-65-0	4.47	<4.47	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	4.47	<4.47	ug/kg dry	
Tetrachloroethylene	127-18-4	4.47	<4.47	ug/kg dry	
Toluene	108-88-3	4.47	<4.47	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	4.47	<4.47	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	4.47	<4.47	ug/kg dry	
Trichloroethylene	79-01-6	4.47	<4.47	ug/kg dry	
Trichlorofluoromethane	75-69-4	4.47	<4.47	ug/kg dry	
Vinyl chloride	75-01-4	4.47	<4.47	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	85	74.4-131	
4-Bromofluorobenzene	460-00-4	103	82.3-134	
Dibromofluoromethane	1868-53-7	94	79.4-122	
Toluene-d8	2037-26-5	100	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	100	50-200	
1,4-Difluorobenzene	540-36-3	102	50-200	
Chlorobenzene-d5	3114-55-4	102	50-200	
Pentafluorobenzene	363-72-4	101	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	162	<162	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	162	<162	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	162	<162	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	162	<162	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	162	<162	ug/kg dry	4.J
2,4,5-Trichlorophenol	95-95-4	97.1	<97.1	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	97.1	<97.1	ug/kg dry	
2,4-Dichlorophenol	120-83-2	162	<162	ug/kg dry	
2,4-Dimethylphenol	105-67-9	162	<162	ug/kg dry	
2,4-Dinitrophenol	51-28-5	162	<162	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	162	<162	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	162	<162	ug/kg dry	
2-Chloronaphthalene	91-58-7	162	<162	ug/kg dry	
2-Chlorophenol	95-57-8	162	<162	ug/kg dry	
2-Methylnaphthalene	91-57-6	162	<162	ug/kg dry	
2-Methylphenol	95-48-7	162	<162	ug/kg dry	
2-Nitroaniline	88-74-4	162	<162	ug/kg dry	
2-Nitrophenol	88-75-5	162	<162	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	162	<162	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	162	<162	ug/kg dry	
3-Nitroaniline	99-09-2	162	<162	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	162	<162	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	162	<162	ug/kg dry	4.T
4-Chloro-3-methylphenol	59-50-7	162	<162	ug/kg dry	
4-Chloroaniline	106-47-8	162	<162	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	162	<162	ug/kg dry	
4-Nitroaniline	100-01-6	162	<162	ug/kg dry	
4-Nitrophenol	100-02-7	162	<162	ug/kg dry	
Acenaphthene	83-32-9	162	<162	ug/kg dry	
Acenaphthylene	208-96-8	162	<162	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	162	<162	ug/kg dry	
Anthracene	120-12-7	162	<162	ug/kg dry	
Benzidine	92-87-5	162	<162	ug/kg dry	4.G, 4.N
Benzo(a)anthracene	56-55-3	162	<162	ug/kg dry	4.T
Benzo(a)pyrene	50-32-8	162	<162	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	162	<162	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	162	<162	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	162	<162	ug/kg dry	
Benzoic Acid	65-85-0	162	<162	ug/kg dry	
Benzyl alcohol	100-51-6	162	<162	ug/kg dry	
bis(2-Chloroethoxy)methane	111-91-1	162	<162	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	162	<162	ug/kg dry	
Bis(2-Ethylhexyl)phthalate	117-81-7	162	<162	ug/kg dry	
Butyl benzyl phthalate	85-68-7	162	<162	ug/kg dry	4.T
Carbazole	86-74-8	162	<162	ug/kg dry	
Chrysene	218-01-9	162	<162	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	162	<162	ug/kg dry	
Dibenzofuran	132-64-9	162	<162	ug/kg dry	
Diethyl phthalate	84-66-2	162	<162	ug/kg dry	
Dimethyl phthalate	131-11-3	162	<162	ug/kg dry	
Di-n-butyl phthalate	84-74-2	162	<162	ug/kg dry	
Di-n-octyl phthalate	117-84-0	162	<162	ug/kg dry	
Fluoranthene	206-44-0	162	<162	ug/kg dry	
Fluorene	86-73-7	162	<162	ug/kg dry	
Hexachlorobenzene	118-74-1	162	<162	ug/kg dry	4.T
Hexachlorobutadiene	87-68-3	162	<162	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	162	<162	ug/kg dry	
Hexachloroethane	67-72-1	162	<162	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	162	<162	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	162	<162	ug/kg dry	
Naphthalene	91-20-3	162	<162	ug/kg dry	
Nitrobenzene	98-95-3	162	<162	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	162	<162	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	162	<162	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	162	<162	ug/kg dry	
Parathion (ethyl)	56-38-2	162	<162	ug/kg dry	
Pentachlorophenol	87-86-5	162	<162	ug/kg dry	
Phenanthrene	85-01-8	162	<162	ug/kg dry	
Phenol	108-95-2	162	<162	ug/kg dry	
Pyrene	129-00-0	162	<162	ug/kg dry	4.T
Pyridine	110-86-1	162	<162	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	68	18.04-120.2	
2-Fluorobiphenyl	321-60-8	70	34.39-110.73	
2-Fluorophenol	367-12-4	72	22.98-107.57	
Nitrobenzene-d5	4165-60-0	73	31-118.25	
Phenol-d6	13127-88-3	77	35.55-111.39	
Terphenyl-d14	1718-51-0	70	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	121	50-200	
Acenaphthene-d10	15067-26-2	131	50-200	
Chrysene-d12	1719-03-5	88	50-200	
Naphthalene-d8	1146-65-2	139	50-200	
Perylene-d12	1520-96-3	94	50-200	
Phenanthrene-d10	1517-22-2	96	50-200	

Date Prepared: 10/29/2015

Preparation Method: EPA 3545 A

Date Analyzed: 10/30/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.24	<3.24	ug/kg dry	
4,4'-DDE	72-55-9	3.24	<3.24	ug/kg dry	
4,4'-DDT	50-29-3	3.24	<3.24	ug/kg dry	
Aldrin	309-00-2	5.39	<5.39	ug/kg dry	
alpha-BHC	319-84-6	5.39	<5.39	ug/kg dry	
beta-BHC	319-85-7	5.39	<5.39	ug/kg dry	
Chlordane	12789-03-6	16.2	<16.2	ug/kg dry	
cis-Chlordane	5103-71-9	5.39	<5.39	ug/kg dry	
delta-BHC	319-86-8	5.39	<5.39	ug/kg dry	
Dieldrin	60-57-1	5.39	<5.39	ug/kg dry	
Endosulfan I	959-98-8	5.39	<5.39	ug/kg dry	
Endosulfan II	33213-65-9	5.39	<5.39	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.39	<5.39	ug/kg dry	
Endrin	72-20-8	5.39	<5.39	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.39	<5.39	ug/kg dry	
Endrin Ketone	53494-70-5	5.39	<5.39	ug/kg dry	
gamma-BHC	58-89-9	5.39	<5.39	ug/kg dry	
Heptachlor	76-44-8	5.39	<5.39	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.39	<5.39	ug/kg dry	
Methoxychlor	72-43-5	5.39	<5.39	ug/kg dry	
Mirex	2385-85-5	5.39	<5.39	ug/kg dry	
Toxaphene	8001-35-2	108	<108	ug/kg dry	
trans-Chlordane	5103-74-2	5.39	<5.39	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	10.8	<10.8	ug/kg dry	
Aroclor-1221	11104-28-2	10.8	<10.8	ug/kg dry	
Aroclor-1232	11141-16-5	10.8	<10.8	ug/kg dry	
Aroclor-1242	53469-21-9	10.8	<10.8	ug/kg dry	
Aroclor-1248	12672-29-6	10.8	<10.8	ug/kg dry	
Aroclor-1254	11097-69-1	10.8	<10.8	ug/kg dry	
Aroclor-1260	11096-82-5	10.8	<10.8	ug/kg dry	
Aroclor-1262	37324-23-5	10.8	<10.8	ug/kg dry	
Aroclor-1268	11100-14-4	10.8	<10.8	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	67	43.5-123	
Tetrachloro-m-xylene	877-09-8	85	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	98	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:45	Sample ID: SB01 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-02 % Solid:92.70
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	10.0	6550	mg/kg dry	
Antimony	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.54	60.9	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.65	<1.65	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.0	1020	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.67	20.6	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.67	8.22	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.67	17.3	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	46.2	18500	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.67	4.00	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.00	2330	mg/kg dry	
Manganese	10/29/2015	EPA 6010 C	15.4	432	mg/kg dry	3.E
Nickel	10/28/2015	EPA 6010 C	1.67	19.7	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.0	948	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	4.62	94.6	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.67	25.7	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.67	33.7	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.01	<0.01	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.22	<0.22	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03 % Solid:90.46
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	6.01	<6.01	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	6.01	<6.01	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	6.01	<6.01	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	6.01	<6.01	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	6.01	<6.01	ug/kg dry	
1,1-Dichloroethane	75-34-3	6.01	<6.01	ug/kg dry	
1,1-Dichloroethylene	75-35-4	6.01	<6.01	ug/kg dry	
1,1-Dichloropropylene	563-58-6	6.01	<6.01	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	6.01	<6.01	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	6.01	<6.01	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	6.01	<6.01	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	6.01	<6.01	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	6.01	<6.01	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	6.01	<6.01	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	6.01	<6.01	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	6.01	<6.01	ug/kg dry	
1,2-Dichloroethane	107-06-2	6.01	<6.01	ug/kg dry	
1,2-Dichloropropane	78-87-5	6.01	<6.01	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	6.01	<6.01	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	6.01	<6.01	ug/kg dry	
1,3-Dichloropropane	142-28-9	6.01	<6.01	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	6.01	<6.01	ug/kg dry	
1,4-Diethylbenzene	105-05-5	6.01	<6.01	ug/kg dry	2.B
1,4-Dioxane	123-91-1	60.1	<60.1	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	6.01	<6.01	ug/kg dry	
2-Chlorotoluene	95-49-8	6.01	<6.01	ug/kg dry	
4-Chlorotoluene	106-43-4	6.01	<6.01	ug/kg dry	
4-Ethyltoluene	622-96-8	6.01	<6.01	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	6.01	<6.01	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	12.0	<12.0	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03 % Solid:90.46
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	60.1	<60.1	ug/kg dry	4.J
Acrylonitrile	107-13-1	6.01	<6.01	ug/kg dry	
Benzene	71-43-2	6.01	31.2	ug/kg dry	
Bromobenzene	108-86-1	6.01	<6.01	ug/kg dry	
Bromochloromethane	74-97-5	6.01	<6.01	ug/kg dry	
Bromodichloromethane	75-27-4	6.01	<6.01	ug/kg dry	
Bromoform	75-25-2	6.01	<6.01	ug/kg dry	
Bromomethane	74-83-9	6.01	<6.01	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	6.01	<6.01	ug/kg dry	
Carbon Tetrachloride	56-23-5	6.01	<6.01	ug/kg dry	
Chlorobenzene	108-90-7	6.01	<6.01	ug/kg dry	
Chlorodifluoromethane	75-45-6	6.01	<6.01	ug/kg dry	2.B
Chloroethane	75-00-3	6.01	<6.01	ug/kg dry	
Chloroform	67-66-3	6.01	<6.01	ug/kg dry	
Chloromethane	74-87-3	6.01	<6.01	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	6.01	<6.01	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	6.01	<6.01	ug/kg dry	
Dibromochloromethane	124-48-1	6.01	<6.01	ug/kg dry	
Dibromomethane	74-95-3	6.01	<6.01	ug/kg dry	
Dichlorodifluoromethane	75-71-8	6.01	<6.01	ug/kg dry	
Ethylbenzene	100-41-4	6.01	<6.01	ug/kg dry	
Hexachlorobutadiene	87-68-3	6.01	<6.01	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	6.01	<6.01	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	12.0	<12.0	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	6.01	<6.01	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	12.0	<12.0	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	6.01	<6.01	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	6.01	<6.01	ug/kg dry	
Naphthalene	91-20-3	6.01	<6.01	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03 % Solid:90.46
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	6.01	<6.01	ug/kg dry	
n-Propylbenzene	103-65-1	6.01	<6.01	ug/kg dry	
o-Xylene	95-47-6	6.01	<6.01	ug/kg dry	
sec-Butylbenzene	135-98-8	6.01	<6.01	ug/kg dry	
Styrene	100-42-5	6.01	<6.01	ug/kg dry	
tert-Butyl alcohol	75-65-0	6.01	<6.01	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	6.01	<6.01	ug/kg dry	
Tetrachloroethylene	127-18-4	6.01	<6.01	ug/kg dry	
Toluene	108-88-3	6.01	8.66	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	6.01	<6.01	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	6.01	<6.01	ug/kg dry	
Trichloroethylene	79-01-6	6.01	<6.01	ug/kg dry	
Trichlorofluoromethane	75-69-4	6.01	<6.01	ug/kg dry	
Vinyl chloride	75-01-4	6.01	<6.01	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	87	74.4-131	
4-Bromofluorobenzene	460-00-4	108	82.3-134	
Dibromofluoromethane	1868-53-7	95	79.4-122	
Toluene-d8	2037-26-5	102	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	84	50-200	
1,4-Difluorobenzene	540-36-3	94	50-200	
Chlorobenzene-d5	3114-55-4	92	50-200	
Pentafluorobenzene	363-72-4	93	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03 % Solid:90.46
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	166	<166	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	166	<166	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	166	<166	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	166	<166	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	166	<166	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	99.5	<99.5	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	99.5	<99.5	ug/kg dry	
2,4-Dichlorophenol	120-83-2	166	<166	ug/kg dry	
2,4-Dimethylphenol	105-67-9	166	<166	ug/kg dry	
2,4-Dinitrophenol	51-28-5	166	<166	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	166	<166	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	166	<166	ug/kg dry	
2-Chloronaphthalene	91-58-7	166	<166	ug/kg dry	
2-Chlorophenol	95-57-8	166	<166	ug/kg dry	
2-Methylnaphthalene	91-57-6	166	<166	ug/kg dry	
2-Methylphenol	95-48-7	166	<166	ug/kg dry	
2-Nitroaniline	88-74-4	166	<166	ug/kg dry	
2-Nitrophenol	88-75-5	166	<166	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	166	<166	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	166	<166	ug/kg dry	
3-Nitroaniline	99-09-2	166	<166	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	166	<166	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	166	<166	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	166	<166	ug/kg dry	
4-Chloroaniline	106-47-8	166	<166	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	166	<166	ug/kg dry	
4-Nitroaniline	100-01-6	166	<166	ug/kg dry	
4-Nitrophenol	100-02-7	166	<166	ug/kg dry	
Acenaphthene	83-32-9	166	<166	ug/kg dry	
Acenaphthylene	208-96-8	166	<166	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03 % Solid:90.46
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	166	<166	ug/kg dry	
Anthracene	120-12-7	166	<166	ug/kg dry	
Benzidine	92-87-5	166	<166	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	166	<166	ug/kg dry	
Benzo(a)pyrene	50-32-8	166	<166	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	166	<166	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	166	<166	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	166	<166	ug/kg dry	
Benzoic Acid	65-85-0	166	<166	ug/kg dry	
Benzyl alcohol	100-51-6	166	<166	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	166	<166	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	166	<166	ug/kg dry	4.J
Bis(2-Ethylhexyl)phthalate	117-81-7	166	<166	ug/kg dry	
Butyl benzyl phthalate	85-68-7	166	<166	ug/kg dry	
Carbazole	86-74-8	166	<166	ug/kg dry	
Chrysene	218-01-9	166	<166	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	166	<166	ug/kg dry	
Dibenzofuran	132-64-9	166	<166	ug/kg dry	
Diethyl phthalate	84-66-2	166	<166	ug/kg dry	
Dimethyl phthalate	131-11-3	166	<166	ug/kg dry	
Di-n-butyl phthalate	84-74-2	166	<166	ug/kg dry	
Di-n-octyl phthalate	117-84-0	166	<166	ug/kg dry	
Fluoranthene	206-44-0	166	<166	ug/kg dry	
Fluorene	86-73-7	166	<166	ug/kg dry	
Hexachlorobenzene	118-74-1	166	<166	ug/kg dry	
Hexachlorobutadiene	87-68-3	166	<166	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	166	<166	ug/kg dry	
Hexachloroethane	67-72-1	166	<166	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	166	<166	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03 % Solid:90.46
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	166	<166	ug/kg dry	
Naphthalene	91-20-3	166	<166	ug/kg dry	
Nitrobenzene	98-95-3	166	<166	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	166	<166	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	166	<166	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	166	<166	ug/kg dry	
Parathion (ethyl)	56-38-2	166	<166	ug/kg dry	
Pentachlorophenol	87-86-5	166	<166	ug/kg dry	
Phenanthrene	85-01-8	166	<166	ug/kg dry	
Phenol	108-95-2	166	<166	ug/kg dry	
Pyrene	129-00-0	166	<166	ug/kg dry	
Pyridine	110-86-1	166	<166	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	82	18.04-120.2	
2-Fluorobiphenyl	321-60-8	72	34.39-110.73	
2-Fluorophenol	367-12-4	71	22.98-107.57	
Nitrobenzene-d5	4165-60-0	87	31-118.25	
Phenol-d6	13127-88-3	69	35.55-111.39	
Terphenyl-d14	1718-51-0	76	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	77	50-200	
Acenaphthene-d10	15067-26-2	79	50-200	
Chrysene-d12	1719-03-5	81	50-200	
Naphthalene-d8	1146-65-2	78	50-200	
Perylene-d12	1520-96-3	81	50-200	
Phenanthrene-d10	1517-22-2	76	50-200	

Date Prepared: 10/29/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03 % Solid:90.46
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.32	<3.32	ug/kg dry	
4,4'-DDE	72-55-9	3.32	<3.32	ug/kg dry	
4,4'-DDT	50-29-3	3.32	<3.32	ug/kg dry	
Aldrin	309-00-2	5.53	<5.53	ug/kg dry	
alpha-BHC	319-84-6	5.53	<5.53	ug/kg dry	
beta-BHC	319-85-7	5.53	<5.53	ug/kg dry	
Chlordane	12789-03-6	16.6	<16.6	ug/kg dry	
cis-Chlordane	5103-71-9	5.53	<5.53	ug/kg dry	
delta-BHC	319-86-8	5.53	<5.53	ug/kg dry	
Dieldrin	60-57-1	5.53	<5.53	ug/kg dry	
Endosulfan I	959-98-8	5.53	<5.53	ug/kg dry	
Endosulfan II	33213-65-9	5.53	<5.53	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.53	<5.53	ug/kg dry	
Endrin	72-20-8	5.53	<5.53	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.53	<5.53	ug/kg dry	
Endrin Ketone	53494-70-5	5.53	<5.53	ug/kg dry	
gamma-BHC	58-89-9	5.53	<5.53	ug/kg dry	
Heptachlor	76-44-8	5.53	<5.53	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.53	<5.53	ug/kg dry	
Methoxychlor	72-43-5	5.53	<5.53	ug/kg dry	
Mirex	2385-85-5	5.53	<5.53	ug/kg dry	
Toxaphene	8001-35-2	111	<111	ug/kg dry	
trans-Chlordane	5103-74-2	5.53	<5.53	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd	
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)	
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03	% Solid:90.46
Matrix: Soil	ELAP: #11693	

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	11.1	<11.1	ug/kg dry	
Aroclor-1221	11104-28-2	11.1	<11.1	ug/kg dry	
Aroclor-1232	11141-16-5	11.1	<11.1	ug/kg dry	
Aroclor-1242	53469-21-9	11.1	<11.1	ug/kg dry	
Aroclor-1248	12672-29-6	11.1	<11.1	ug/kg dry	
Aroclor-1254	11097-69-1	11.1	<11.1	ug/kg dry	
Aroclor-1260	11096-82-5	11.1	<11.1	ug/kg dry	
Aroclor-1262	37324-23-5	11.1	<11.1	ug/kg dry	
Aroclor-1268	11100-14-4	11.1	<11.1	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	74	43.5-123	
Tetrachloro-m-xylene	877-09-8	86	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	98	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd	
Date (Time) Collected: 10/22/2015 09:50	Sample ID: SB02 (0-2)	
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-03	% Solid:90.46
Matrix: Soil	ELAP: #11693	

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	10.8	5990	mg/kg dry	
Antimony	10/28/2015	EPA 6010 C	1.80	<1.80	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.80	<1.80	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.80	37.3	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.80	<1.80	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.80	<1.80	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.8	2030	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.80	15.0	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.80	7.00	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.80	11.7	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	53.8	12500	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.80	3.71	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.38	1810	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.80	250	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.80	11.3	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.8	757	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.80	<1.80	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.80	<1.80	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	5.38	60.0	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.80	<1.80	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.80	20.2	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.80	23.8	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	<0.02	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.22	<0.22	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.58	<5.58	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	5.58	<5.58	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	5.58	<5.58	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.58	<5.58	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	5.58	<5.58	ug/kg dry	
1,1-Dichloroethane	75-34-3	5.58	<5.58	ug/kg dry	
1,1-Dichloroethylene	75-35-4	5.58	<5.58	ug/kg dry	
1,1-Dichloropropylene	563-58-6	5.58	<5.58	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	5.58	<5.58	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	5.58	<5.58	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	5.58	<5.58	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	5.58	<5.58	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	5.58	<5.58	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	5.58	<5.58	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	5.58	<5.58	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	5.58	<5.58	ug/kg dry	
1,2-Dichloroethane	107-06-2	5.58	<5.58	ug/kg dry	
1,2-Dichloropropane	78-87-5	5.58	<5.58	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	5.58	<5.58	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	5.58	<5.58	ug/kg dry	
1,3-Dichloropropane	142-28-9	5.58	<5.58	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	5.58	<5.58	ug/kg dry	
1,4-Diethylbenzene	105-05-5	5.58	<5.58	ug/kg dry	2.B
1,4-Dioxane	123-91-1	55.8	<55.8	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	5.58	<5.58	ug/kg dry	
2-Chlorotoluene	95-49-8	5.58	<5.58	ug/kg dry	
4-Chlorotoluene	106-43-4	5.58	<5.58	ug/kg dry	
4-Ethyltoluene	622-96-8	5.58	<5.58	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	5.58	<5.58	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	11.2	<11.2	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	55.8	<55.8	ug/kg dry	4.J
Acrylonitrile	107-13-1	5.58	<5.58	ug/kg dry	
Benzene	71-43-2	5.58	<5.58	ug/kg dry	
Bromobenzene	108-86-1	5.58	<5.58	ug/kg dry	
Bromochloromethane	74-97-5	5.58	<5.58	ug/kg dry	
Bromodichloromethane	75-27-4	5.58	<5.58	ug/kg dry	
Bromoform	75-25-2	5.58	<5.58	ug/kg dry	
Bromomethane	74-83-9	5.58	<5.58	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	5.58	<5.58	ug/kg dry	
Carbon Tetrachloride	56-23-5	5.58	<5.58	ug/kg dry	
Chlorobenzene	108-90-7	5.58	<5.58	ug/kg dry	
Chlorodifluoromethane	75-45-6	5.58	<5.58	ug/kg dry	2.B
Chloroethane	75-00-3	5.58	<5.58	ug/kg dry	
Chloroform	67-66-3	5.58	<5.58	ug/kg dry	
Chloromethane	74-87-3	5.58	<5.58	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	5.58	<5.58	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	5.58	<5.58	ug/kg dry	
Dibromochloromethane	124-48-1	5.58	<5.58	ug/kg dry	
Dibromomethane	74-95-3	5.58	<5.58	ug/kg dry	
Dichlorodifluoromethane	75-71-8	5.58	<5.58	ug/kg dry	
Ethylbenzene	100-41-4	5.58	<5.58	ug/kg dry	
Hexachlorobutadiene	87-68-3	5.58	<5.58	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	5.58	<5.58	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	11.2	<11.2	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	5.58	<5.58	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	11.2	<11.2	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	5.58	<5.58	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	5.58	<5.58	ug/kg dry	
Naphthalene	91-20-3	5.58	<5.58	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	5.58	<5.58	ug/kg dry	
n-Propylbenzene	103-65-1	5.58	<5.58	ug/kg dry	
o-Xylene	95-47-6	5.58	<5.58	ug/kg dry	
sec-Butylbenzene	135-98-8	5.58	<5.58	ug/kg dry	
Styrene	100-42-5	5.58	<5.58	ug/kg dry	
tert-Butyl alcohol	75-65-0	5.58	<5.58	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	5.58	<5.58	ug/kg dry	
Tetrachloroethylene	127-18-4	5.58	<5.58	ug/kg dry	
Toluene	108-88-3	5.58	<5.58	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	5.58	<5.58	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	5.58	<5.58	ug/kg dry	
Trichloroethylene	79-01-6	5.58	<5.58	ug/kg dry	
Trichlorofluoromethane	75-69-4	5.58	<5.58	ug/kg dry	
Vinyl chloride	75-01-4	5.58	<5.58	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	86	74.4-131	
4-Bromofluorobenzene	460-00-4	104	82.3-134	
Dibromofluoromethane	1868-53-7	95	79.4-122	
Toluene-d8	2037-26-5	99	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	97	50-200	
1,4-Difluorobenzene	540-36-3	99	50-200	
Chlorobenzene-d5	3114-55-4	99	50-200	
Pentafluorobenzene	363-72-4	97	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	164	<164	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	164	<164	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	164	<164	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	164	<164	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	164	<164	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	98.6	<98.6	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	98.6	<98.6	ug/kg dry	
2,4-Dichlorophenol	120-83-2	164	<164	ug/kg dry	
2,4-Dimethylphenol	105-67-9	164	<164	ug/kg dry	
2,4-Dinitrophenol	51-28-5	164	<164	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	164	<164	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	164	<164	ug/kg dry	
2-Chloronaphthalene	91-58-7	164	<164	ug/kg dry	
2-Chlorophenol	95-57-8	164	<164	ug/kg dry	
2-Methylnaphthalene	91-57-6	164	<164	ug/kg dry	
2-Methylphenol	95-48-7	164	<164	ug/kg dry	
2-Nitroaniline	88-74-4	164	<164	ug/kg dry	
2-Nitrophenol	88-75-5	164	<164	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	164	<164	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	164	<164	ug/kg dry	
3-Nitroaniline	99-09-2	164	<164	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	164	<164	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	164	<164	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	164	<164	ug/kg dry	
4-Chloroaniline	106-47-8	164	<164	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	164	<164	ug/kg dry	
4-Nitroaniline	100-01-6	164	<164	ug/kg dry	
4-Nitrophenol	100-02-7	164	<164	ug/kg dry	
Acenaphthene	83-32-9	164	<164	ug/kg dry	
Acenaphthylene	208-96-8	164	<164	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	164	<164	ug/kg dry	
Anthracene	120-12-7	164	<164	ug/kg dry	
Benzidine	92-87-5	164	<164	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	164	<164	ug/kg dry	
Benzo(a)pyrene	50-32-8	164	<164	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	164	<164	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	164	<164	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	164	<164	ug/kg dry	
Benzoic Acid	65-85-0	164	<164	ug/kg dry	
Benzyl alcohol	100-51-6	164	<164	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	164	<164	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	164	<164	ug/kg dry	4.J
Bis(2-Ethylhexyl)phthalate	117-81-7	164	<164	ug/kg dry	
Butyl benzyl phthalate	85-68-7	164	<164	ug/kg dry	
Carbazole	86-74-8	164	<164	ug/kg dry	
Chrysene	218-01-9	164	<164	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	164	<164	ug/kg dry	
Dibenzofuran	132-64-9	164	<164	ug/kg dry	
Diethyl phthalate	84-66-2	164	<164	ug/kg dry	
Dimethyl phthalate	131-11-3	164	<164	ug/kg dry	
Di-n-butyl phthalate	84-74-2	164	<164	ug/kg dry	
Di-n-octyl phthalate	117-84-0	164	<164	ug/kg dry	
Fluoranthene	206-44-0	164	<164	ug/kg dry	
Fluorene	86-73-7	164	<164	ug/kg dry	
Hexachlorobenzene	118-74-1	164	<164	ug/kg dry	
Hexachlorobutadiene	87-68-3	164	<164	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	164	<164	ug/kg dry	
Hexachloroethane	67-72-1	164	<164	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	164	<164	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	164	<164	ug/kg dry	
Naphthalene	91-20-3	164	<164	ug/kg dry	
Nitrobenzene	98-95-3	164	<164	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	164	<164	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	164	<164	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	164	<164	ug/kg dry	
Parathion (ethyl)	56-38-2	164	<164	ug/kg dry	
Pentachlorophenol	87-86-5	164	<164	ug/kg dry	
Phenanthrene	85-01-8	164	<164	ug/kg dry	
Phenol	108-95-2	164	<164	ug/kg dry	
Pyrene	129-00-0	164	<164	ug/kg dry	
Pyridine	110-86-1	164	<164	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	71	18.04-120.2	
2-Fluorobiphenyl	321-60-8	63	34.39-110.73	
2-Fluorophenol	367-12-4	61	22.98-107.57	
Nitrobenzene-d5	4165-60-0	77	31-118.25	
Phenol-d6	13127-88-3	60	35.55-111.39	
Terphenyl-d14	1718-51-0	68	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	79	50-200	
Acenaphthene-d10	15067-26-2	82	50-200	
Chrysene-d12	1719-03-5	81	50-200	
Naphthalene-d8	1146-65-2	80	50-200	
Perylene-d12	1520-96-3	84	50-200	
Phenanthrene-d10	1517-22-2	79	50-200	

Date Prepared: 10/29/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.29	<3.29	ug/kg dry	
4,4'-DDE	72-55-9	3.29	<3.29	ug/kg dry	
4,4'-DDT	50-29-3	3.29	<3.29	ug/kg dry	
Aldrin	309-00-2	5.48	<5.48	ug/kg dry	
alpha-BHC	319-84-6	5.48	<5.48	ug/kg dry	
beta-BHC	319-85-7	5.48	<5.48	ug/kg dry	
Chlordane	12789-03-6	16.4	<16.4	ug/kg dry	
cis-Chlordane	5103-71-9	5.48	<5.48	ug/kg dry	
delta-BHC	319-86-8	5.48	<5.48	ug/kg dry	
Dieldrin	60-57-1	5.48	<5.48	ug/kg dry	
Endosulfan I	959-98-8	5.48	<5.48	ug/kg dry	
Endosulfan II	33213-65-9	5.48	<5.48	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.48	<5.48	ug/kg dry	
Endrin	72-20-8	5.48	<5.48	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.48	<5.48	ug/kg dry	
Endrin Ketone	53494-70-5	5.48	<5.48	ug/kg dry	
gamma-BHC	58-89-9	5.48	<5.48	ug/kg dry	
Heptachlor	76-44-8	5.48	<5.48	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.48	<5.48	ug/kg dry	
Methoxychlor	72-43-5	5.48	<5.48	ug/kg dry	
Mirex	2385-85-5	5.48	<5.48	ug/kg dry	
Toxaphene	8001-35-2	110	<110	ug/kg dry	
trans-Chlordane	5103-74-2	5.48	<5.48	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	11.0	<11.0	ug/kg dry	
Aroclor-1221	11104-28-2	11.0	<11.0	ug/kg dry	
Aroclor-1232	11141-16-5	11.0	<11.0	ug/kg dry	
Aroclor-1242	53469-21-9	11.0	<11.0	ug/kg dry	
Aroclor-1248	12672-29-6	11.0	<11.0	ug/kg dry	
Aroclor-1254	11097-69-1	11.0	<11.0	ug/kg dry	
Aroclor-1260	11096-82-5	11.0	<11.0	ug/kg dry	
Aroclor-1262	37324-23-5	11.0	<11.0	ug/kg dry	
Aroclor-1268	11100-14-4	11.0	<11.0	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	69	43.5-123	
Tetrachloro-m-xylene	877-09-8	79	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	98	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:10	Sample ID: SB03 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-04 % Solid:91.27
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	10.0	6640	mg/kg dry	
Antimony	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.66	46.7	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.66	<1.66	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.0	1850	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.67	16.4	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.67	8.63	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.67	13.7	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	49.8	14200	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.67	3.77	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.00	2160	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.67	312	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.67	14.0	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.0	1130	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	4.98	111	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.67	23.5	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.67	26.6	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.01	<0.01	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.22	<0.22	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.37	<5.37	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	5.37	<5.37	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	5.37	<5.37	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.37	<5.37	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	5.37	<5.37	ug/kg dry	
1,1-Dichloroethane	75-34-3	5.37	<5.37	ug/kg dry	
1,1-Dichloroethylene	75-35-4	5.37	<5.37	ug/kg dry	
1,1-Dichloropropylene	563-58-6	5.37	<5.37	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	5.37	<5.37	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	5.37	<5.37	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	5.37	<5.37	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	5.37	<5.37	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	5.37	<5.37	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	5.37	<5.37	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	5.37	<5.37	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	5.37	<5.37	ug/kg dry	
1,2-Dichloroethane	107-06-2	5.37	<5.37	ug/kg dry	
1,2-Dichloropropane	78-87-5	5.37	<5.37	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	5.37	<5.37	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	5.37	<5.37	ug/kg dry	
1,3-Dichloropropane	142-28-9	5.37	<5.37	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	5.37	<5.37	ug/kg dry	
1,4-Diethylbenzene	105-05-5	5.37	<5.37	ug/kg dry	2.B
1,4-Dioxane	123-91-1	53.7	<53.7	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	5.37	<5.37	ug/kg dry	
2-Chlorotoluene	95-49-8	5.37	<5.37	ug/kg dry	
4-Chlorotoluene	106-43-4	5.37	<5.37	ug/kg dry	
4-Ethyltoluene	622-96-8	5.37	<5.37	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	5.37	<5.37	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	10.7	<10.7	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	53.7	<53.7	ug/kg dry	4.J
Acrylonitrile	107-13-1	5.37	<5.37	ug/kg dry	
Benzene	71-43-2	5.37	<5.37	ug/kg dry	
Bromobenzene	108-86-1	5.37	<5.37	ug/kg dry	
Bromochloromethane	74-97-5	5.37	<5.37	ug/kg dry	
Bromodichloromethane	75-27-4	5.37	<5.37	ug/kg dry	
Bromoform	75-25-2	5.37	<5.37	ug/kg dry	
Bromomethane	74-83-9	5.37	<5.37	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	5.37	<5.37	ug/kg dry	
Carbon Tetrachloride	56-23-5	5.37	<5.37	ug/kg dry	
Chlorobenzene	108-90-7	5.37	<5.37	ug/kg dry	
Chlorodifluoromethane	75-45-6	5.37	<5.37	ug/kg dry	2.B
Chloroethane	75-00-3	5.37	<5.37	ug/kg dry	
Chloroform	67-66-3	5.37	<5.37	ug/kg dry	
Chloromethane	74-87-3	5.37	<5.37	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	5.37	<5.37	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	5.37	<5.37	ug/kg dry	
Dibromochloromethane	124-48-1	5.37	<5.37	ug/kg dry	
Dibromomethane	74-95-3	5.37	<5.37	ug/kg dry	
Dichlorodifluoromethane	75-71-8	5.37	<5.37	ug/kg dry	
Ethylbenzene	100-41-4	5.37	<5.37	ug/kg dry	
Hexachlorobutadiene	87-68-3	5.37	<5.37	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	5.37	<5.37	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	10.7	<10.7	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	5.37	<5.37	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	10.7	<10.7	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	5.37	<5.37	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	5.37	<5.37	ug/kg dry	
Naphthalene	91-20-3	5.37	<5.37	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	5.37	<5.37	ug/kg dry	
n-Propylbenzene	103-65-1	5.37	<5.37	ug/kg dry	
o-Xylene	95-47-6	5.37	<5.37	ug/kg dry	
sec-Butylbenzene	135-98-8	5.37	<5.37	ug/kg dry	
Styrene	100-42-5	5.37	<5.37	ug/kg dry	
tert-Butyl alcohol	75-65-0	5.37	<5.37	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	5.37	<5.37	ug/kg dry	
Tetrachloroethylene	127-18-4	5.37	<5.37	ug/kg dry	
Toluene	108-88-3	5.37	<5.37	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	5.37	<5.37	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	5.37	<5.37	ug/kg dry	
Trichloroethylene	79-01-6	5.37	<5.37	ug/kg dry	
Trichlorofluoromethane	75-69-4	5.37	<5.37	ug/kg dry	
Vinyl chloride	75-01-4	5.37	<5.37	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	94	74.4-131	
4-Bromofluorobenzene	460-00-4	101	82.3-134	
Dibromofluoromethane	1868-53-7	94	79.4-122	
Toluene-d8	2037-26-5	100	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	88	50-200	
1,4-Difluorobenzene	540-36-3	89	50-200	
Chlorobenzene-d5	3114-55-4	89	50-200	
Pentafluorobenzene	363-72-4	90	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	160	<160	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	160	<160	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	160	<160	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	160	<160	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	160	<160	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	96.1	<96.1	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	96.1	<96.1	ug/kg dry	
2,4-Dichlorophenol	120-83-2	160	<160	ug/kg dry	
2,4-Dimethylphenol	105-67-9	160	<160	ug/kg dry	
2,4-Dinitrophenol	51-28-5	160	<160	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	160	<160	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	160	<160	ug/kg dry	
2-Chloronaphthalene	91-58-7	160	<160	ug/kg dry	
2-Chlorophenol	95-57-8	160	<160	ug/kg dry	
2-Methylnaphthalene	91-57-6	160	<160	ug/kg dry	
2-Methylphenol	95-48-7	160	<160	ug/kg dry	
2-Nitroaniline	88-74-4	160	<160	ug/kg dry	
2-Nitrophenol	88-75-5	160	<160	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	160	<160	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	160	<160	ug/kg dry	
3-Nitroaniline	99-09-2	160	<160	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	160	<160	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	160	<160	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	160	<160	ug/kg dry	
4-Chloroaniline	106-47-8	160	<160	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	160	<160	ug/kg dry	
4-Nitroaniline	100-01-6	160	<160	ug/kg dry	
4-Nitrophenol	100-02-7	160	<160	ug/kg dry	
Acenaphthene	83-32-9	160	<160	ug/kg dry	
Acenaphthylene	208-96-8	160	<160	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	160	<160	ug/kg dry	
Anthracene	120-12-7	160	<160	ug/kg dry	
Benzidine	92-87-5	160	<160	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	160	<160	ug/kg dry	
Benzo(a)pyrene	50-32-8	160	<160	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	160	<160	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	160	<160	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	160	<160	ug/kg dry	
Benzoic Acid	65-85-0	160	<160	ug/kg dry	
Benzyl alcohol	100-51-6	160	<160	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	160	<160	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	160	<160	ug/kg dry	4.J
Bis(2-Ethylhexyl)phthalate	117-81-7	160	<160	ug/kg dry	
Butyl benzyl phthalate	85-68-7	160	<160	ug/kg dry	
Carbazole	86-74-8	160	<160	ug/kg dry	
Chrysene	218-01-9	160	<160	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	160	<160	ug/kg dry	
Dibenzofuran	132-64-9	160	<160	ug/kg dry	
Diethyl phthalate	84-66-2	160	<160	ug/kg dry	
Dimethyl phthalate	131-11-3	160	<160	ug/kg dry	
Di-n-butyl phthalate	84-74-2	160	<160	ug/kg dry	
Di-n-octyl phthalate	117-84-0	160	<160	ug/kg dry	
Fluoranthene	206-44-0	160	<160	ug/kg dry	
Fluorene	86-73-7	160	<160	ug/kg dry	
Hexachlorobenzene	118-74-1	160	<160	ug/kg dry	
Hexachlorobutadiene	87-68-3	160	<160	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	160	<160	ug/kg dry	
Hexachloroethane	67-72-1	160	<160	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	160	<160	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	160	<160	ug/kg dry	
Naphthalene	91-20-3	160	<160	ug/kg dry	
Nitrobenzene	98-95-3	160	<160	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	160	<160	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	160	<160	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	160	<160	ug/kg dry	
Parathion (ethyl)	56-38-2	160	<160	ug/kg dry	
Pentachlorophenol	87-86-5	160	<160	ug/kg dry	
Phenanthrene	85-01-8	160	<160	ug/kg dry	
Phenol	108-95-2	160	<160	ug/kg dry	
Pyrene	129-00-0	160	<160	ug/kg dry	
Pyridine	110-86-1	160	<160	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	78	18.04-120.2	
2-Fluorobiphenyl	321-60-8	43	34.39-110.73	
2-Fluorophenol	367-12-4	41	22.98-107.57	
Nitrobenzene-d5	4165-60-0	52	31-118.25	
Phenol-d6	13127-88-3	40	35.55-111.39	
Terphenyl-d14	1718-51-0	75	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	76	50-200	
Acenaphthene-d10	15067-26-2	78	50-200	
Chrysene-d12	1719-03-5	82	50-200	
Naphthalene-d8	1146-65-2	78	50-200	
Perylene-d12	1520-96-3	81	50-200	
Phenanthrene-d10	1517-22-2	79	50-200	

Date Prepared: 10/29/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.20	<3.20	ug/kg dry	
4,4'-DDE	72-55-9	3.20	<3.20	ug/kg dry	
4,4'-DDT	50-29-3	3.20	<3.20	ug/kg dry	
Aldrin	309-00-2	5.34	<5.34	ug/kg dry	
alpha-BHC	319-84-6	5.34	<5.34	ug/kg dry	
beta-BHC	319-85-7	5.34	<5.34	ug/kg dry	
Chlordane	12789-03-6	16.0	<16.0	ug/kg dry	
cis-Chlordane	5103-71-9	5.34	<5.34	ug/kg dry	
delta-BHC	319-86-8	5.34	<5.34	ug/kg dry	
Dieldrin	60-57-1	5.34	<5.34	ug/kg dry	
Endosulfan I	959-98-8	5.34	<5.34	ug/kg dry	
Endosulfan II	33213-65-9	5.34	<5.34	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.34	<5.34	ug/kg dry	
Endrin	72-20-8	5.34	<5.34	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.34	<5.34	ug/kg dry	
Endrin Ketone	53494-70-5	5.34	<5.34	ug/kg dry	
gamma-BHC	58-89-9	5.34	<5.34	ug/kg dry	
Heptachlor	76-44-8	5.34	<5.34	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.34	<5.34	ug/kg dry	
Methoxychlor	72-43-5	5.34	<5.34	ug/kg dry	
Mirex	2385-85-5	5.34	<5.34	ug/kg dry	
Toxaphene	8001-35-2	107	<107	ug/kg dry	
trans-Chlordane	5103-74-2	5.34	<5.34	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05 % Solid:93.61
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	10.7	<10.7	ug/kg dry	
Aroclor-1221	11104-28-2	10.7	<10.7	ug/kg dry	
Aroclor-1232	11141-16-5	10.7	<10.7	ug/kg dry	
Aroclor-1242	53469-21-9	10.7	<10.7	ug/kg dry	
Aroclor-1248	12672-29-6	10.7	<10.7	ug/kg dry	
Aroclor-1254	11097-69-1	10.7	<10.7	ug/kg dry	
Aroclor-1260	11096-82-5	10.7	<10.7	ug/kg dry	
Aroclor-1262	37324-23-5	10.7	<10.7	ug/kg dry	
Aroclor-1268	11100-14-4	10.7	<10.7	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	73	43.5-123	
Tetrachloro-m-xylene	877-09-8	85	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	99	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd	
Date (Time) Collected: 10/22/2015 12:00	Sample ID: SB04 (2-4)	
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-05	% Solid:93.61
Matrix: Soil	ELAP: #11693	

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/29/2015	EPA 6010 C	86.2	10900	mg/kg dry	3.E
Antimony	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.67	3.60	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.44	51.9	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.65	<1.65	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.0	1530	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.67	16.8	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.67	6.95	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.67	16.1	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	43.1	14500	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.67	27.7	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.00	1880	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.67	301	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.67	10.9	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.0	602	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	4.31	103	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.67	22.8	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.67	205	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.01	0.14	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.21	<0.21	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.09	<5.09	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	5.09	<5.09	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	5.09	<5.09	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.09	<5.09	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	5.09	<5.09	ug/kg dry	
1,1-Dichloroethane	75-34-3	5.09	<5.09	ug/kg dry	
1,1-Dichloroethylene	75-35-4	5.09	<5.09	ug/kg dry	
1,1-Dichloropropylene	563-58-6	5.09	<5.09	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	5.09	<5.09	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	5.09	<5.09	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	5.09	<5.09	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	5.09	<5.09	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	5.09	<5.09	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	5.09	<5.09	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	5.09	<5.09	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	5.09	<5.09	ug/kg dry	
1,2-Dichloroethane	107-06-2	5.09	<5.09	ug/kg dry	
1,2-Dichloropropane	78-87-5	5.09	<5.09	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	5.09	<5.09	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	5.09	<5.09	ug/kg dry	
1,3-Dichloropropane	142-28-9	5.09	<5.09	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	5.09	<5.09	ug/kg dry	
1,4-Diethylbenzene	105-05-5	5.09	<5.09	ug/kg dry	2.B
1,4-Dioxane	123-91-1	50.9	<50.9	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	5.09	<5.09	ug/kg dry	
2-Chlorotoluene	95-49-8	5.09	<5.09	ug/kg dry	
4-Chlorotoluene	106-43-4	5.09	<5.09	ug/kg dry	
4-Ethyltoluene	622-96-8	5.09	<5.09	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	5.09	<5.09	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	10.2	<10.2	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	50.9	<50.9	ug/kg dry	4.J
Acrylonitrile	107-13-1	5.09	<5.09	ug/kg dry	
Benzene	71-43-2	5.09	<5.09	ug/kg dry	
Bromobenzene	108-86-1	5.09	<5.09	ug/kg dry	
Bromochloromethane	74-97-5	5.09	<5.09	ug/kg dry	
Bromodichloromethane	75-27-4	5.09	<5.09	ug/kg dry	
Bromoform	75-25-2	5.09	<5.09	ug/kg dry	
Bromomethane	74-83-9	5.09	<5.09	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	5.09	<5.09	ug/kg dry	
Carbon Tetrachloride	56-23-5	5.09	<5.09	ug/kg dry	
Chlorobenzene	108-90-7	5.09	<5.09	ug/kg dry	
Chlorodifluoromethane	75-45-6	5.09	<5.09	ug/kg dry	2.B
Chloroethane	75-00-3	5.09	<5.09	ug/kg dry	
Chloroform	67-66-3	5.09	<5.09	ug/kg dry	
Chloromethane	74-87-3	5.09	<5.09	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	5.09	<5.09	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	5.09	<5.09	ug/kg dry	
Dibromochloromethane	124-48-1	5.09	<5.09	ug/kg dry	
Dibromomethane	74-95-3	5.09	<5.09	ug/kg dry	
Dichlorodifluoromethane	75-71-8	5.09	<5.09	ug/kg dry	
Ethylbenzene	100-41-4	5.09	<5.09	ug/kg dry	
Hexachlorobutadiene	87-68-3	5.09	<5.09	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	5.09	<5.09	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	10.2	<10.2	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	5.09	<5.09	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	10.2	<10.2	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	5.09	<5.09	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	5.09	<5.09	ug/kg dry	
Naphthalene	91-20-3	5.09	<5.09	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	5.09	<5.09	ug/kg dry	
n-Propylbenzene	103-65-1	5.09	<5.09	ug/kg dry	
o-Xylene	95-47-6	5.09	<5.09	ug/kg dry	
sec-Butylbenzene	135-98-8	5.09	<5.09	ug/kg dry	
Styrene	100-42-5	5.09	<5.09	ug/kg dry	
tert-Butyl alcohol	75-65-0	5.09	<5.09	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	5.09	<5.09	ug/kg dry	
Tetrachloroethylene	127-18-4	5.09	<5.09	ug/kg dry	
Toluene	108-88-3	5.09	<5.09	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	5.09	<5.09	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	5.09	<5.09	ug/kg dry	
Trichloroethylene	79-01-6	5.09	<5.09	ug/kg dry	
Trichlorofluoromethane	75-69-4	5.09	<5.09	ug/kg dry	
Vinyl chloride	75-01-4	5.09	<5.09	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	89	74.4-131	
4-Bromofluorobenzene	460-00-4	102	82.3-134	
Dibromofluoromethane	1868-53-7	97	79.4-122	
Toluene-d8	2037-26-5	101	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	97	50-200	
1,4-Difluorobenzene	540-36-3	99	50-200	
Chlorobenzene-d5	3114-55-4	98	50-200	
Pentafluorobenzene	363-72-4	97	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	156	<156	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	156	<156	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	156	<156	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	156	<156	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	156	<156	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	93.8	<93.8	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	93.8	<93.8	ug/kg dry	
2,4-Dichlorophenol	120-83-2	156	<156	ug/kg dry	
2,4-Dimethylphenol	105-67-9	156	<156	ug/kg dry	
2,4-Dinitrophenol	51-28-5	156	<156	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	156	<156	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	156	<156	ug/kg dry	
2-Chloronaphthalene	91-58-7	156	<156	ug/kg dry	
2-Chlorophenol	95-57-8	156	<156	ug/kg dry	
2-Methylnaphthalene	91-57-6	156	<156	ug/kg dry	
2-Methylphenol	95-48-7	156	<156	ug/kg dry	
2-Nitroaniline	88-74-4	156	<156	ug/kg dry	
2-Nitrophenol	88-75-5	156	<156	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	156	<156	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	156	<156	ug/kg dry	
3-Nitroaniline	99-09-2	156	<156	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	156	<156	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	156	<156	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	156	<156	ug/kg dry	
4-Chloroaniline	106-47-8	156	<156	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	156	<156	ug/kg dry	
4-Nitroaniline	100-01-6	156	<156	ug/kg dry	
4-Nitrophenol	100-02-7	156	<156	ug/kg dry	
Acenaphthene	83-32-9	156	<156	ug/kg dry	
Acenaphthylene	208-96-8	156	<156	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	156	<156	ug/kg dry	
Anthracene	120-12-7	156	<156	ug/kg dry	
Benzidine	92-87-5	156	<156	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	156	<156	ug/kg dry	
Benzo(a)pyrene	50-32-8	156	<156	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	156	<156	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	156	<156	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	156	<156	ug/kg dry	
Benzoic Acid	65-85-0	156	<156	ug/kg dry	
Benzyl alcohol	100-51-6	156	<156	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	156	<156	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	156	<156	ug/kg dry	4.J, 4.N
Bis(2-Ethylhexyl)phthalate	117-81-7	156	<156	ug/kg dry	
Butyl benzyl phthalate	85-68-7	156	<156	ug/kg dry	
Carbazole	86-74-8	156	<156	ug/kg dry	
Chrysene	218-01-9	156	<156	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	156	<156	ug/kg dry	
Dibenzofuran	132-64-9	156	<156	ug/kg dry	
Diethyl phthalate	84-66-2	156	<156	ug/kg dry	
Dimethyl phthalate	131-11-3	156	<156	ug/kg dry	
Di-n-butyl phthalate	84-74-2	156	<156	ug/kg dry	
Di-n-octyl phthalate	117-84-0	156	<156	ug/kg dry	
Fluoranthene	206-44-0	156	<156	ug/kg dry	
Fluorene	86-73-7	156	<156	ug/kg dry	
Hexachlorobenzene	118-74-1	156	<156	ug/kg dry	
Hexachlorobutadiene	87-68-3	156	<156	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	156	<156	ug/kg dry	
Hexachloroethane	67-72-1	156	<156	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	156	<156	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	156	<156	ug/kg dry	
Naphthalene	91-20-3	156	<156	ug/kg dry	
Nitrobenzene	98-95-3	156	<156	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	156	<156	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	156	<156	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	156	<156	ug/kg dry	
Parathion (ethyl)	56-38-2	156	<156	ug/kg dry	
Pentachlorophenol	87-86-5	156	<156	ug/kg dry	
Phenanthrene	85-01-8	156	<156	ug/kg dry	
Phenol	108-95-2	156	<156	ug/kg dry	
Pyrene	129-00-0	156	<156	ug/kg dry	
Pyridine	110-86-1	156	<156	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	90	18.04-120.2	
2-Fluorobiphenyl	321-60-8	78	34.39-110.73	
2-Fluorophenol	367-12-4	75	22.98-107.57	
Nitrobenzene-d5	4165-60-0	95	31-118.25	
Phenol-d6	13127-88-3	77	35.55-111.39	
Terphenyl-d14	1718-51-0	80	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	65	50-200	
Acenaphthene-d10	15067-26-2	67	50-200	
Chrysene-d12	1719-03-5	60	50-200	
Naphthalene-d8	1146-65-2	68	50-200	
Perylene-d12	1520-96-3	63	50-200	
Phenanthrene-d10	1517-22-2	66	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.13	<3.13	ug/kg dry	
4,4'-DDE	72-55-9	3.13	<3.13	ug/kg dry	
4,4'-DDT	50-29-3	3.13	<3.13	ug/kg dry	
Aldrin	309-00-2	5.21	<5.21	ug/kg dry	
alpha-BHC	319-84-6	5.21	<5.21	ug/kg dry	
beta-BHC	319-85-7	5.21	<5.21	ug/kg dry	
Chlordane	12789-03-6	15.6	<15.6	ug/kg dry	
cis-Chlordane	5103-71-9	5.21	<5.21	ug/kg dry	
delta-BHC	319-86-8	5.21	<5.21	ug/kg dry	
Dieldrin	60-57-1	5.21	<5.21	ug/kg dry	
Endosulfan I	959-98-8	5.21	<5.21	ug/kg dry	
Endosulfan II	33213-65-9	5.21	<5.21	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.21	<5.21	ug/kg dry	
Endrin	72-20-8	5.21	<5.21	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.21	<5.21	ug/kg dry	
Endrin Ketone	53494-70-5	5.21	<5.21	ug/kg dry	
gamma-BHC	58-89-9	5.21	<5.21	ug/kg dry	
Heptachlor	76-44-8	5.21	<5.21	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.21	<5.21	ug/kg dry	
Methoxychlor	72-43-5	5.21	<5.21	ug/kg dry	
Mirex	2385-85-5	5.21	<5.21	ug/kg dry	
Toxaphene	8001-35-2	104	<104	ug/kg dry	
trans-Chlordane	5103-74-2	5.21	<5.21	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	10.4	<10.4	ug/kg dry	
Aroclor-1221	11104-28-2	10.4	<10.4	ug/kg dry	
Aroclor-1232	11141-16-5	10.4	<10.4	ug/kg dry	
Aroclor-1242	53469-21-9	10.4	<10.4	ug/kg dry	
Aroclor-1248	12672-29-6	10.4	<10.4	ug/kg dry	
Aroclor-1254	11097-69-1	10.4	<10.4	ug/kg dry	
Aroclor-1260	11096-82-5	10.4	<10.4	ug/kg dry	
Aroclor-1262	37324-23-5	10.4	<10.4	ug/kg dry	
Aroclor-1268	11100-14-4	10.4	<10.4	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	73	43.5-123	
Tetrachloro-m-xylene	877-09-8	85	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	99	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 12:15	Sample ID: SB04 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-06 % Solid:95.99
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	10.0	5510	mg/kg dry	
Antimony	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.52	36.5	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.65	<1.65	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.0	556	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.67	14.6	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.67	5.50	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.67	10.8	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	45.4	13400	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.67	2.47	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.00	1490	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.67	221	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.67	9.94	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.0	629	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	4.54	78.6	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.67	18.6	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.67	19.5	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.01	<0.01	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.21	<0.21	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.02	<5.02	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	5.02	<5.02	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	5.02	<5.02	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.02	<5.02	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	5.02	<5.02	ug/kg dry	
1,1-Dichloroethane	75-34-3	5.02	<5.02	ug/kg dry	
1,1-Dichloroethylene	75-35-4	5.02	<5.02	ug/kg dry	
1,1-Dichloropropylene	563-58-6	5.02	<5.02	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	5.02	<5.02	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	5.02	<5.02	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	5.02	<5.02	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	5.02	<5.02	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	5.02	<5.02	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	5.02	<5.02	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	5.02	<5.02	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	5.02	<5.02	ug/kg dry	
1,2-Dichloroethane	107-06-2	5.02	<5.02	ug/kg dry	
1,2-Dichloropropane	78-87-5	5.02	<5.02	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	5.02	<5.02	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	5.02	<5.02	ug/kg dry	
1,3-Dichloropropane	142-28-9	5.02	<5.02	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	5.02	<5.02	ug/kg dry	
1,4-Diethylbenzene	105-05-5	5.02	<5.02	ug/kg dry	2.B
1,4-Dioxane	123-91-1	50.2	<50.2	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	5.02	<5.02	ug/kg dry	
2-Chlorotoluene	95-49-8	5.02	<5.02	ug/kg dry	
4-Chlorotoluene	106-43-4	5.02	<5.02	ug/kg dry	
4-Ethyltoluene	622-96-8	5.02	<5.02	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	5.02	<5.02	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	10.0	<10.0	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	50.2	<50.2	ug/kg dry	4.J
Acrylonitrile	107-13-1	5.02	<5.02	ug/kg dry	
Benzene	71-43-2	5.02	<5.02	ug/kg dry	
Bromobenzene	108-86-1	5.02	<5.02	ug/kg dry	
Bromochloromethane	74-97-5	5.02	<5.02	ug/kg dry	
Bromodichloromethane	75-27-4	5.02	<5.02	ug/kg dry	
Bromoform	75-25-2	5.02	<5.02	ug/kg dry	
Bromomethane	74-83-9	5.02	<5.02	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	5.02	<5.02	ug/kg dry	
Carbon Tetrachloride	56-23-5	5.02	<5.02	ug/kg dry	
Chlorobenzene	108-90-7	5.02	<5.02	ug/kg dry	
Chlorodifluoromethane	75-45-6	5.02	<5.02	ug/kg dry	2.B
Chloroethane	75-00-3	5.02	<5.02	ug/kg dry	
Chloroform	67-66-3	5.02	<5.02	ug/kg dry	
Chloromethane	74-87-3	5.02	<5.02	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	5.02	<5.02	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	5.02	<5.02	ug/kg dry	
Dibromochloromethane	124-48-1	5.02	<5.02	ug/kg dry	
Dibromomethane	74-95-3	5.02	<5.02	ug/kg dry	
Dichlorodifluoromethane	75-71-8	5.02	<5.02	ug/kg dry	
Ethylbenzene	100-41-4	5.02	<5.02	ug/kg dry	
Hexachlorobutadiene	87-68-3	5.02	<5.02	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	5.02	<5.02	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	10.0	<10.0	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	5.02	<5.02	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	10.0	<10.0	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	5.02	<5.02	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	5.02	<5.02	ug/kg dry	
Naphthalene	91-20-3	5.02	<5.02	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	5.02	<5.02	ug/kg dry	
n-Propylbenzene	103-65-1	5.02	<5.02	ug/kg dry	
o-Xylene	95-47-6	5.02	<5.02	ug/kg dry	
sec-Butylbenzene	135-98-8	5.02	<5.02	ug/kg dry	
Styrene	100-42-5	5.02	<5.02	ug/kg dry	
tert-Butyl alcohol	75-65-0	5.02	<5.02	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	5.02	<5.02	ug/kg dry	
Tetrachloroethylene	127-18-4	5.02	<5.02	ug/kg dry	
Toluene	108-88-3	5.02	<5.02	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	5.02	<5.02	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	5.02	<5.02	ug/kg dry	
Trichloroethylene	79-01-6	5.02	<5.02	ug/kg dry	
Trichlorofluoromethane	75-69-4	5.02	<5.02	ug/kg dry	
Vinyl chloride	75-01-4	5.02	<5.02	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	90	74.4-131	
4-Bromofluorobenzene	460-00-4	104	82.3-134	
Dibromofluoromethane	1868-53-7	99	79.4-122	
Toluene-d8	2037-26-5	101	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	86	50-200	
1,4-Difluorobenzene	540-36-3	89	50-200	
Chlorobenzene-d5	3114-55-4	88	50-200	
Pentafluorobenzene	363-72-4	88	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	163	<163	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	163	<163	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	163	<163	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	163	<163	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	163	<163	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	97.6	<97.6	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	97.6	<97.6	ug/kg dry	
2,4-Dichlorophenol	120-83-2	163	<163	ug/kg dry	
2,4-Dimethylphenol	105-67-9	163	<163	ug/kg dry	
2,4-Dinitrophenol	51-28-5	163	<163	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	163	<163	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	163	<163	ug/kg dry	
2-Chloronaphthalene	91-58-7	163	<163	ug/kg dry	
2-Chlorophenol	95-57-8	163	<163	ug/kg dry	
2-Methylnaphthalene	91-57-6	163	<163	ug/kg dry	
2-Methylphenol	95-48-7	163	<163	ug/kg dry	
2-Nitroaniline	88-74-4	163	<163	ug/kg dry	
2-Nitrophenol	88-75-5	163	<163	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	163	<163	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	163	<163	ug/kg dry	
3-Nitroaniline	99-09-2	163	<163	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	163	<163	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	163	<163	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	163	<163	ug/kg dry	
4-Chloroaniline	106-47-8	163	<163	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	163	<163	ug/kg dry	
4-Nitroaniline	100-01-6	163	<163	ug/kg dry	
4-Nitrophenol	100-02-7	163	<163	ug/kg dry	
Acenaphthene	83-32-9	163	<163	ug/kg dry	
Acenaphthylene	208-96-8	163	<163	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	163	<163	ug/kg dry	
Anthracene	120-12-7	163	<163	ug/kg dry	
Benzidine	92-87-5	163	<163	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	163	<163	ug/kg dry	
Benzo(a)pyrene	50-32-8	163	<163	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	163	<163	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	163	<163	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	163	<163	ug/kg dry	
Benzoic Acid	65-85-0	163	<163	ug/kg dry	
Benzyl alcohol	100-51-6	163	<163	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	163	<163	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	163	<163	ug/kg dry	4.J, 4.N
Bis(2-Ethylhexyl)phthalate	117-81-7	163	<163	ug/kg dry	
Butyl benzyl phthalate	85-68-7	163	<163	ug/kg dry	
Carbazole	86-74-8	163	<163	ug/kg dry	
Chrysene	218-01-9	163	<163	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	163	<163	ug/kg dry	
Dibenzofuran	132-64-9	163	<163	ug/kg dry	
Diethyl phthalate	84-66-2	163	<163	ug/kg dry	
Dimethyl phthalate	131-11-3	163	<163	ug/kg dry	
Di-n-butyl phthalate	84-74-2	163	<163	ug/kg dry	
Di-n-octyl phthalate	117-84-0	163	<163	ug/kg dry	
Fluoranthene	206-44-0	163	<163	ug/kg dry	
Fluorene	86-73-7	163	<163	ug/kg dry	
Hexachlorobenzene	118-74-1	163	<163	ug/kg dry	
Hexachlorobutadiene	87-68-3	163	<163	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	163	<163	ug/kg dry	
Hexachloroethane	67-72-1	163	<163	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	163	<163	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	163	<163	ug/kg dry	
Naphthalene	91-20-3	163	<163	ug/kg dry	
Nitrobenzene	98-95-3	163	<163	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	163	<163	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	163	<163	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	163	<163	ug/kg dry	
Parathion (ethyl)	56-38-2	163	<163	ug/kg dry	
Pentachlorophenol	87-86-5	163	<163	ug/kg dry	
Phenanthrene	85-01-8	163	<163	ug/kg dry	
Phenol	108-95-2	163	<163	ug/kg dry	
Pyrene	129-00-0	163	<163	ug/kg dry	
Pyridine	110-86-1	163	<163	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	42	18.04-120.2	
2-Fluorobiphenyl	321-60-8	93	34.39-110.73	
2-Fluorophenol	367-12-4	63	22.98-107.57	
Nitrobenzene-d5	4165-60-0	102	31-118.25	
Phenol-d6	13127-88-3	83	35.55-111.39	
Terphenyl-d14	1718-51-0	107	41.02-106	4.E

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	52	50-200	
Acenaphthene-d10	15067-26-2	51	50-200	
Chrysene-d12	1719-03-5	53	50-200	
Naphthalene-d8	1146-65-2	50	50-200	
Perylene-d12	1520-96-3	53	50-200	
Phenanthrene-d10	1517-22-2	50	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.25	<3.25	ug/kg dry	
4,4'-DDE	72-55-9	3.25	<3.25	ug/kg dry	
4,4'-DDT	50-29-3	3.25	<3.25	ug/kg dry	
Aldrin	309-00-2	5.42	<5.42	ug/kg dry	
alpha-BHC	319-84-6	5.42	<5.42	ug/kg dry	
beta-BHC	319-85-7	5.42	<5.42	ug/kg dry	
Chlordane	12789-03-6	16.3	<16.3	ug/kg dry	
cis-Chlordane	5103-71-9	5.42	<5.42	ug/kg dry	
delta-BHC	319-86-8	5.42	<5.42	ug/kg dry	
Dieldrin	60-57-1	5.42	<5.42	ug/kg dry	
Endosulfan I	959-98-8	5.42	<5.42	ug/kg dry	
Endosulfan II	33213-65-9	5.42	<5.42	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.42	<5.42	ug/kg dry	
Endrin	72-20-8	5.42	<5.42	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.42	18.4	ug/kg dry	
Endrin Ketone	53494-70-5	5.42	<5.42	ug/kg dry	
gamma-BHC	58-89-9	5.42	<5.42	ug/kg dry	
Heptachlor	76-44-8	5.42	<5.42	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.42	<5.42	ug/kg dry	
Methoxychlor	72-43-5	5.42	<5.42	ug/kg dry	
Mirex	2385-85-5	5.42	<5.42	ug/kg dry	
Toxaphene	8001-35-2	108	<108	ug/kg dry	
trans-Chlordane	5103-74-2	5.42	<5.42	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd	
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)	
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07	% Solid:92.22
Matrix: Soil	ELAP: #11693	

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	10.8	<10.8	ug/kg dry	
Aroclor-1221	11104-28-2	10.8	<10.8	ug/kg dry	
Aroclor-1232	11141-16-5	10.8	<10.8	ug/kg dry	
Aroclor-1242	53469-21-9	10.8	<10.8	ug/kg dry	
Aroclor-1248	12672-29-6	10.8	<10.8	ug/kg dry	
Aroclor-1254	11097-69-1	10.8	<10.8	ug/kg dry	
Aroclor-1260	11096-82-5	10.8	<10.8	ug/kg dry	
Aroclor-1262	37324-23-5	10.8	<10.8	ug/kg dry	
Aroclor-1268	11100-14-4	10.8	<10.8	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	71	43.5-123	
Tetrachloro-m-xylene	877-09-8	84	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	100	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:00	Sample ID: SB05 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-07 % Solid:92.22
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/29/2015	EPA 6010 C	89.9	9790	mg/kg dry	3.E
Antimony	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.50	47.5	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.65	<1.65	mg/kg dry	
Calcium	10/29/2015	EPA 6010 C	89.9	40300	mg/kg dry	3.E
Chromium	10/28/2015	EPA 6010 C	1.67	16.6	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.67	6.17	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.67	10.1	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	44.9	12900	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.67	4.84	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.00	3230	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.67	261	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.67	9.27	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.0	1250	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	4.49	303	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.67	18.7	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.67	27.8	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	0.03	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.22	<0.22	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.21	<5.21	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	5.21	<5.21	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	5.21	<5.21	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.21	<5.21	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	5.21	<5.21	ug/kg dry	
1,1-Dichloroethane	75-34-3	5.21	<5.21	ug/kg dry	
1,1-Dichloroethylene	75-35-4	5.21	<5.21	ug/kg dry	
1,1-Dichloropropylene	563-58-6	5.21	<5.21	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	5.21	<5.21	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	5.21	<5.21	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	5.21	<5.21	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	5.21	<5.21	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	5.21	<5.21	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	5.21	<5.21	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	5.21	<5.21	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	5.21	<5.21	ug/kg dry	
1,2-Dichloroethane	107-06-2	5.21	<5.21	ug/kg dry	
1,2-Dichloropropane	78-87-5	5.21	<5.21	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	5.21	<5.21	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	5.21	<5.21	ug/kg dry	
1,3-Dichloropropane	142-28-9	5.21	<5.21	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	5.21	<5.21	ug/kg dry	
1,4-Diethylbenzene	105-05-5	5.21	<5.21	ug/kg dry	2.B
1,4-Dioxane	123-91-1	52.1	<52.1	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	5.21	<5.21	ug/kg dry	
2-Chlorotoluene	95-49-8	5.21	<5.21	ug/kg dry	
4-Chlorotoluene	106-43-4	5.21	<5.21	ug/kg dry	
4-Ethyltoluene	622-96-8	5.21	<5.21	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	5.21	<5.21	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	10.4	<10.4	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	52.1	<52.1	ug/kg dry	4.J
Acrylonitrile	107-13-1	5.21	<5.21	ug/kg dry	
Benzene	71-43-2	5.21	<5.21	ug/kg dry	
Bromobenzene	108-86-1	5.21	<5.21	ug/kg dry	
Bromochloromethane	74-97-5	5.21	<5.21	ug/kg dry	
Bromodichloromethane	75-27-4	5.21	<5.21	ug/kg dry	
Bromoform	75-25-2	5.21	<5.21	ug/kg dry	
Bromomethane	74-83-9	5.21	<5.21	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	5.21	<5.21	ug/kg dry	
Carbon Tetrachloride	56-23-5	5.21	<5.21	ug/kg dry	
Chlorobenzene	108-90-7	5.21	<5.21	ug/kg dry	
Chlorodifluoromethane	75-45-6	5.21	<5.21	ug/kg dry	2.B
Chloroethane	75-00-3	5.21	<5.21	ug/kg dry	
Chloroform	67-66-3	5.21	<5.21	ug/kg dry	
Chloromethane	74-87-3	5.21	<5.21	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	5.21	<5.21	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	5.21	<5.21	ug/kg dry	
Dibromochloromethane	124-48-1	5.21	<5.21	ug/kg dry	
Dibromomethane	74-95-3	5.21	<5.21	ug/kg dry	
Dichlorodifluoromethane	75-71-8	5.21	<5.21	ug/kg dry	
Ethylbenzene	100-41-4	5.21	<5.21	ug/kg dry	
Hexachlorobutadiene	87-68-3	5.21	<5.21	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	5.21	<5.21	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	10.4	<10.4	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	5.21	<5.21	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	10.4	<10.4	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	5.21	<5.21	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	5.21	<5.21	ug/kg dry	
Naphthalene	91-20-3	5.21	<5.21	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	5.21	<5.21	ug/kg dry	
n-Propylbenzene	103-65-1	5.21	<5.21	ug/kg dry	
o-Xylene	95-47-6	5.21	<5.21	ug/kg dry	
sec-Butylbenzene	135-98-8	5.21	<5.21	ug/kg dry	
Styrene	100-42-5	5.21	<5.21	ug/kg dry	
tert-Butyl alcohol	75-65-0	5.21	<5.21	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	5.21	<5.21	ug/kg dry	
Tetrachloroethylene	127-18-4	5.21	<5.21	ug/kg dry	
Toluene	108-88-3	5.21	<5.21	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	5.21	<5.21	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	5.21	<5.21	ug/kg dry	
Trichloroethylene	79-01-6	5.21	<5.21	ug/kg dry	
Trichlorofluoromethane	75-69-4	5.21	<5.21	ug/kg dry	
Vinyl chloride	75-01-4	5.21	<5.21	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	91	74.4-131	
4-Bromofluorobenzene	460-00-4	103	82.3-134	
Dibromofluoromethane	1868-53-7	96	79.4-122	
Toluene-d8	2037-26-5	99	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	90	50-200	
1,4-Difluorobenzene	540-36-3	91	50-200	
Chlorobenzene-d5	3114-55-4	90	50-200	
Pentafluorobenzene	363-72-4	90	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	170	<170	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	170	<170	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	170	<170	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	170	<170	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	170	<170	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	102	<102	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	102	<102	ug/kg dry	
2,4-Dichlorophenol	120-83-2	170	<170	ug/kg dry	
2,4-Dimethylphenol	105-67-9	170	<170	ug/kg dry	
2,4-Dinitrophenol	51-28-5	170	<170	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	170	<170	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	170	<170	ug/kg dry	
2-Chloronaphthalene	91-58-7	170	<170	ug/kg dry	
2-Chlorophenol	95-57-8	170	<170	ug/kg dry	
2-Methylnaphthalene	91-57-6	170	<170	ug/kg dry	
2-Methylphenol	95-48-7	170	<170	ug/kg dry	
2-Nitroaniline	88-74-4	170	<170	ug/kg dry	
2-Nitrophenol	88-75-5	170	<170	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	170	<170	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	170	<170	ug/kg dry	
3-Nitroaniline	99-09-2	170	<170	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	170	<170	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	170	<170	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	170	<170	ug/kg dry	
4-Chloroaniline	106-47-8	170	<170	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	170	<170	ug/kg dry	
4-Nitroaniline	100-01-6	170	<170	ug/kg dry	
4-Nitrophenol	100-02-7	170	<170	ug/kg dry	
Acenaphthene	83-32-9	170	<170	ug/kg dry	
Acenaphthylene	208-96-8	170	<170	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	170	<170	ug/kg dry	
Anthracene	120-12-7	170	<170	ug/kg dry	
Benzidine	92-87-5	170	<170	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	170	<170	ug/kg dry	
Benzo(a)pyrene	50-32-8	170	<170	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	170	<170	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	170	<170	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	170	<170	ug/kg dry	
Benzoic Acid	65-85-0	170	<170	ug/kg dry	
Benzyl alcohol	100-51-6	170	<170	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	170	<170	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	170	<170	ug/kg dry	4.J, 4.N
Bis(2-Ethylhexyl)phthalate	117-81-7	170	<170	ug/kg dry	
Butyl benzyl phthalate	85-68-7	170	184	ug/kg dry	
Carbazole	86-74-8	170	<170	ug/kg dry	
Chrysene	218-01-9	170	<170	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	170	<170	ug/kg dry	
Dibenzofuran	132-64-9	170	<170	ug/kg dry	
Diethyl phthalate	84-66-2	170	<170	ug/kg dry	
Dimethyl phthalate	131-11-3	170	<170	ug/kg dry	
Di-n-butyl phthalate	84-74-2	170	<170	ug/kg dry	
Di-n-octyl phthalate	117-84-0	170	<170	ug/kg dry	
Fluoranthene	206-44-0	170	<170	ug/kg dry	
Fluorene	86-73-7	170	<170	ug/kg dry	
Hexachlorobenzene	118-74-1	170	<170	ug/kg dry	
Hexachlorobutadiene	87-68-3	170	<170	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	170	<170	ug/kg dry	
Hexachloroethane	67-72-1	170	<170	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	170	<170	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	170	<170	ug/kg dry	
Naphthalene	91-20-3	170	<170	ug/kg dry	
Nitrobenzene	98-95-3	170	<170	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	170	<170	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	170	<170	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	170	<170	ug/kg dry	
Parathion (ethyl)	56-38-2	170	<170	ug/kg dry	
Pentachlorophenol	87-86-5	170	<170	ug/kg dry	
Phenanthrene	85-01-8	170	<170	ug/kg dry	
Phenol	108-95-2	170	<170	ug/kg dry	
Pyrene	129-00-0	170	<170	ug/kg dry	
Pyridine	110-86-1	170	<170	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	44	18.04-120.2	
2-Fluorobiphenyl	321-60-8	84	34.39-110.73	
2-Fluorophenol	367-12-4	68	22.98-107.57	
Nitrobenzene-d5	4165-60-0	103	31-118.25	
Phenol-d6	13127-88-3	81	35.55-111.39	
Terphenyl-d14	1718-51-0	89	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	55	50-200	
Acenaphthene-d10	15067-26-2	56	50-200	
Chrysene-d12	1719-03-5	58	50-200	
Naphthalene-d8	1146-65-2	58	50-200	
Perylene-d12	1520-96-3	58	50-200	
Phenanthrene-d10	1517-22-2	57	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.40	<3.40	ug/kg dry	
4,4'-DDE	72-55-9	3.40	<3.40	ug/kg dry	
4,4'-DDT	50-29-3	3.40	<3.40	ug/kg dry	
Aldrin	309-00-2	5.66	<5.66	ug/kg dry	
alpha-BHC	319-84-6	5.66	<5.66	ug/kg dry	
beta-BHC	319-85-7	5.66	<5.66	ug/kg dry	
Chlordane	12789-03-6	17.0	<17.0	ug/kg dry	
cis-Chlordane	5103-71-9	5.66	<5.66	ug/kg dry	
delta-BHC	319-86-8	5.66	<5.66	ug/kg dry	
Dieldrin	60-57-1	5.66	<5.66	ug/kg dry	
Endosulfan I	959-98-8	5.66	<5.66	ug/kg dry	
Endosulfan II	33213-65-9	5.66	<5.66	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.66	<5.66	ug/kg dry	
Endrin	72-20-8	5.66	<5.66	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.66	14.8	ug/kg dry	
Endrin Ketone	53494-70-5	5.66	<5.66	ug/kg dry	
gamma-BHC	58-89-9	5.66	<5.66	ug/kg dry	
Heptachlor	76-44-8	5.66	<5.66	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.66	<5.66	ug/kg dry	
Methoxychlor	72-43-5	5.66	<5.66	ug/kg dry	
Mirex	2385-85-5	5.66	<5.66	ug/kg dry	
Toxaphene	8001-35-2	113	<113	ug/kg dry	
trans-Chlordane	5103-74-2	5.66	<5.66	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08 % Solid:88.27
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	11.3	<11.3	ug/kg dry	
Aroclor-1221	11104-28-2	11.3	<11.3	ug/kg dry	
Aroclor-1232	11141-16-5	11.3	<11.3	ug/kg dry	
Aroclor-1242	53469-21-9	11.3	<11.3	ug/kg dry	
Aroclor-1248	12672-29-6	11.3	<11.3	ug/kg dry	
Aroclor-1254	11097-69-1	11.3	<11.3	ug/kg dry	
Aroclor-1260	11096-82-5	11.3	<11.3	ug/kg dry	
Aroclor-1262	37324-23-5	11.3	<11.3	ug/kg dry	
Aroclor-1268	11100-14-4	11.3	<11.3	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	64	43.5-123	
Tetrachloro-m-xylene	877-09-8	82	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	102	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/02/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd	
Date (Time) Collected: 10/22/2015 13:30	Sample ID: SB06 (0-2)	
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-08	% Solid:88.27
Matrix: Soil	ELAP: #11693	

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	11.6	7590	mg/kg dry	
Antimony	10/28/2015	EPA 6010 C	1.93	<1.93	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.93	<1.93	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.93	42.1	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.93	<1.93	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.93	<1.93	mg/kg dry	
Calcium	10/29/2015	EPA 6010 C	116	38200	mg/kg dry	3.E
Chromium	10/28/2015	EPA 6010 C	1.93	13.3	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.93	4.96	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.93	8.21	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	57.8	11600	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.93	4.49	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.78	3070	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.93	184	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.93	7.68	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	11.6	861	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.93	<1.93	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.93	<1.93	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	5.78	237	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.93	<1.93	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.93	15.5	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.93	25.8	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	0.02	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.23	<0.23	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.66	<5.66	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	5.66	<5.66	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	5.66	<5.66	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.66	<5.66	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	5.66	<5.66	ug/kg dry	
1,1-Dichloroethane	75-34-3	5.66	<5.66	ug/kg dry	
1,1-Dichloroethylene	75-35-4	5.66	<5.66	ug/kg dry	
1,1-Dichloropropylene	563-58-6	5.66	<5.66	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	5.66	<5.66	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	5.66	<5.66	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	5.66	<5.66	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	5.66	<5.66	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	5.66	<5.66	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	5.66	<5.66	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	5.66	<5.66	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	5.66	<5.66	ug/kg dry	
1,2-Dichloroethane	107-06-2	5.66	<5.66	ug/kg dry	
1,2-Dichloropropane	78-87-5	5.66	<5.66	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	5.66	<5.66	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	5.66	<5.66	ug/kg dry	
1,3-Dichloropropane	142-28-9	5.66	<5.66	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	5.66	<5.66	ug/kg dry	
1,4-Diethylbenzene	105-05-5	5.66	<5.66	ug/kg dry	2.B
1,4-Dioxane	123-91-1	56.6	<56.6	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	5.66	<5.66	ug/kg dry	
2-Chlorotoluene	95-49-8	5.66	<5.66	ug/kg dry	
4-Chlorotoluene	106-43-4	5.66	<5.66	ug/kg dry	
4-Ethyltoluene	622-96-8	5.66	<5.66	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	5.66	<5.66	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	11.3	<11.3	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	56.6	<56.6	ug/kg dry	4.J
Acrylonitrile	107-13-1	5.66	<5.66	ug/kg dry	
Benzene	71-43-2	5.66	<5.66	ug/kg dry	
Bromobenzene	108-86-1	5.66	<5.66	ug/kg dry	
Bromochloromethane	74-97-5	5.66	<5.66	ug/kg dry	
Bromodichloromethane	75-27-4	5.66	<5.66	ug/kg dry	
Bromoform	75-25-2	5.66	<5.66	ug/kg dry	
Bromomethane	74-83-9	5.66	<5.66	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	5.66	<5.66	ug/kg dry	
Carbon Tetrachloride	56-23-5	5.66	<5.66	ug/kg dry	
Chlorobenzene	108-90-7	5.66	<5.66	ug/kg dry	
Chlorodifluoromethane	75-45-6	5.66	<5.66	ug/kg dry	2.B
Chloroethane	75-00-3	5.66	<5.66	ug/kg dry	
Chloroform	67-66-3	5.66	<5.66	ug/kg dry	
Chloromethane	74-87-3	5.66	<5.66	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	5.66	<5.66	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	5.66	<5.66	ug/kg dry	
Dibromochloromethane	124-48-1	5.66	<5.66	ug/kg dry	
Dibromomethane	74-95-3	5.66	<5.66	ug/kg dry	
Dichlorodifluoromethane	75-71-8	5.66	<5.66	ug/kg dry	
Ethylbenzene	100-41-4	5.66	<5.66	ug/kg dry	
Hexachlorobutadiene	87-68-3	5.66	<5.66	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	5.66	<5.66	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	11.3	<11.3	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	5.66	<5.66	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	11.3	<11.3	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	5.66	<5.66	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	5.66	<5.66	ug/kg dry	
Naphthalene	91-20-3	5.66	<5.66	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	5.66	<5.66	ug/kg dry	
n-Propylbenzene	103-65-1	5.66	<5.66	ug/kg dry	
o-Xylene	95-47-6	5.66	<5.66	ug/kg dry	
sec-Butylbenzene	135-98-8	5.66	<5.66	ug/kg dry	
Styrene	100-42-5	5.66	<5.66	ug/kg dry	
tert-Butyl alcohol	75-65-0	5.66	<5.66	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	5.66	<5.66	ug/kg dry	
Tetrachloroethylene	127-18-4	5.66	<5.66	ug/kg dry	
Toluene	108-88-3	5.66	<5.66	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	5.66	<5.66	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	5.66	<5.66	ug/kg dry	
Trichloroethylene	79-01-6	5.66	<5.66	ug/kg dry	
Trichlorofluoromethane	75-69-4	5.66	<5.66	ug/kg dry	
Vinyl chloride	75-01-4	5.66	<5.66	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	96	74.4-131	
4-Bromofluorobenzene	460-00-4	105	82.3-134	
Dibromofluoromethane	1868-53-7	100	79.4-122	
Toluene-d8	2037-26-5	99	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	84	50-200	
1,4-Difluorobenzene	540-36-3	87	50-200	
Chlorobenzene-d5	3114-55-4	87	50-200	
Pentafluorobenzene	363-72-4	87	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	191	<191	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	191	<191	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	191	<191	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	191	<191	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	191	<191	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	114	<114	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	114	<114	ug/kg dry	
2,4-Dichlorophenol	120-83-2	191	<191	ug/kg dry	
2,4-Dimethylphenol	105-67-9	191	<191	ug/kg dry	
2,4-Dinitrophenol	51-28-5	191	<191	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	191	<191	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	191	<191	ug/kg dry	
2-Chloronaphthalene	91-58-7	191	<191	ug/kg dry	
2-Chlorophenol	95-57-8	191	<191	ug/kg dry	
2-Methylnaphthalene	91-57-6	191	<191	ug/kg dry	
2-Methylphenol	95-48-7	191	<191	ug/kg dry	
2-Nitroaniline	88-74-4	191	<191	ug/kg dry	
2-Nitrophenol	88-75-5	191	<191	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	191	<191	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	191	<191	ug/kg dry	
3-Nitroaniline	99-09-2	191	<191	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	191	<191	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	191	<191	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	191	<191	ug/kg dry	
4-Chloroaniline	106-47-8	191	<191	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	191	<191	ug/kg dry	
4-Nitroaniline	100-01-6	191	<191	ug/kg dry	
4-Nitrophenol	100-02-7	191	<191	ug/kg dry	
Acenaphthene	83-32-9	191	<191	ug/kg dry	
Acenaphthylene	208-96-8	191	<191	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	191	<191	ug/kg dry	
Anthracene	120-12-7	191	<191	ug/kg dry	
Benzidine	92-87-5	191	<191	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	191	<191	ug/kg dry	
Benzo(a)pyrene	50-32-8	191	<191	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	191	<191	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	191	<191	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	191	<191	ug/kg dry	
Benzoic Acid	65-85-0	191	<191	ug/kg dry	
Benzyl alcohol	100-51-6	191	<191	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	191	<191	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	191	<191	ug/kg dry	4.J, 4.N
Bis(2-Ethylhexyl)phthalate	117-81-7	191	<191	ug/kg dry	
Butyl benzyl phthalate	85-68-7	191	<191	ug/kg dry	
Carbazole	86-74-8	191	<191	ug/kg dry	
Chrysene	218-01-9	191	<191	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	191	<191	ug/kg dry	
Dibenzofuran	132-64-9	191	<191	ug/kg dry	
Diethyl phthalate	84-66-2	191	<191	ug/kg dry	
Dimethyl phthalate	131-11-3	191	<191	ug/kg dry	
Di-n-butyl phthalate	84-74-2	191	<191	ug/kg dry	
Di-n-octyl phthalate	117-84-0	191	<191	ug/kg dry	
Fluoranthene	206-44-0	191	<191	ug/kg dry	
Fluorene	86-73-7	191	<191	ug/kg dry	
Hexachlorobenzene	118-74-1	191	<191	ug/kg dry	
Hexachlorobutadiene	87-68-3	191	<191	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	191	<191	ug/kg dry	
Hexachloroethane	67-72-1	191	<191	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	191	<191	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	191	<191	ug/kg dry	
Naphthalene	91-20-3	191	<191	ug/kg dry	
Nitrobenzene	98-95-3	191	<191	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	191	<191	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	191	<191	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	191	<191	ug/kg dry	
Parathion (ethyl)	56-38-2	191	<191	ug/kg dry	
Pentachlorophenol	87-86-5	191	<191	ug/kg dry	
Phenanthrene	85-01-8	191	<191	ug/kg dry	
Phenol	108-95-2	191	<191	ug/kg dry	
Pyrene	129-00-0	191	<191	ug/kg dry	
Pyridine	110-86-1	191	<191	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	108	18.04-120.2	
2-Fluorobiphenyl	321-60-8	95	34.39-110.73	
2-Fluorophenol	367-12-4	88	22.98-107.57	
Nitrobenzene-d5	4165-60-0	111	31-118.25	
Phenol-d6	13127-88-3	90	35.55-111.39	
Terphenyl-d14	1718-51-0	98	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	56	50-200	
Acenaphthene-d10	15067-26-2	58	50-200	
Chrysene-d12	1719-03-5	60	50-200	
Naphthalene-d8	1146-65-2	57	50-200	
Perylene-d12	1520-96-3	60	50-200	
Phenanthrene-d10	1517-22-2	58	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.81	<3.81	ug/kg dry	
4,4'-DDE	72-55-9	3.81	<3.81	ug/kg dry	
4,4'-DDT	50-29-3	3.81	<3.81	ug/kg dry	
Aldrin	309-00-2	6.36	<6.36	ug/kg dry	
alpha-BHC	319-84-6	6.36	<6.36	ug/kg dry	
beta-BHC	319-85-7	6.36	<6.36	ug/kg dry	
Chlordane	12789-03-6	19.1	<19.1	ug/kg dry	
cis-Chlordane	5103-71-9	6.36	<6.36	ug/kg dry	
delta-BHC	319-86-8	6.36	<6.36	ug/kg dry	
Dieldrin	60-57-1	6.36	<6.36	ug/kg dry	
Endosulfan I	959-98-8	6.36	<6.36	ug/kg dry	
Endosulfan II	33213-65-9	6.36	<6.36	ug/kg dry	
Endosulfan Sulfate	1031-07-8	6.36	<6.36	ug/kg dry	
Endrin	72-20-8	6.36	<6.36	ug/kg dry	
Endrin Aldehyde	7421-93-4	6.36	<6.36	ug/kg dry	
Endrin Ketone	53494-70-5	6.36	<6.36	ug/kg dry	
gamma-BHC	58-89-9	6.36	<6.36	ug/kg dry	
Heptachlor	76-44-8	6.36	<6.36	ug/kg dry	
Heptachlor Epoxide	1024-57-3	6.36	<6.36	ug/kg dry	
Methoxychlor	72-43-5	6.36	<6.36	ug/kg dry	
Mirex	2385-85-5	6.36	<6.36	ug/kg dry	
Toxaphene	8001-35-2	127	<127	ug/kg dry	
trans-Chlordane	5103-74-2	6.36	<6.36	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	12.7	<12.7	ug/kg dry	
Aroclor-1221	11104-28-2	12.7	<12.7	ug/kg dry	
Aroclor-1232	11141-16-5	12.7	<12.7	ug/kg dry	
Aroclor-1242	53469-21-9	12.7	<12.7	ug/kg dry	
Aroclor-1248	12672-29-6	12.7	<12.7	ug/kg dry	
Aroclor-1254	11097-69-1	12.7	<12.7	ug/kg dry	
Aroclor-1260	11096-82-5	12.7	<12.7	ug/kg dry	
Aroclor-1262	37324-23-5	12.7	<12.7	ug/kg dry	
Aroclor-1268	11100-14-4	12.7	<12.7	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	101	43.5-123	
Tetrachloro-m-xylene	877-09-8	100	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	101	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:40	Sample ID: SB07 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-09 % Solid:78.65
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/29/2015	EPA 6010 C	121	6970	mg/kg dry	3.E
Antimony	10/28/2015	EPA 6010 C	2.02	<2.02	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	2.02	2.80	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	2.02	57.1	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	2.02	<2.02	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	2.02	<2.02	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	12.1	2610	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	2.02	24.9	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	2.02	9.44	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	2.02	19.1	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	60.4	10100	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	2.02	14.2	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	6.04	3280	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	2.02	229	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	2.02	14.3	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	12.1	1610	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	2.02	<2.02	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	2.02	<2.02	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	6.04	630	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	2.02	<2.02	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	2.02	28.3	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	2.02	45.9	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	0.13	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.25	<0.25	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	4.74	<4.74	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	4.74	<4.74	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	4.74	<4.74	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	4.74	<4.74	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	4.74	<4.74	ug/kg dry	
1,1-Dichloroethane	75-34-3	4.74	<4.74	ug/kg dry	
1,1-Dichloroethylene	75-35-4	4.74	<4.74	ug/kg dry	
1,1-Dichloropropylene	563-58-6	4.74	<4.74	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	4.74	<4.74	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	4.74	<4.74	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	4.74	<4.74	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	4.74	<4.74	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	4.74	<4.74	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	4.74	<4.74	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	4.74	<4.74	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	4.74	<4.74	ug/kg dry	
1,2-Dichloroethane	107-06-2	4.74	<4.74	ug/kg dry	
1,2-Dichloropropane	78-87-5	4.74	<4.74	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	4.74	<4.74	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	4.74	<4.74	ug/kg dry	
1,3-Dichloropropane	142-28-9	4.74	<4.74	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	4.74	<4.74	ug/kg dry	
1,4-Diethylbenzene	105-05-5	4.74	<4.74	ug/kg dry	2.B
1,4-Dioxane	123-91-1	47.4	<47.4	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	4.74	<4.74	ug/kg dry	
2-Chlorotoluene	95-49-8	4.74	<4.74	ug/kg dry	
4-Chlorotoluene	106-43-4	4.74	<4.74	ug/kg dry	
4-Ethyltoluene	622-96-8	4.74	<4.74	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	4.74	<4.74	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	9.48	<9.48	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	47.4	<47.4	ug/kg dry	4.J
Acrylonitrile	107-13-1	4.74	<4.74	ug/kg dry	
Benzene	71-43-2	4.74	<4.74	ug/kg dry	
Bromobenzene	108-86-1	4.74	<4.74	ug/kg dry	
Bromochloromethane	74-97-5	4.74	<4.74	ug/kg dry	
Bromodichloromethane	75-27-4	4.74	<4.74	ug/kg dry	
Bromoform	75-25-2	4.74	<4.74	ug/kg dry	
Bromomethane	74-83-9	4.74	<4.74	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	4.74	<4.74	ug/kg dry	
Carbon Tetrachloride	56-23-5	4.74	<4.74	ug/kg dry	
Chlorobenzene	108-90-7	4.74	<4.74	ug/kg dry	
Chlorodifluoromethane	75-45-6	4.74	<4.74	ug/kg dry	2.B
Chloroethane	75-00-3	4.74	<4.74	ug/kg dry	
Chloroform	67-66-3	4.74	<4.74	ug/kg dry	
Chloromethane	74-87-3	4.74	<4.74	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	4.74	<4.74	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	4.74	<4.74	ug/kg dry	
Dibromochloromethane	124-48-1	4.74	<4.74	ug/kg dry	
Dibromomethane	74-95-3	4.74	<4.74	ug/kg dry	
Dichlorodifluoromethane	75-71-8	4.74	<4.74	ug/kg dry	
Ethylbenzene	100-41-4	4.74	<4.74	ug/kg dry	
Hexachlorobutadiene	87-68-3	4.74	<4.74	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	4.74	<4.74	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	9.48	<9.48	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	4.74	<4.74	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	9.48	<9.48	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	4.74	<4.74	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	4.74	<4.74	ug/kg dry	
Naphthalene	91-20-3	4.74	<4.74	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	4.74	<4.74	ug/kg dry	
n-Propylbenzene	103-65-1	4.74	<4.74	ug/kg dry	
o-Xylene	95-47-6	4.74	<4.74	ug/kg dry	
sec-Butylbenzene	135-98-8	4.74	<4.74	ug/kg dry	
Styrene	100-42-5	4.74	<4.74	ug/kg dry	
tert-Butyl alcohol	75-65-0	4.74	<4.74	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	4.74	<4.74	ug/kg dry	
Tetrachloroethylene	127-18-4	4.74	<4.74	ug/kg dry	
Toluene	108-88-3	4.74	<4.74	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	4.74	<4.74	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	4.74	<4.74	ug/kg dry	
Trichloroethylene	79-01-6	4.74	<4.74	ug/kg dry	
Trichlorofluoromethane	75-69-4	4.74	<4.74	ug/kg dry	
Vinyl chloride	75-01-4	4.74	<4.74	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	90	74.4-131	
4-Bromofluorobenzene	460-00-4	106	82.3-134	
Dibromofluoromethane	1868-53-7	101	79.4-122	
Toluene-d8	2037-26-5	99	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	98	50-200	
1,4-Difluorobenzene	540-36-3	101	50-200	
Chlorobenzene-d5	3114-55-4	101	50-200	
Pentafluorobenzene	363-72-4	98	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	165	<165	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	165	<165	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	165	<165	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	165	<165	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	165	<165	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	99.0	<99.0	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	99.0	<99.0	ug/kg dry	
2,4-Dichlorophenol	120-83-2	165	<165	ug/kg dry	
2,4-Dimethylphenol	105-67-9	165	<165	ug/kg dry	
2,4-Dinitrophenol	51-28-5	165	<165	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	165	<165	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	165	<165	ug/kg dry	
2-Chloronaphthalene	91-58-7	165	<165	ug/kg dry	
2-Chlorophenol	95-57-8	165	<165	ug/kg dry	
2-Methylnaphthalene	91-57-6	165	<165	ug/kg dry	
2-Methylphenol	95-48-7	165	<165	ug/kg dry	
2-Nitroaniline	88-74-4	165	<165	ug/kg dry	
2-Nitrophenol	88-75-5	165	<165	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	165	<165	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	165	<165	ug/kg dry	
3-Nitroaniline	99-09-2	165	<165	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	165	<165	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	165	<165	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	165	<165	ug/kg dry	
4-Chloroaniline	106-47-8	165	<165	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	165	<165	ug/kg dry	
4-Nitroaniline	100-01-6	165	<165	ug/kg dry	
4-Nitrophenol	100-02-7	165	<165	ug/kg dry	
Acenaphthene	83-32-9	165	<165	ug/kg dry	
Acenaphthylene	208-96-8	165	<165	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	165	<165	ug/kg dry	
Anthracene	120-12-7	165	<165	ug/kg dry	
Benzidine	92-87-5	165	<165	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	165	<165	ug/kg dry	
Benzo(a)pyrene	50-32-8	165	<165	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	165	<165	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	165	<165	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	165	<165	ug/kg dry	
Benzoic Acid	65-85-0	165	<165	ug/kg dry	
Benzyl alcohol	100-51-6	165	<165	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	165	<165	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	165	<165	ug/kg dry	4.J, 4.N
Bis(2-Ethylhexyl)phthalate	117-81-7	165	<165	ug/kg dry	
Butyl benzyl phthalate	85-68-7	165	<165	ug/kg dry	
Carbazole	86-74-8	165	<165	ug/kg dry	
Chrysene	218-01-9	165	<165	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	165	<165	ug/kg dry	
Dibenzofuran	132-64-9	165	<165	ug/kg dry	
Diethyl phthalate	84-66-2	165	<165	ug/kg dry	
Dimethyl phthalate	131-11-3	165	<165	ug/kg dry	
Di-n-butyl phthalate	84-74-2	165	<165	ug/kg dry	
Di-n-octyl phthalate	117-84-0	165	<165	ug/kg dry	
Fluoranthene	206-44-0	165	<165	ug/kg dry	
Fluorene	86-73-7	165	<165	ug/kg dry	
Hexachlorobenzene	118-74-1	165	<165	ug/kg dry	
Hexachlorobutadiene	87-68-3	165	<165	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	165	<165	ug/kg dry	
Hexachloroethane	67-72-1	165	<165	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	165	<165	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	165	<165	ug/kg dry	
Naphthalene	91-20-3	165	<165	ug/kg dry	
Nitrobenzene	98-95-3	165	<165	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	165	<165	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	165	<165	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	165	<165	ug/kg dry	
Parathion (ethyl)	56-38-2	165	<165	ug/kg dry	
Pentachlorophenol	87-86-5	165	<165	ug/kg dry	
Phenanthrene	85-01-8	165	<165	ug/kg dry	
Phenol	108-95-2	165	<165	ug/kg dry	
Pyrene	129-00-0	165	<165	ug/kg dry	
Pyridine	110-86-1	165	<165	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	103	18.04-120.2	
2-Fluorobiphenyl	321-60-8	89	34.39-110.73	
2-Fluorophenol	367-12-4	85	22.98-107.57	
Nitrobenzene-d5	4165-60-0	108	31-118.25	
Phenol-d6	13127-88-3	89	35.55-111.39	
Terphenyl-d14	1718-51-0	97	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	55	50-200	
Acenaphthene-d10	15067-26-2	59	50-200	
Chrysene-d12	1719-03-5	60	50-200	
Naphthalene-d8	1146-65-2	58	50-200	
Perylene-d12	1520-96-3	59	50-200	
Phenanthrene-d10	1517-22-2	57	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.30	<3.30	ug/kg dry	
4,4'-DDE	72-55-9	3.30	<3.30	ug/kg dry	
4,4'-DDT	50-29-3	3.30	<3.30	ug/kg dry	
Aldrin	309-00-2	5.50	<5.50	ug/kg dry	
alpha-BHC	319-84-6	5.50	<5.50	ug/kg dry	
beta-BHC	319-85-7	5.50	<5.50	ug/kg dry	
Chlordane	12789-03-6	16.5	<16.5	ug/kg dry	
cis-Chlordane	5103-71-9	5.50	<5.50	ug/kg dry	
delta-BHC	319-86-8	5.50	<5.50	ug/kg dry	
Dieldrin	60-57-1	5.50	<5.50	ug/kg dry	
Endosulfan I	959-98-8	5.50	<5.50	ug/kg dry	
Endosulfan II	33213-65-9	5.50	<5.50	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.50	<5.50	ug/kg dry	
Endrin	72-20-8	5.50	<5.50	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.50	<5.50	ug/kg dry	
Endrin Ketone	53494-70-5	5.50	<5.50	ug/kg dry	
gamma-BHC	58-89-9	5.50	<5.50	ug/kg dry	
Heptachlor	76-44-8	5.50	<5.50	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.50	<5.50	ug/kg dry	
Methoxychlor	72-43-5	5.50	<5.50	ug/kg dry	
Mirex	2385-85-5	5.50	<5.50	ug/kg dry	
Toxaphene	8001-35-2	110	<110	ug/kg dry	
trans-Chlordane	5103-74-2	5.50	<5.50	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	11.0	<11.0	ug/kg dry	
Aroclor-1221	11104-28-2	11.0	<11.0	ug/kg dry	
Aroclor-1232	11141-16-5	11.0	<11.0	ug/kg dry	
Aroclor-1242	53469-21-9	11.0	<11.0	ug/kg dry	
Aroclor-1248	12672-29-6	11.0	<11.0	ug/kg dry	
Aroclor-1254	11097-69-1	11.0	<11.0	ug/kg dry	
Aroclor-1260	11096-82-5	11.0	<11.0	ug/kg dry	
Aroclor-1262	37324-23-5	11.0	<11.0	ug/kg dry	
Aroclor-1268	11100-14-4	11.0	<11.0	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	96	43.5-123	
Tetrachloro-m-xylene	877-09-8	97	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	103	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 13:50	Sample ID: SB07 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-10 % Solid:90.93
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	10.2	4060	mg/kg dry	
Antimony	10/28/2015	EPA 6010 C	1.71	<1.71	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.71	<1.71	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.71	35.5	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.71	<1.71	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.71	<1.71	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.2	957	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.71	14.5	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.71	5.49	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.71	8.26	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	51.2	11500	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.71	2.58	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.12	1550	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.71	246	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.71	9.93	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.2	602	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.71	<1.71	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.71	<1.71	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	5.12	67.1	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.71	<1.71	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.71	19.6	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.71	20.0	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	<0.02	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.22	<0.22	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	8.21	<8.21	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	8.21	<8.21	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	8.21	<8.21	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	8.21	<8.21	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	8.21	<8.21	ug/kg dry	
1,1-Dichloroethane	75-34-3	8.21	<8.21	ug/kg dry	
1,1-Dichloroethylene	75-35-4	8.21	<8.21	ug/kg dry	
1,1-Dichloropropylene	563-58-6	8.21	<8.21	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	8.21	<8.21	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	8.21	<8.21	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	8.21	<8.21	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	8.21	<8.21	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	8.21	<8.21	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	8.21	<8.21	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	8.21	<8.21	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	8.21	<8.21	ug/kg dry	
1,2-Dichloroethane	107-06-2	8.21	<8.21	ug/kg dry	
1,2-Dichloropropane	78-87-5	8.21	<8.21	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	8.21	<8.21	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	8.21	<8.21	ug/kg dry	
1,3-Dichloropropane	142-28-9	8.21	<8.21	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	8.21	<8.21	ug/kg dry	
1,4-Diethylbenzene	105-05-5	8.21	<8.21	ug/kg dry	2.B
1,4-Dioxane	123-91-1	82.1	<82.1	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	8.21	<8.21	ug/kg dry	
2-Chlorotoluene	95-49-8	8.21	<8.21	ug/kg dry	
4-Chlorotoluene	106-43-4	8.21	<8.21	ug/kg dry	
4-Ethyltoluene	622-96-8	8.21	<8.21	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	8.21	<8.21	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	16.4	<16.4	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	82.1	<82.1	ug/kg dry	4.J
Acrylonitrile	107-13-1	8.21	<8.21	ug/kg dry	
Benzene	71-43-2	8.21	<8.21	ug/kg dry	
Bromobenzene	108-86-1	8.21	<8.21	ug/kg dry	
Bromochloromethane	74-97-5	8.21	<8.21	ug/kg dry	
Bromodichloromethane	75-27-4	8.21	<8.21	ug/kg dry	
Bromoform	75-25-2	8.21	<8.21	ug/kg dry	
Bromomethane	74-83-9	8.21	<8.21	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	8.21	<8.21	ug/kg dry	
Carbon Tetrachloride	56-23-5	8.21	<8.21	ug/kg dry	
Chlorobenzene	108-90-7	8.21	<8.21	ug/kg dry	
Chlorodifluoromethane	75-45-6	8.21	<8.21	ug/kg dry	2.B
Chloroethane	75-00-3	8.21	<8.21	ug/kg dry	
Chloroform	67-66-3	8.21	<8.21	ug/kg dry	
Chloromethane	74-87-3	8.21	<8.21	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	8.21	<8.21	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	8.21	<8.21	ug/kg dry	
Dibromochloromethane	124-48-1	8.21	<8.21	ug/kg dry	
Dibromomethane	74-95-3	8.21	<8.21	ug/kg dry	
Dichlorodifluoromethane	75-71-8	8.21	<8.21	ug/kg dry	
Ethylbenzene	100-41-4	8.21	<8.21	ug/kg dry	
Hexachlorobutadiene	87-68-3	8.21	<8.21	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	8.21	<8.21	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	16.4	<16.4	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	8.21	<8.21	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	16.4	<16.4	ug/kg dry	4.N, 4.J
Methylene Chloride	75-09-2	8.21	<8.21	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	8.21	<8.21	ug/kg dry	
Naphthalene	91-20-3	8.21	<8.21	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	8.21	<8.21	ug/kg dry	
n-Propylbenzene	103-65-1	8.21	<8.21	ug/kg dry	
o-Xylene	95-47-6	8.21	<8.21	ug/kg dry	
sec-Butylbenzene	135-98-8	8.21	<8.21	ug/kg dry	
Styrene	100-42-5	8.21	<8.21	ug/kg dry	
tert-Butyl alcohol	75-65-0	8.21	<8.21	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	8.21	<8.21	ug/kg dry	
Tetrachloroethylene	127-18-4	8.21	<8.21	ug/kg dry	
Toluene	108-88-3	8.21	<8.21	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	8.21	<8.21	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	8.21	<8.21	ug/kg dry	
Trichloroethylene	79-01-6	8.21	<8.21	ug/kg dry	
Trichlorofluoromethane	75-69-4	8.21	<8.21	ug/kg dry	
Vinyl chloride	75-01-4	8.21	<8.21	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	96	74.4-131	
4-Bromofluorobenzene	460-00-4	103	82.3-134	
Dibromofluoromethane	1868-53-7	98	79.4-122	
Toluene-d8	2037-26-5	100	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	78	50-200	
1,4-Difluorobenzene	540-36-3	80	50-200	
Chlorobenzene-d5	3114-55-4	80	50-200	
Pentafluorobenzene	363-72-4	81	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	186	<186	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	186	<186	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	186	<186	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	186	<186	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	186	<186	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	111	<111	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	111	<111	ug/kg dry	
2,4-Dichlorophenol	120-83-2	186	<186	ug/kg dry	
2,4-Dimethylphenol	105-67-9	186	<186	ug/kg dry	
2,4-Dinitrophenol	51-28-5	186	<186	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	186	<186	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	186	<186	ug/kg dry	
2-Chloronaphthalene	91-58-7	186	<186	ug/kg dry	
2-Chlorophenol	95-57-8	186	<186	ug/kg dry	
2-Methylnaphthalene	91-57-6	186	<186	ug/kg dry	
2-Methylphenol	95-48-7	186	<186	ug/kg dry	
2-Nitroaniline	88-74-4	186	<186	ug/kg dry	
2-Nitrophenol	88-75-5	186	<186	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	186	<186	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	186	<186	ug/kg dry	
3-Nitroaniline	99-09-2	186	<186	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	186	<186	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	186	<186	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	186	<186	ug/kg dry	
4-Chloroaniline	106-47-8	186	<186	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	186	<186	ug/kg dry	
4-Nitroaniline	100-01-6	186	<186	ug/kg dry	
4-Nitrophenol	100-02-7	186	<186	ug/kg dry	
Acenaphthene	83-32-9	186	<186	ug/kg dry	
Acenaphthylene	208-96-8	186	<186	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	186	<186	ug/kg dry	
Anthracene	120-12-7	186	<186	ug/kg dry	
Benzidine	92-87-5	186	<186	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	186	<186	ug/kg dry	
Benzo(a)pyrene	50-32-8	186	<186	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	186	<186	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	186	<186	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	186	<186	ug/kg dry	
Benzoic Acid	65-85-0	186	<186	ug/kg dry	
Benzyl alcohol	100-51-6	186	<186	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	186	<186	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	186	<186	ug/kg dry	4.J, 4.N
Bis(2-Ethylhexyl)phthalate	117-81-7	186	<186	ug/kg dry	
Butyl benzyl phthalate	85-68-7	186	<186	ug/kg dry	
Carbazole	86-74-8	186	<186	ug/kg dry	
Chrysene	218-01-9	186	<186	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	186	<186	ug/kg dry	
Dibenzofuran	132-64-9	186	<186	ug/kg dry	
Diethyl phthalate	84-66-2	186	<186	ug/kg dry	
Dimethyl phthalate	131-11-3	186	<186	ug/kg dry	
Di-n-butyl phthalate	84-74-2	186	<186	ug/kg dry	
Di-n-octyl phthalate	117-84-0	186	<186	ug/kg dry	
Fluoranthene	206-44-0	186	<186	ug/kg dry	
Fluorene	86-73-7	186	<186	ug/kg dry	
Hexachlorobenzene	118-74-1	186	<186	ug/kg dry	
Hexachlorobutadiene	87-68-3	186	<186	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	186	<186	ug/kg dry	
Hexachloroethane	67-72-1	186	<186	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	186	<186	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	186	<186	ug/kg dry	
Naphthalene	91-20-3	186	<186	ug/kg dry	
Nitrobenzene	98-95-3	186	<186	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	186	<186	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	186	<186	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	186	<186	ug/kg dry	
Parathion (ethyl)	56-38-2	186	<186	ug/kg dry	
Pentachlorophenol	87-86-5	186	<186	ug/kg dry	
Phenanthrene	85-01-8	186	<186	ug/kg dry	
Phenol	108-95-2	186	<186	ug/kg dry	
Pyrene	129-00-0	186	<186	ug/kg dry	
Pyridine	110-86-1	186	<186	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	63	18.04-120.2	
2-Fluorobiphenyl	321-60-8	55	34.39-110.73	
2-Fluorophenol	367-12-4	55	22.98-107.57	
Nitrobenzene-d5	4165-60-0	69	31-118.25	
Phenol-d6	13127-88-3	56	35.55-111.39	
Terphenyl-d14	1718-51-0	59	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	53	50-200	
Acenaphthene-d10	15067-26-2	58	50-200	
Chrysene-d12	1719-03-5	58	50-200	
Naphthalene-d8	1146-65-2	56	50-200	
Perylene-d12	1520-96-3	59	50-200	
Phenanthrene-d10	1517-22-2	57	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.72	<3.72	ug/kg dry	
4,4'-DDE	72-55-9	3.72	<3.72	ug/kg dry	
4,4'-DDT	50-29-3	3.72	<3.72	ug/kg dry	
Aldrin	309-00-2	6.19	<6.19	ug/kg dry	
alpha-BHC	319-84-6	6.19	<6.19	ug/kg dry	
beta-BHC	319-85-7	6.19	<6.19	ug/kg dry	
Chlordane	12789-03-6	18.6	<18.6	ug/kg dry	
cis-Chlordane	5103-71-9	6.19	<6.19	ug/kg dry	
delta-BHC	319-86-8	6.19	<6.19	ug/kg dry	
Dieldrin	60-57-1	6.19	<6.19	ug/kg dry	
Endosulfan I	959-98-8	6.19	<6.19	ug/kg dry	
Endosulfan II	33213-65-9	6.19	<6.19	ug/kg dry	
Endosulfan Sulfate	1031-07-8	6.19	<6.19	ug/kg dry	
Endrin	72-20-8	6.19	<6.19	ug/kg dry	
Endrin Aldehyde	7421-93-4	6.19	<6.19	ug/kg dry	
Endrin Ketone	53494-70-5	6.19	<6.19	ug/kg dry	
gamma-BHC	58-89-9	6.19	<6.19	ug/kg dry	
Heptachlor	76-44-8	6.19	<6.19	ug/kg dry	
Heptachlor Epoxide	1024-57-3	6.19	<6.19	ug/kg dry	
Methoxychlor	72-43-5	6.19	<6.19	ug/kg dry	
Mirex	2385-85-5	6.19	<6.19	ug/kg dry	
Toxaphene	8001-35-2	124	<124	ug/kg dry	
trans-Chlordane	5103-74-2	6.19	<6.19	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	12.4	<12.4	ug/kg dry	
Aroclor-1221	11104-28-2	12.4	<12.4	ug/kg dry	
Aroclor-1232	11141-16-5	12.4	<12.4	ug/kg dry	
Aroclor-1242	53469-21-9	12.4	<12.4	ug/kg dry	
Aroclor-1248	12672-29-6	12.4	<12.4	ug/kg dry	
Aroclor-1254	11097-69-1	12.4	<12.4	ug/kg dry	
Aroclor-1260	11096-82-5	12.4	<12.4	ug/kg dry	
Aroclor-1262	37324-23-5	12.4	<12.4	ug/kg dry	
Aroclor-1268	11100-14-4	12.4	<12.4	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	110	43.5-123	
Tetrachloro-m-xylene	877-09-8	107	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	95	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:00	Sample ID: SB08 (0-2)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-11 % Solid:80.74
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/29/2015	EPA 6010 C	119	15400	mg/kg dry	3.E
Antimony	10/28/2015	EPA 6010 C	1.99	<1.99	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.99	<1.99	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.99	51.4	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.99	<1.99	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.99	<1.99	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	11.9	1980	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.99	23.1	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.99	6.71	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.99	13.6	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	59.5	19000	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.99	7.78	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.95	3150	mg/kg dry	
Manganese	10/28/2015	EPA 6010 C	1.99	78.0	mg/kg dry	
Nickel	10/28/2015	EPA 6010 C	1.99	11.9	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	11.9	986	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.99	<1.99	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.99	<1.99	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	5.95	279	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.99	<1.99	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.99	22.9	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.99	37.2	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	<0.02	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.25	<0.25	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12 % Solid:94.28
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	8.58	<8.58	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	8.58	<8.58	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	8.58	<8.58	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	8.58	<8.58	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	8.58	<8.58	ug/kg dry	
1,1-Dichloroethane	75-34-3	8.58	<8.58	ug/kg dry	
1,1-Dichloroethylene	75-35-4	8.58	<8.58	ug/kg dry	
1,1-Dichloropropylene	563-58-6	8.58	<8.58	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	8.58	<8.58	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	8.58	<8.58	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	8.58	<8.58	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	8.58	<8.58	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	8.58	<8.58	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	8.58	<8.58	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	8.58	<8.58	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	8.58	<8.58	ug/kg dry	
1,2-Dichloroethane	107-06-2	8.58	<8.58	ug/kg dry	
1,2-Dichloropropane	78-87-5	8.58	<8.58	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	8.58	<8.58	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	8.58	<8.58	ug/kg dry	
1,3-Dichloropropane	142-28-9	8.58	<8.58	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	8.58	<8.58	ug/kg dry	
1,4-Diethylbenzene	105-05-5	8.58	<8.58	ug/kg dry	2.B
1,4-Dioxane	123-91-1	85.8	<85.8	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	8.58	<8.58	ug/kg dry	
2-Chlorotoluene	95-49-8	8.58	<8.58	ug/kg dry	
4-Chlorotoluene	106-43-4	8.58	<8.58	ug/kg dry	
4-Ethyltoluene	622-96-8	8.58	<8.58	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	8.58	<8.58	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	17.2	<17.2	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12 % Solid:94.28
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	85.8	<85.8	ug/kg dry	4.J
Acrylonitrile	107-13-1	8.58	<8.58	ug/kg dry	
Benzene	71-43-2	8.58	<8.58	ug/kg dry	
Bromobenzene	108-86-1	8.58	<8.58	ug/kg dry	
Bromochloromethane	74-97-5	8.58	<8.58	ug/kg dry	
Bromodichloromethane	75-27-4	8.58	<8.58	ug/kg dry	
Bromoform	75-25-2	8.58	<8.58	ug/kg dry	
Bromomethane	74-83-9	8.58	<8.58	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	8.58	<8.58	ug/kg dry	
Carbon Tetrachloride	56-23-5	8.58	<8.58	ug/kg dry	
Chlorobenzene	108-90-7	8.58	<8.58	ug/kg dry	
Chlorodifluoromethane	75-45-6	8.58	<8.58	ug/kg dry	2.B
Chloroethane	75-00-3	8.58	<8.58	ug/kg dry	
Chloroform	67-66-3	8.58	<8.58	ug/kg dry	
Chloromethane	74-87-3	8.58	<8.58	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	8.58	<8.58	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	8.58	<8.58	ug/kg dry	
Dibromochloromethane	124-48-1	8.58	<8.58	ug/kg dry	
Dibromomethane	74-95-3	8.58	<8.58	ug/kg dry	
Dichlorodifluoromethane	75-71-8	8.58	<8.58	ug/kg dry	
Ethylbenzene	100-41-4	8.58	<8.58	ug/kg dry	
Hexachlorobutadiene	87-68-3	8.58	<8.58	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	8.58	<8.58	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	17.2	<17.2	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	8.58	<8.58	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	17.2	<17.2	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	8.58	<8.58	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	8.58	<8.58	ug/kg dry	
Naphthalene	91-20-3	8.58	<8.58	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12 % Solid:94.28
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	8.58	<8.58	ug/kg dry	
n-Propylbenzene	103-65-1	8.58	<8.58	ug/kg dry	
o-Xylene	95-47-6	8.58	<8.58	ug/kg dry	
sec-Butylbenzene	135-98-8	8.58	<8.58	ug/kg dry	
Styrene	100-42-5	8.58	<8.58	ug/kg dry	
tert-Butyl alcohol	75-65-0	8.58	<8.58	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	8.58	<8.58	ug/kg dry	
Tetrachloroethylene	127-18-4	8.58	<8.58	ug/kg dry	
Toluene	108-88-3	8.58	<8.58	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	8.58	<8.58	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	8.58	<8.58	ug/kg dry	
Trichloroethylene	79-01-6	8.58	<8.58	ug/kg dry	
Trichlorofluoromethane	75-69-4	8.58	<8.58	ug/kg dry	
Vinyl chloride	75-01-4	8.58	<8.58	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	91	74.4-131	
4-Bromofluorobenzene	460-00-4	102	82.3-134	
Dibromofluoromethane	1868-53-7	101	79.4-122	
Toluene-d8	2037-26-5	101	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	98	50-200	
1,4-Difluorobenzene	540-36-3	100	50-200	
Chlorobenzene-d5	3114-55-4	99	50-200	
Pentafluorobenzene	363-72-4	97	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd	
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)	
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12	% Solid:94.28
Matrix: Soil	ELAP: #11693	

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	159	<159	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	159	<159	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	159	<159	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	159	<159	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	159	<159	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	95.5	<95.5	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	95.5	<95.5	ug/kg dry	
2,4-Dichlorophenol	120-83-2	159	<159	ug/kg dry	
2,4-Dimethylphenol	105-67-9	159	<159	ug/kg dry	
2,4-Dinitrophenol	51-28-5	159	<159	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	159	<159	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	159	<159	ug/kg dry	
2-Chloronaphthalene	91-58-7	159	<159	ug/kg dry	
2-Chlorophenol	95-57-8	159	<159	ug/kg dry	
2-Methylnaphthalene	91-57-6	159	<159	ug/kg dry	
2-Methylphenol	95-48-7	159	<159	ug/kg dry	
2-Nitroaniline	88-74-4	159	<159	ug/kg dry	
2-Nitrophenol	88-75-5	159	<159	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	159	<159	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	159	<159	ug/kg dry	
3-Nitroaniline	99-09-2	159	<159	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	159	<159	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	159	<159	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	159	<159	ug/kg dry	
4-Chloroaniline	106-47-8	159	<159	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	159	<159	ug/kg dry	
4-Nitroaniline	100-01-6	159	<159	ug/kg dry	
4-Nitrophenol	100-02-7	159	<159	ug/kg dry	
Acenaphthene	83-32-9	159	<159	ug/kg dry	
Acenaphthylene	208-96-8	159	<159	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12 % Solid:94.28
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	159	<159	ug/kg dry	
Anthracene	120-12-7	159	<159	ug/kg dry	
Benzidine	92-87-5	159	<159	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	159	<159	ug/kg dry	
Benzo(a)pyrene	50-32-8	159	<159	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	159	<159	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	159	<159	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	159	<159	ug/kg dry	
Benzoic Acid	65-85-0	159	<159	ug/kg dry	
Benzyl alcohol	100-51-6	159	<159	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	159	<159	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	159	<159	ug/kg dry	4.N, 4.J
Bis(2-Ethylhexyl)phthalate	117-81-7	159	<159	ug/kg dry	
Butyl benzyl phthalate	85-68-7	159	<159	ug/kg dry	
Carbazole	86-74-8	159	<159	ug/kg dry	
Chrysene	218-01-9	159	<159	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	159	<159	ug/kg dry	
Dibenzofuran	132-64-9	159	<159	ug/kg dry	
Diethyl phthalate	84-66-2	159	<159	ug/kg dry	
Dimethyl phthalate	131-11-3	159	<159	ug/kg dry	
Di-n-butyl phthalate	84-74-2	159	<159	ug/kg dry	
Di-n-octyl phthalate	117-84-0	159	<159	ug/kg dry	
Fluoranthene	206-44-0	159	<159	ug/kg dry	
Fluorene	86-73-7	159	<159	ug/kg dry	
Hexachlorobenzene	118-74-1	159	<159	ug/kg dry	
Hexachlorobutadiene	87-68-3	159	<159	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	159	<159	ug/kg dry	
Hexachloroethane	67-72-1	159	<159	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	159	<159	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12 % Solid:94.28
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	159	<159	ug/kg dry	
Naphthalene	91-20-3	159	<159	ug/kg dry	
Nitrobenzene	98-95-3	159	<159	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	159	<159	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	159	<159	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	159	<159	ug/kg dry	
Parathion (ethyl)	56-38-2	159	<159	ug/kg dry	
Pentachlorophenol	87-86-5	159	<159	ug/kg dry	
Phenanthrene	85-01-8	159	<159	ug/kg dry	
Phenol	108-95-2	159	<159	ug/kg dry	
Pyrene	129-00-0	159	<159	ug/kg dry	
Pyridine	110-86-1	159	<159	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	110	18.04-120.2	
2-Fluorobiphenyl	321-60-8	94	34.39-110.73	
2-Fluorophenol	367-12-4	92	22.98-107.57	
Nitrobenzene-d5	4165-60-0	116	31-118.25	
Phenol-d6	13127-88-3	94	35.55-111.39	
Terphenyl-d14	1718-51-0	103	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	55	50-200	
Acenaphthene-d10	15067-26-2	58	50-200	
Chrysene-d12	1719-03-5	59	50-200	
Naphthalene-d8	1146-65-2	57	50-200	
Perylene-d12	1520-96-3	58	50-200	
Phenanthrene-d10	1517-22-2	57	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12 % Solid:94.28
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.18	<3.18	ug/kg dry	
4,4'-DDE	72-55-9	3.18	<3.18	ug/kg dry	
4,4'-DDT	50-29-3	3.18	<3.18	ug/kg dry	
Aldrin	309-00-2	5.30	<5.30	ug/kg dry	
alpha-BHC	319-84-6	5.30	<5.30	ug/kg dry	
beta-BHC	319-85-7	5.30	<5.30	ug/kg dry	
Chlordane	12789-03-6	15.9	<15.9	ug/kg dry	
cis-Chlordane	5103-71-9	5.30	<5.30	ug/kg dry	
delta-BHC	319-86-8	5.30	<5.30	ug/kg dry	
Dieldrin	60-57-1	5.30	<5.30	ug/kg dry	
Endosulfan I	959-98-8	5.30	<5.30	ug/kg dry	
Endosulfan II	33213-65-9	5.30	<5.30	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.30	<5.30	ug/kg dry	
Endrin	72-20-8	5.30	<5.30	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.30	<5.30	ug/kg dry	
Endrin Ketone	53494-70-5	5.30	<5.30	ug/kg dry	
gamma-BHC	58-89-9	5.30	<5.30	ug/kg dry	
Heptachlor	76-44-8	5.30	<5.30	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.30	<5.30	ug/kg dry	
Methoxychlor	72-43-5	5.30	<5.30	ug/kg dry	
Mirex	2385-85-5	5.30	<5.30	ug/kg dry	
Toxaphene	8001-35-2	106	<106	ug/kg dry	
trans-Chlordane	5103-74-2	5.30	<5.30	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd	
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)	
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12	% Solid:94.28
Matrix: Soil	ELAP: #11693	

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	10.6	<10.6	ug/kg dry	
Aroclor-1221	11104-28-2	10.6	<10.6	ug/kg dry	
Aroclor-1232	11141-16-5	10.6	<10.6	ug/kg dry	
Aroclor-1242	53469-21-9	10.6	<10.6	ug/kg dry	
Aroclor-1248	12672-29-6	10.6	<10.6	ug/kg dry	
Aroclor-1254	11097-69-1	10.6	<10.6	ug/kg dry	
Aroclor-1260	11096-82-5	10.6	<10.6	ug/kg dry	
Aroclor-1262	37324-23-5	10.6	<10.6	ug/kg dry	
Aroclor-1268	11100-14-4	10.6	<10.6	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	99	43.5-123	
Tetrachloro-m-xylene	877-09-8	97	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	106	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:10	Sample ID: SB08 (10-12)
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-12 % Solid:94.28
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	10.0	5810	mg/kg dry	
Antimony	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.54	56.5	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.65	<1.65	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.0	1900	mg/kg dry	
Chromium	10/28/2015	EPA 6010 C	1.67	12.3	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.67	6.08	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.67	71.2	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	46.2	21800	mg/kg dry	3.E
Lead	10/28/2015	EPA 6010 C	1.67	7.96	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.00	1140	mg/kg dry	
Manganese	10/29/2015	EPA 6010 C	15.4	448	mg/kg dry	3.E
Nickel	10/28/2015	EPA 6010 C	1.67	11.2	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.0	1140	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	4.62	132	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.67	<1.67	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.67	15.0	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.67	31.7	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.01	<0.01	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.21	<0.21	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Volatiles Low Level Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	8.71	<8.71	ug/kg dry	
1,1,1-Trichloroethane	71-55-6	8.71	<8.71	ug/kg dry	
1,1,2,2-Tetrachloroethane	79-34-5	8.71	<8.71	ug/kg dry	4.J, 4.N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	8.71	<8.71	ug/kg dry	
1,1,2-Trichloroethane	79-00-5	8.71	<8.71	ug/kg dry	
1,1-Dichloroethane	75-34-3	8.71	<8.71	ug/kg dry	
1,1-Dichloroethylene	75-35-4	8.71	<8.71	ug/kg dry	
1,1-Dichloropropylene	563-58-6	8.71	<8.71	ug/kg dry	
1,2,3-Trichlorobenzene	87-61-6	8.71	<8.71	ug/kg dry	
1,2,3-Trichloropropane	96-18-4	8.71	<8.71	ug/kg dry	4.J, 4.N
1,2,4,5-Tetramethylbenzene	95-93-2	8.71	<8.71	ug/kg dry	2.B
1,2,4-Trichlorobenzene	120-82-1	8.71	<8.71	ug/kg dry	
1,2,4-Trimethylbenzene	95-63-6	8.71	<8.71	ug/kg dry	
1,2-Dibromo-3-chloropropane	96-12-8	8.71	<8.71	ug/kg dry	4.J
1,2-Dibromoethane	106-93-4	8.71	<8.71	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	8.71	<8.71	ug/kg dry	
1,2-Dichloroethane	107-06-2	8.71	<8.71	ug/kg dry	
1,2-Dichloropropane	78-87-5	8.71	<8.71	ug/kg dry	
1,3,5-Trimethylbenzene	108-67-8	8.71	<8.71	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	8.71	<8.71	ug/kg dry	
1,3-Dichloropropane	142-28-9	8.71	<8.71	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	8.71	<8.71	ug/kg dry	
1,4-Diethylbenzene	105-05-5	8.71	<8.71	ug/kg dry	2.B
1,4-Dioxane	123-91-1	87.1	<87.1	ug/kg dry	4.J
2,2-Dichloropropane	594-20-7	8.71	<8.71	ug/kg dry	
2-Chlorotoluene	95-49-8	8.71	<8.71	ug/kg dry	
4-Chlorotoluene	106-43-4	8.71	<8.71	ug/kg dry	
4-Ethyltoluene	622-96-8	8.71	<8.71	ug/kg dry	2.B
4-Isopropyltoluene	99-87-6	8.71	<8.71	ug/kg dry	
4-Methyl-2-Pentanone	108-10-1	17.4	<17.4	ug/kg dry	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	87.1	<87.1	ug/kg dry	4.J
Acrylonitrile	107-13-1	8.71	<8.71	ug/kg dry	
Benzene	71-43-2	8.71	<8.71	ug/kg dry	
Bromobenzene	108-86-1	8.71	<8.71	ug/kg dry	
Bromochloromethane	74-97-5	8.71	<8.71	ug/kg dry	
Bromodichloromethane	75-27-4	8.71	<8.71	ug/kg dry	
Bromoform	75-25-2	8.71	<8.71	ug/kg dry	
Bromomethane	74-83-9	8.71	<8.71	ug/kg dry	4.J, 4.N
Carbon disulfide	75-15-0	8.71	<8.71	ug/kg dry	
Carbon Tetrachloride	56-23-5	8.71	<8.71	ug/kg dry	
Chlorobenzene	108-90-7	8.71	<8.71	ug/kg dry	
Chlorodifluoromethane	75-45-6	8.71	<8.71	ug/kg dry	2.B
Chloroethane	75-00-3	8.71	<8.71	ug/kg dry	
Chloroform	67-66-3	8.71	<8.71	ug/kg dry	
Chloromethane	74-87-3	8.71	<8.71	ug/kg dry	
cis-1,2-Dichloroethylene	156-59-2	8.71	<8.71	ug/kg dry	
cis-1,3-Dichloropropylene	10061-01-5	8.71	<8.71	ug/kg dry	
Dibromochloromethane	124-48-1	8.71	<8.71	ug/kg dry	
Dibromomethane	74-95-3	8.71	<8.71	ug/kg dry	
Dichlorodifluoromethane	75-71-8	8.71	<8.71	ug/kg dry	
Ethylbenzene	100-41-4	8.71	<8.71	ug/kg dry	
Hexachlorobutadiene	87-68-3	8.71	<8.71	ug/kg dry	
Isopropylbenzene (Cumene)	98-82-8	8.71	<8.71	ug/kg dry	
m,p-Xylenes	108-38-3/106-42-3	17.4	<17.4	ug/kg dry	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	8.71	<8.71	ug/kg dry	4.J, 4.N
Methyl Ethyl Ketone (2-Butanone)	78-93-3	17.4	<17.4	ug/kg dry	4.J, 4.N
Methylene Chloride	75-09-2	8.71	<8.71	ug/kg dry	
Methyl-tert-Butyl Ether	1634-04-4	8.71	<8.71	ug/kg dry	
Naphthalene	91-20-3	8.71	<8.71	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
n-Butylbenzene	104-51-8	8.71	<8.71	ug/kg dry	
n-Propylbenzene	103-65-1	8.71	<8.71	ug/kg dry	
o-Xylene	95-47-6	8.71	<8.71	ug/kg dry	
sec-Butylbenzene	135-98-8	8.71	<8.71	ug/kg dry	
Styrene	100-42-5	8.71	<8.71	ug/kg dry	
tert-Butyl alcohol	75-65-0	8.71	<8.71	ug/kg dry	4.J, 4.N
tert-Butylbenzene	98-06-6	8.71	<8.71	ug/kg dry	
Tetrachloroethylene	127-18-4	8.71	<8.71	ug/kg dry	
Toluene	108-88-3	8.71	<8.71	ug/kg dry	
trans-1,2-Dichloroethylene	156-60-5	8.71	<8.71	ug/kg dry	4.J
trans-1,3-Dichloropropylene	10061-02-6	8.71	<8.71	ug/kg dry	
Trichloroethylene	79-01-6	8.71	<8.71	ug/kg dry	
Trichlorofluoromethane	75-69-4	8.71	<8.71	ug/kg dry	
Vinyl chloride	75-01-4	8.71	<8.71	ug/kg dry	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	92	74.4-131	
4-Bromofluorobenzene	460-00-4	103	82.3-134	
Dibromofluoromethane	1868-53-7	100	79.4-122	
Toluene-d8	2037-26-5	101	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	93	50-200	
1,4-Difluorobenzene	540-36-3	97	50-200	
Chlorobenzene-d5	3114-55-4	97	50-200	
Pentafluorobenzene	363-72-4	95	50-200	

Date Prepared: 10/30/2015

Preparation Method: EPA 5035A-L

Date Analyzed: 10/30/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	167	<167	ug/kg dry	
1,2-Dichlorobenzene	95-50-1	167	<167	ug/kg dry	
1,3-Dichlorobenzene	541-73-1	167	<167	ug/kg dry	
1,4-Dichlorobenzene	106-46-7	167	<167	ug/kg dry	
2,2'-Oxybis(1-Chloropropane)	108-60-1	167	<167	ug/kg dry	
2,4,5-Trichlorophenol	95-95-4	100	<100	ug/kg dry	
2,4,6-Trichlorophenol	88-06-2	100	<100	ug/kg dry	
2,4-Dichlorophenol	120-83-2	167	<167	ug/kg dry	
2,4-Dimethylphenol	105-67-9	167	<167	ug/kg dry	
2,4-Dinitrophenol	51-28-5	167	<167	ug/kg dry	
2,4-Dinitrotoluene	121-14-2	167	<167	ug/kg dry	
2,6-Dinitrotoluene	606-20-2	167	<167	ug/kg dry	
2-Chloronaphthalene	91-58-7	167	<167	ug/kg dry	
2-Chlorophenol	95-57-8	167	<167	ug/kg dry	
2-Methylnaphthalene	91-57-6	167	<167	ug/kg dry	
2-Methylphenol	95-48-7	167	<167	ug/kg dry	
2-Nitroaniline	88-74-4	167	<167	ug/kg dry	
2-Nitrophenol	88-75-5	167	<167	ug/kg dry	
3,3'-Dichlorobenzidine	91-94-1	167	<167	ug/kg dry	
3/4-Methylphenol	108-39-4/106-44-5	167	<167	ug/kg dry	
3-Nitroaniline	99-09-2	167	<167	ug/kg dry	
4,6-Dinitro-2-methylphenol	534-52-1	167	<167	ug/kg dry	
4-Bromophenyl phenyl ether	101-55-3	167	<167	ug/kg dry	
4-Chloro-3-methylphenol	59-50-7	167	<167	ug/kg dry	
4-Chloroaniline	106-47-8	167	<167	ug/kg dry	
4-Chlorophenyl phenyl ether	7005-72-3	167	<167	ug/kg dry	
4-Nitroaniline	100-01-6	167	<167	ug/kg dry	
4-Nitrophenol	100-02-7	167	<167	ug/kg dry	
Acenaphthene	83-32-9	167	<167	ug/kg dry	
Acenaphthylene	208-96-8	167	<167	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	167	<167	ug/kg dry	
Anthracene	120-12-7	167	<167	ug/kg dry	
Benzidine	92-87-5	167	<167	ug/kg dry	4.J, 4.N
Benzo(a)anthracene	56-55-3	167	<167	ug/kg dry	
Benzo(a)pyrene	50-32-8	167	<167	ug/kg dry	
Benzo(b)fluoranthene	205-99-2	167	<167	ug/kg dry	
Benzo(g,h,i)perylene	191-24-2	167	<167	ug/kg dry	
Benzo(k)fluoranthene	207-08-9	167	<167	ug/kg dry	
Benzoic Acid	65-85-0	167	<167	ug/kg dry	
Benzyl alcohol	100-51-6	167	<167	ug/kg dry	4.J
bis(2-Chloroethoxy)methane	111-91-1	167	<167	ug/kg dry	
Bis(2-Chloroethyl)ether	111-44-4	167	<167	ug/kg dry	4.J, 4.N
Bis(2-Ethylhexyl)phthalate	117-81-7	167	<167	ug/kg dry	
Butyl benzyl phthalate	85-68-7	167	<167	ug/kg dry	
Carbazole	86-74-8	167	<167	ug/kg dry	
Chrysene	218-01-9	167	<167	ug/kg dry	
Dibenzo(a,h)anthracene	53-70-3	167	<167	ug/kg dry	
Dibenzofuran	132-64-9	167	<167	ug/kg dry	
Diethyl phthalate	84-66-2	167	<167	ug/kg dry	
Dimethyl phthalate	131-11-3	167	<167	ug/kg dry	
Di-n-butyl phthalate	84-74-2	167	<167	ug/kg dry	
Di-n-octyl phthalate	117-84-0	167	<167	ug/kg dry	
Fluoranthene	206-44-0	167	<167	ug/kg dry	
Fluorene	86-73-7	167	<167	ug/kg dry	
Hexachlorobenzene	118-74-1	167	<167	ug/kg dry	
Hexachlorobutadiene	87-68-3	167	<167	ug/kg dry	
Hexachlorocyclopentadiene	77-47-4	167	<167	ug/kg dry	
Hexachloroethane	67-72-1	167	<167	ug/kg dry	
Indeno(1,2,3-cd)pyrene	193-39-5	167	<167	ug/kg dry	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Parameter	CAS No.	LOQ	Result	Units	Flag
Isophorone	78-59-1	167	<167	ug/kg dry	
Naphthalene	91-20-3	167	<167	ug/kg dry	
Nitrobenzene	98-95-3	167	<167	ug/kg dry	
N-Nitrosodimethylamine	62-75-9	167	<167	ug/kg dry	
N-Nitroso-di-n-propylamine	621-64-7	167	<167	ug/kg dry	
N-Nitrosodiphenylamine	86-30-6	167	<167	ug/kg dry	
Parathion (ethyl)	56-38-2	167	<167	ug/kg dry	
Pentachlorophenol	87-86-5	167	<167	ug/kg dry	
Phenanthrene	85-01-8	167	<167	ug/kg dry	
Phenol	108-95-2	167	<167	ug/kg dry	
Pyrene	129-00-0	167	<167	ug/kg dry	
Pyridine	110-86-1	167	<167	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	59	18.04-120.2	
2-Fluorobiphenyl	321-60-8	50	34.39-110.73	
2-Fluorophenol	367-12-4	48	22.98-107.57	
Nitrobenzene-d5	4165-60-0	60	31-118.25	
Phenol-d6	13127-88-3	48	35.55-111.39	
Terphenyl-d14	1718-51-0	55	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	55	50-200	
Acenaphthene-d10	15067-26-2	56	50-200	
Chrysene-d12	1719-03-5	58	50-200	
Naphthalene-d8	1146-65-2	55	50-200	
Perylene-d12	1520-96-3	58	50-200	
Phenanthrene-d10	1517-22-2	55	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/03/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	3.34	<3.34	ug/kg dry	
4,4'-DDE	72-55-9	3.34	<3.34	ug/kg dry	
4,4'-DDT	50-29-3	3.34	<3.34	ug/kg dry	
Aldrin	309-00-2	5.56	<5.56	ug/kg dry	
alpha-BHC	319-84-6	5.56	<5.56	ug/kg dry	
beta-BHC	319-85-7	5.56	<5.56	ug/kg dry	
Chlordane	12789-03-6	16.7	<16.7	ug/kg dry	
cis-Chlordane	5103-71-9	5.56	<5.56	ug/kg dry	
delta-BHC	319-86-8	5.56	<5.56	ug/kg dry	
Dieldrin	60-57-1	5.56	<5.56	ug/kg dry	
Endosulfan I	959-98-8	5.56	<5.56	ug/kg dry	
Endosulfan II	33213-65-9	5.56	<5.56	ug/kg dry	
Endosulfan Sulfate	1031-07-8	5.56	<5.56	ug/kg dry	
Endrin	72-20-8	5.56	<5.56	ug/kg dry	
Endrin Aldehyde	7421-93-4	5.56	<5.56	ug/kg dry	
Endrin Ketone	53494-70-5	5.56	<5.56	ug/kg dry	
gamma-BHC	58-89-9	5.56	<5.56	ug/kg dry	
Heptachlor	76-44-8	5.56	<5.56	ug/kg dry	
Heptachlor Epoxide	1024-57-3	5.56	<5.56	ug/kg dry	
Methoxychlor	72-43-5	5.56	<5.56	ug/kg dry	
Mirex	2385-85-5	5.56	<5.56	ug/kg dry	
Toxaphene	8001-35-2	111	<111	ug/kg dry	
trans-Chlordane	5103-74-2	5.56	<5.56	ug/kg dry	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	11.1	<11.1	ug/kg dry	
Aroclor-1221	11104-28-2	11.1	<11.1	ug/kg dry	
Aroclor-1232	11141-16-5	11.1	<11.1	ug/kg dry	
Aroclor-1242	53469-21-9	11.1	<11.1	ug/kg dry	
Aroclor-1248	12672-29-6	11.1	<11.1	ug/kg dry	
Aroclor-1254	11097-69-1	11.1	<11.1	ug/kg dry	
Aroclor-1260	11096-82-5	11.1	<11.1	ug/kg dry	
Aroclor-1262	37324-23-5	11.1	<11.1	ug/kg dry	
Aroclor-1268	11100-14-4	11.1	<11.1	ug/kg dry	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	101	43.5-123	
Tetrachloro-m-xylene	877-09-8	99	72.3-118	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	102	50-200	

Date Prepared: 11/02/2015

Preparation Method: EPA 3545 A

Date Analyzed: 11/04/2015

Analytical Method: EPA 8082 A

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 14:25	Sample ID: Duplicate Soil
Date (Time) Received: 10/27/2015 16:30	Laboratory ID: 5102716-13 % Solid:89.93
Matrix: Soil	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	10/28/2015	EPA 6010 C	10.6	7630	mg/kg dry	4.G
Antimony	10/28/2015	EPA 6010 C	1.76	<1.76	mg/kg dry	
Arsenic	10/28/2015	EPA 6010 C	1.76	<1.76	mg/kg dry	
Barium	10/28/2015	EPA 6010 C	1.76	53.9	mg/kg dry	
Beryllium	10/28/2015	EPA 6010 C	1.76	<1.76	mg/kg dry	
Cadmium	10/28/2015	EPA 6010 C	1.76	<1.76	mg/kg dry	
Calcium	10/28/2015	EPA 6010 C	10.6	913	mg/kg dry	4.G
Chromium	10/28/2015	EPA 6010 C	1.76	20.7	mg/kg dry	
Cobalt	10/28/2015	EPA 6010 C	1.76	6.42	mg/kg dry	
Copper	10/28/2015	EPA 6010 C	1.76	10.7	mg/kg dry	
Iron	10/29/2015	EPA 6010 C	52.8	15600	mg/kg dry	3.E, 4.F
Lead	10/28/2015	EPA 6010 C	1.76	6.42	mg/kg dry	
Magnesium	10/28/2015	EPA 6010 C	5.28	1840	mg/kg dry	4.G
Manganese	10/28/2015	EPA 6010 C	1.76	314	mg/kg dry	4.G
Nickel	10/28/2015	EPA 6010 C	1.76	12.4	mg/kg dry	
Potassium	10/28/2015	EPA 6010 C	10.6	692	mg/kg dry	
Selenium	10/28/2015	EPA 6010 C	1.76	<1.76	mg/kg dry	
Silver	10/28/2015	EPA 6010 C	1.76	<1.76	mg/kg dry	
Sodium	10/28/2015	EPA 6010 C	5.28	70.9	mg/kg dry	
Thallium	10/28/2015	EPA 6010 C	1.76	<1.76	mg/kg dry	
Vanadium	10/28/2015	EPA 6010 C	1.76	25.7	mg/kg dry	
Zinc	10/28/2015	EPA 6010 C	1.76	36.8	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 3050B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 7471 B	0.02	0.04	mg/kg dry	

Date Prepared: 10/28/2015 Preparation Method: EPA 7471 B

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/03/2015	EPA 9014	0.22	<0.22	mg/kg dry	

Date Prepared: 10/29/2015 Preparation Method: Distillation Prep

Data Qualifiers Key Reference:

2.B	Parameter not certifiable by ELAP.
3.E	Compound reported at a dilution factor.
4.E	Surrogate recovery has failed high.
4.F	Spike recovery does not meet QC criteria due to high target compound concentration.
4.G	Spike recovery out of range due to matrix interference.
4.J	Continuing Calibration Verification (CCV) quality control levels failed low, values are considered to be estimated.
4.N	LCS recovery was below QC acceptance limit.
4.T	Sample Matrix Spike/Spike Dup RPD is above acceptable range.
MDL	Minimum Detection Limit
LOQ	Limit of Quantitation

LONG ISLAND ANALYTICAL LABORATORIES INC.
"TOMORROWS ANALYTICAL SOLUTIONS TODAY"
110 Colin Drive • Holbrook, New York 11741 • Phone (631) 472-3400 • Fax (631) 472-8505 • Email: LIAL@lialinc.com

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS DOCUMENT

2

CLIENT NAME/ADDRESS: Assoc Env Sci	CONTACT: John	SAMPLER (SIGNATURE)	SAMPLE(S) SEALED: YES / NO
	PHONE: 631 234 4250	SAMPLER NAME (PRINT)	CORRECT CONTAINER(S): YES / NO
PROJECT LOCATION: 109-17 72nd Rd	FAX: 631 234 4297		5102716
	EMAIL: [illegible]	SAMPLES RECEIVED AT: 2.7 °C	

TERMS & CONDITIONS: Accounts are payable in full within thirty days, outstanding balances accrue service charges of 1.5% per month. Tendering of samples to LIAL for analytical testing constitutes agreement by buyer/sampler to LIAL's Standard terms

LABORATORY ID # (For Laboratory Use Only)	MATRIX	TYPE	pH	RES. CHLORINE	PRES.	DATE	TIME	SAMPLE # / LOCATION	ANALYSIS REQUIRED: VOC 8260	SVOC 8270	Pest/PCB 8081	8082	EPA 6010 + 7471	TAL	# OF CONTAINERS
1. 5102716-01	S	G				ice	10/22	0935	SB01 (0-2)	X	X	X	X	X			4
2. 02	S	G				ice		0945	SB01 (10-12)	X	X	X	X	X			4
3. 03	S	G				ice		0950	SB02 (0-2)	X	X	X	X	X			4
4. 04	S	G				ice		1010	SB03 (0-2)	X	X	X	X	X			4
5. 05	S	G				ice		1200	SB04 (2-4)	X	X	X	X	X			3
6. 06	S	G				ice		1215	SB04 (10-12)	X	X	X	X	X			4
7. 07	S	G				ice		1300	SB05 (0-2)	X	X	X	X	X			4
8. 08	S	G				ice		1330	SB06 (0-2)	X	X	X	X	X			4
9. 09	S	G				ice		1340	SB07 (0-2)	X	X	X	X	X			3
10. 10	S	G				ice		1350	SB07 (10-12)	X	X	X	X	X			4
11. 11	S	G				ice		1400	SB08 (0-2)	X	X	X	X	X			4
12. 12	S	G				ice		1410	SB08 (10-12)	X	X	X	X	X			3
13. 13	S	G				ice		1415	Duplicate Soil	X	X	X	X	X		QC Sample	3
14.																	

MATRIX: S=SOIL; SL=SLUDGE; DW=DRINKING WATER; A=AIR; W=WIPE; PC=PAINT CHIPS; BM= BULK MATERIAL, O=OIL, WW=WASTE WATER
TYPE: G=GRAB; C=COMPOSITE; SS=SPLIT SPOON
PRES: (1) ICE; (2) HCL; (3) H_2SO_4; (4) NAOH; (5) $NA_2S_3O_3$; (6) HNO_3; (7) OTHER

TURNAROUND REQUIRED: ☒ NORMAL ☐ STAT
BY / /

COMMENTS / INSTRUCTIONS

RELINQUISHED BY (SIGNATURE)	DATE 10/27 TIME 2:15PM	PRINTED NAME	RECEIVED BY (SIGNATURE)	DATE 10-27-15 TIME 2:25P	PRINTED NAME Ben Lamberson
RELINQUISHED BY (SIGNATURE)	DATE TIME	PRINTED NAME	RECEIVED BY SAMPLE CUSTODIAN	DATE 10-27-15 TIME 4:30PM	PRINTED NAME Ben Lamberson

WHITE - OFFICE / CANARY - SAMPLE CUSTODIAN / PINK - CLIENT

APPENDIX 5

GROUNDWATER LABORATORY ANALYTICAL REPORT

LONG ISLAND ANALYTICAL LABORATORIES INC.
"TOMORROWS ANALYTICAL SOLUTIONS TODAY"

Laboratory Report

NYSDOH ELAP# 11693
USEPA# NY01273
CTDOH# PH-0284
AIHA# 164456
NJDEP# NY012
PADEP# 68-2943

LIAL# 5102714

November 06, 2015

Associated Environmental Services
John Schretzmayer
25 Central Avenue
Hauppauge, NY 11788

Re: 109-17 72nd Rd

Dear John Schretzmayer,

Enclosed please find the laboratory Analysis Report(s) for sample(s) received on October 27, 2015. Long Island Analytical laboratories analyzed the samples on November 04, 2015 for the following:

SAMPLE ID	ANALYSIS
GW01	EPA 608, EPA 8081 B, EPA 8260 C, EPA 8270 D, TAL Filtered Metals, TAL Target Analyte List

Samples received at 2.7 ° C

If you have any questions or require further information, please call at your convenience. Long Island Analytical Laboratories Inc. is a NELAP accredited laboratory. All reported results meet the requirements of the NELAP standards unless noted. Report shall not be reproduced except in full without the written approval of the laboratory. Results related only to items tested. Long Island Analytical Laboratories would like to thank you for the opportunity to be of service to you.

Best Regards,

Long Island Analytical Laboratories, Inc.

Michael Veraldi - Laboratory Director

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Volatiles Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,1,1,2-Tetrachloroethane	630-20-6	5.00	<5.00	ug/L	
1,1,1-Trichloroethane	71-55-6	5.00	<5.00	ug/L	
1,1,2,2-Tetrachloroethane	79-34-5	5.00	<5.00	ug/L	
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5.00	<5.00	ug/L	
1,1,2-Trichloroethane	79-00-5	5.00	<5.00	ug/L	
1,1-Dichloroethane	75-34-3	5.00	<5.00	ug/L	
1,1-Dichloroethylene	75-35-4	5.00	<5.00	ug/L	
1,1-Dichloropropylene	563-58-6	5.00	<5.00	ug/L	
1,2,3-Trichlorobenzene	87-61-6	5.00	<5.00	ug/L	
1,2,3-Trichloropropane	96-18-4	5.00	<5.00	ug/L	
1,2,4,5-Tetramethylbenzene	95-93-2	5.00	<5.00	ug/L	2.B
1,2,4-Trichlorobenzene	120-82-1	5.00	<5.00	ug/L	
1,2,4-Trimethylbenzene	95-63-6	5.00	<5.00	ug/L	
1,2-Dibromo-3-chloropropane	96-12-8	5.00	<5.00	ug/L	4.J
1,2-Dibromoethane	106-93-4	5.00	<5.00	ug/L	4.J
1,2-Dichlorobenzene	95-50-1	5.00	<5.00	ug/L	
1,2-Dichloroethane	107-06-2	5.00	<5.00	ug/L	
1,2-Dichloropropane	78-87-5	5.00	<5.00	ug/L	
1,3,5-Trimethylbenzene	108-67-8	5.00	<5.00	ug/L	
1,3-Dichlorobenzene	541-73-1	5.00	<5.00	ug/L	
1,3-Dichloropropane	142-28-9	5.00	<5.00	ug/L	4.J, 4.N
1,4-Dichlorobenzene	106-46-7	5.00	<5.00	ug/L	
1,4-Diethylbenzene	105-05-5	5.00	<5.00	ug/L	2.B
2,2-Dichloropropane	594-20-7	5.00	<5.00	ug/L	
2-Chloroethyl Vinyl Ether	110-75-8	5.00	<5.00	ug/L	
2-Chlorotoluene	95-49-8	5.00	<5.00	ug/L	
4-Chlorotoluene	106-43-4	5.00	<5.00	ug/L	
4-Ethyltoluene	622-96-8	5.00	<5.00	ug/L	2.B
4-Isopropyltoluene	99-87-6	5.00	<5.00	ug/L	
4-Methyl-2-Pentanone	108-10-1	5.00	<5.00	ug/L	4.J

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Volatiles Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Acetone	67-64-1	10.0	<10.0	ug/L	
Acrolein	107-02-8	5.00	<5.00	ug/L	4.M
Acrylonitrile	107-13-1	5.00	<5.00	ug/L	
Benzene	71-43-2	0.700	<0.700	ug/L	
Bromobenzene	108-86-1	5.00	<5.00	ug/L	
Bromochloromethane	74-97-5	5.00	<5.00	ug/L	
Bromodichloromethane	75-27-4	5.00	<5.00	ug/L	
Bromoform	75-25-2	5.00	<5.00	ug/L	
Bromomethane	74-83-9	5.00	<5.00	ug/L	
Carbon disulfide	75-15-0	5.00	<5.00	ug/L	
Carbon Tetrachloride	56-23-5	5.00	<5.00	ug/L	4.J
Chlorobenzene	108-90-7	5.00	<5.00	ug/L	
Chlorodifluoromethane	75-45-6	5.00	<5.00	ug/L	2.B, 4.J, 4.N
Chloroethane	75-00-3	5.00	<5.00	ug/L	
Chloroform	67-66-3	5.00	<5.00	ug/L	
Chloromethane	74-87-3	5.00	<5.00	ug/L	
cis-1,2-Dichloroethylene	156-59-2	5.00	<5.00	ug/L	
cis-1,3-Dichloropropylene	10061-01-5	5.00	<5.00	ug/L	
Dibromochloromethane	124-48-1	5.00	<5.00	ug/L	
Dibromomethane	74-95-3	5.00	<5.00	ug/L	
Dichlorodifluoromethane	75-71-8	5.00	<5.00	ug/L	4.J
Ethylbenzene	100-41-4	5.00	<5.00	ug/L	
Hexachlorobutadiene	87-68-3	5.00	<5.00	ug/L	
Isopropylbenzene (Cumene)	98-82-8	5.00	<5.00	ug/L	
m,p-Xylenes	108-38-3/106-42-3	10.0	<10.0	ug/L	
Methyl Acetate	79-20-9	5.00	<5.00	ug/L	
Methyl Butyl Ketone (2-Hexanone)	591-78-6	10.0	<10.0	ug/L	
Methyl Ethyl Ketone (2-Butanone)	78-93-3	10.0	<10.0	ug/L	
Methylene Chloride	75-09-2	5.00	<5.00	ug/L	4.M

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Volatiles Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Methyl-tert-Butyl Ether	1634-04-4	5.00	<5.00	ug/L	
Naphthalene	91-20-3	5.00	<5.00	ug/L	
n-Butylbenzene	104-51-8	5.00	<5.00	ug/L	
n-Propylbenzene	103-65-1	5.00	<5.00	ug/L	
o-Xylene	95-47-6	5.00	<5.00	ug/L	
sec-Butylbenzene	135-98-8	5.00	<5.00	ug/L	
Styrene	100-42-5	5.00	<5.00	ug/L	
tert-Butyl alcohol	75-65-0	5.00	<5.00	ug/L	
tert-Butylbenzene	98-06-6	5.00	<5.00	ug/L	
Tetrachloroethylene	127-18-4	5.00	<5.00	ug/L	
Toluene	108-88-3	5.00	<5.00	ug/L	
trans-1,2-Dichloroethylene	156-60-5	5.00	<5.00	ug/L	4.M
trans-1,3-Dichloropropylene	10061-02-6	5.00	<5.00	ug/L	
Trichloroethylene	79-01-6	5.00	<5.00	ug/L	
Trichlorofluoromethane	75-69-4	5.00	<5.00	ug/L	4.J
Vinyl acetate	108-05-4	5.00	<5.00	ug/L	
Vinyl chloride	75-01-4	5.00	<5.00	ug/L	4.M

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
1,2-Dichloroethane-d4	10706-07-0	101	74.4-131	
4-Bromofluorobenzene	460-00-4	105	82.3-134	
Dibromofluoromethane	1868-53-7	99	79.4-122	
Toluene-d8	2037-26-5	104	85-123	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	95	50-200	
1,4-Difluorobenzene	540-36-3	101	50-200	
Chlorobenzene-d5	3114-55-4	103	50-200	
Pentafluorobenzene	363-72-4	102	50-200	

Date Prepared: 10/27/2015

Preparation Method: EPA 5030 C

Date Analyzed: 10/27/2015

Analytical Method: EPA 8260 C

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
1,2,4-Trichlorobenzene	120-82-1	5.00	<5.00	ug/L	
1,2-Dichlorobenzene	95-50-1	5.00	<5.00	ug/L	
1,3-Dichlorobenzene	541-73-1	5.00	<5.00	ug/L	4.G
1,4-Dichlorobenzene	106-46-7	5.00	<5.00	ug/L	
2,2'-Oxybis(1-Chloropropane)	108-60-1	5.00	<5.00	ug/L	
2,4,5-Trichlorophenol	95-95-4	5.00	<5.00	ug/L	
2,4,6-Trichlorophenol	88-06-2	5.00	<5.00	ug/L	
2,4-Dichlorophenol	120-83-2	5.00	<5.00	ug/L	
2,4-Dimethylphenol	105-67-9	5.00	<5.00	ug/L	
2,4-Dinitrophenol	51-28-5	10.0	<10.0	ug/L	4.G, 4.J
2,4-Dinitrotoluene	121-14-2	5.00	<5.00	ug/L	
2,6-Dinitrotoluene	606-20-2	5.00	<5.00	ug/L	
2-Chloronaphthalene	91-58-7	5.00	<5.00	ug/L	
2-Chlorophenol	95-57-8	5.00	<5.00	ug/L	
2-Methylnaphthalene	91-57-6	5.00	<5.00	ug/L	
2-Methylphenol	95-48-7	5.00	<5.00	ug/L	
2-Nitroaniline	88-74-4	5.00	<5.00	ug/L	
2-Nitrophenol	88-75-5	5.00	<5.00	ug/L	
3,3'-Dichlorobenzidine	91-94-1	5.00	<5.00	ug/L	
3/4-Methylphenol	108-39-4/106-44-5	5.00	<5.00	ug/L	
3-Nitroaniline	99-09-2	5.00	<5.00	ug/L	
4,6-Dinitro-2-methylphenol	534-52-1	10.0	<10.0	ug/L	
4-Bromophenyl phenyl ether	101-55-3	5.00	<5.00	ug/L	
4-Chloro-3-methylphenol	59-50-7	5.00	<5.00	ug/L	
4-Chloroaniline	106-47-8	5.00	<5.00	ug/L	
4-Chlorophenyl phenyl ether	7005-72-3	5.00	<5.00	ug/L	
4-Nitroaniline	100-01-6	5.00	<5.00	ug/L	
4-Nitrophenol	100-02-7	5.00	<5.00	ug/L	
Acenaphthene	83-32-9	5.00	<5.00	ug/L	
Acenaphthylene	208-96-8	5.00	<5.00	ug/L	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aniline	62-53-3	5.00	<5.00	ug/L	4.N
Anthracene	120-12-7	5.00	<5.00	ug/L	
Benzo(a)anthracene	56-55-3	5.00	<5.00	ug/L	
Benzo(a)pyrene	50-32-8	5.00	<5.00	ug/L	
Benzo(b)fluoranthene	205-99-2	5.00	<5.00	ug/L	
Benzo(g,h,i)perylene	191-24-2	5.00	<5.00	ug/L	
Benzo(k)fluoranthene	207-08-9	5.00	<5.00	ug/L	4.T
Benzoic Acid	65-85-0	10.0	<10.0	ug/L	
Benzyl alcohol	100-51-6	5.00	<5.00	ug/L	
bis(2-Chloroethoxy)methane	111-91-1	5.00	<5.00	ug/L	
Bis(2-Chloroethyl)ether	111-44-4	5.00	<5.00	ug/L	
Bis(2-Ethylhexyl)phthalate	117-81-7	5.00	<5.00	ug/L	
Butyl benzyl phthalate	85-68-7	5.00	<5.00	ug/L	
Carbazole	86-74-8	5.00	<5.00	ug/L	
Chrysene	218-01-9	5.00	<5.00	ug/L	
Dibenzo(a,h)anthracene	53-70-3	5.00	<5.00	ug/L	
Dibenzofuran	132-64-9	5.00	<5.00	ug/L	
Diethyl phthalate	84-66-2	5.00	<5.00	ug/L	
Dimethyl phthalate	131-11-3	5.00	<5.00	ug/L	
Di-n-butyl phthalate	84-74-2	5.00	<5.00	ug/L	
Di-n-octyl phthalate	117-84-0	5.00	<5.00	ug/L	
Fluoranthene	206-44-0	5.00	<5.00	ug/L	
Fluorene	86-73-7	5.00	<5.00	ug/L	
Hexachlorobenzene	118-74-1	5.00	<5.00	ug/L	
Hexachlorobutadiene	87-68-3	5.00	<5.00	ug/L	
Hexachlorocyclopentadiene	77-47-4	5.00	<5.00	ug/L	4.G
Hexachloroethane	67-72-1	5.00	<5.00	ug/L	4.G
Indeno(1,2,3-cd)pyrene	193-39-5	5.00	<5.00	ug/L	
Isophorone	78-59-1	5.00	<5.00	ug/L	

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Semivolatile Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Naphthalene	91-20-3	5.00	<5.00	ug/L	
Nitrobenzene	98-95-3	5.00	<5.00	ug/L	
N-Nitrosodimethylamine	62-75-9	5.00	<5.00	ug/L	4.G, 4.J, 4.N
N-Nitroso-di-n-propylamine	621-64-7	5.00	<5.00	ug/L	
N-Nitrosodiphenylamine	86-30-6	5.00	<5.00	ug/L	
Pentachlorophenol	87-86-5	5.00	<5.00	ug/L	
Phenanthrene	85-01-8	5.00	<5.00	ug/L	
Phenol	108-95-2	5.00	<5.00	ug/L	
Pyrene	129-00-0	5.00	<5.00	ug/L	
Pyridine	110-86-1	10.0	<10.0	ug/L	4.J

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
2,4,6-Tribromophenol	118-79-6	84	18.04-120.2	
2-Fluorobiphenyl	321-60-8	58	34.39-110.73	
2-Fluorophenol	367-12-4	47	22.98-107.57	
Nitrobenzene-d5	4165-60-0	67	31-118.25	
Phenol-d6	13127-88-3	35	35.55-111.39	4.D
Terphenyl-d14	1718-51-0	81	41.02-106	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1,4-Dichlorobenzene-d4	3855-82-1	79	50-200	
Acenaphthene-d10	15067-26-2	76	50-200	
Chrysene-d12	1719-03-5	99	50-200	
Naphthalene-d8	1146-65-2	85	50-200	
Perylene-d12	1520-96-3	99	50-200	
Phenanthrene-d10	1517-22-2	95	50-200	

Date Prepared: 10/28/2015

Preparation Method: EPA 3510 C

Date Analyzed: 11/02/2015

Analytical Method: EPA 8270 D

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Pesticides Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
4,4'-DDD	72-54-8	2.00	<2.00	ug/L	
4,4'-DDE	72-55-9	2.00	<2.00	ug/L	
4,4'-DDT	50-29-3	2.00	<2.00	ug/L	
Aldrin	309-00-2	2.00	<2.00	ug/L	
alpha-BHC	319-84-6	2.00	<2.00	ug/L	
beta-BHC	319-85-7	2.00	<2.00	ug/L	
Chlordane	12789-03-6	2.00	<2.00	ug/L	
cis-Chlordane	5103-71-9	2.00	<2.00	ug/L	
delta-BHC	319-86-8	2.00	<2.00	ug/L	
Dieldrin	60-57-1	2.00	<2.00	ug/L	
Endosulfan I	959-98-8	2.00	<2.00	ug/L	
Endosulfan II	33213-65-9	2.00	<2.00	ug/L	
Endosulfan Sulfate	1031-07-8	2.00	<2.00	ug/L	
Endrin	72-20-8	2.00	<2.00	ug/L	
Endrin Aldehyde	7421-93-4	2.00	<2.00	ug/L	
Endrin Ketone	53494-70-5	2.00	<2.00	ug/L	
gamma-BHC	58-89-9	2.00	<2.00	ug/L	
Heptachlor	76-44-8	2.00	<2.00	ug/L	
Heptachlor Epoxide	1024-57-3	2.00	<2.00	ug/L	
Methoxychlor	72-43-5	2.00	<2.00	ug/L	
Toxaphene	8001-35-2	2.00	<2.00	ug/L	
trans-Chlordane	5103-74-2	2.00	<2.00	ug/L	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	103	57.3-128	
Tetrachloro-m-xylene	877-09-8	96	66.7-125	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	112	50-200	

Date Prepared: 10/28/2015

Preparation Method: EPA 3510 C

Date Analyzed: 10/30/2015

Analytical Method: EPA 8081 B

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

PCB/Aroclor Analysis

Parameter	CAS No.	LOQ	Result	Units	Flag
Aroclor-1016	12674-11-2	0.0500	<0.0500	ug/L	
Aroclor-1221	11104-28-2	0.0500	<0.0500	ug/L	
Aroclor-1232	11141-16-5	0.0500	<0.0500	ug/L	
Aroclor-1242	53469-21-9	0.0500	<0.0500	ug/L	
Aroclor-1248	12672-29-6	0.0500	<0.0500	ug/L	
Aroclor-1254	11097-69-1	0.0500	<0.0500	ug/L	
Aroclor-1260	11096-82-5	0.0500	<0.0500	ug/L	

Surrogate	CAS No.	% Recovery	Rec. Limits	Flag
Decachlorobiphenyl	2051-24-3	94	38.2-138	
Tetrachloro-m-xylene	877-09-8	100	52.2-128	

Internal Standard	CAS No.	% Recovery	Rec. Limits	Flag
1-Bromo-2-Nitrobenzene	108-31-6	109	50-200	

Date Prepared: 10/28/2015

Preparation Method: EPA 608

Date Analyzed: 10/30/2015

Analytical Method: EPA 608

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Total Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	11/02/2015	EPA 200.7 Rev. 4.4	0.05	27.5	mg/L	4.G
Antimony	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Arsenic	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Barium	11/02/2015	EPA 200.7 Rev. 4.4	1.00	<1.00	mg/L	
Beryllium	11/02/2015	EPA 200.7 Rev. 4.4	0.02	<0.02	mg/L	
Cadmium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Calcium	11/02/2015	EPA 200.7 Rev. 4.4	0.10	133	mg/L	4.G
Chromium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	0.60	mg/L	
Cobalt	11/02/2015	EPA 200.7 Rev. 4.4	0.05	0.06	mg/L	
Copper	11/02/2015	EPA 200.7 Rev. 4.4	0.05	0.18	mg/L	
Iron	11/02/2015	EPA 200.7 Rev. 4.4	0.20	88.2	mg/L	4.G
Lead	11/02/2015	EPA 200.7 Rev. 4.4	0.050	<0.050	mg/L	
Magnesium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	73.7	mg/L	
Manganese	11/02/2015	EPA 200.7 Rev. 4.4	0.05	2.60	mg/L	
Nickel	11/02/2015	EPA 200.7 Rev. 4.4	0.05	0.26	mg/L	
Potassium	11/02/2015	EPA 200.7 Rev. 4.4	0.25	9.99	mg/L	
Selenium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Silver	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Sodium	11/02/2015	EPA 200.7 Rev. 4.4	0.10	35.1	mg/L	
Thallium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Vanadium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	0.08	mg/L	
Zinc	11/02/2015	EPA 200.7 Rev. 4.4	0.05	0.14	mg/L	

Date Prepared: 11/02/2015 Preparation Method: EPA 200.2

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 245.1 Rev. 3.0	0.002	<0.002	mg/L	

Date Prepared: 11/02/2015 Preparation Method: EPA 245.1

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Cyanide	11/04/2015	SM 4500-CN E-99,-11	0.02	<0.02	mg/L	

Date Prepared: 11/02/2015 Preparation Method: Distillation Prep

Client: Associated Environmental Services	Client ID: 109-17 72nd Rd
Date (Time) Collected: 10/22/2015 10:30	Sample ID: GW01
Date (Time) Received: 10/27/2015 15:51	Laboratory ID: 5102714-01
Matrix: Non-Potable Water	ELAP: #11693

Filtered Metals Analysis

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Aluminum	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Antimony	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Arsenic	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Barium	11/02/2015	EPA 200.7 Rev. 4.4	1.00	<1.00	mg/L	
Beryllium	11/02/2015	EPA 200.7 Rev. 4.4	0.02	<0.02	mg/L	
Cadmium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Calcium	11/02/2015	EPA 200.7 Rev. 4.4	0.10	74.4	mg/L	4.G
Chromium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Cobalt	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Copper	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Iron	11/02/2015	EPA 200.7 Rev. 4.4	0.20	<0.20	mg/L	
Lead	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Magnesium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	32.7	mg/L	
Manganese	11/02/2015	EPA 200.7 Rev. 4.4	0.05	0.48	mg/L	
Nickel	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Potassium	11/02/2015	EPA 200.7 Rev. 4.4	0.25	2.56	mg/L	
Selenium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Silver	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Sodium	11/02/2015	EPA 200.7 Rev. 4.4	0.10	33.4	mg/L	
Thallium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Vanadium	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	
Zinc	11/02/2015	EPA 200.7 Rev. 4.4	0.05	<0.05	mg/L	

Date Prepared: 11/02/2015 Preparation Method: EPA 200.2

Parameter	Date Analyzed	Method	LOQ	Result	Units	Flag
Mercury	11/03/2015	EPA 245.1 Rev. 3.0	0.002	<0.002	mg/L	

Date Prepared: 11/02/2015 Preparation Method: EPA 245.1 Filtered

Data Qualifiers Key Reference:

2.B Parameter not certifiable by ELAP.
4.D Surrogate recovery has failed low.
4.G Spike recovery out of range due to matrix interference.
4.J Continuing Calibration Verification (CCV) quality control levels failed low, values are considered to be estimated.
4.M LCS recovery was above QC acceptance limit.
4.N LCS recovery was below QC acceptance limit.
4.T Sample Matrix Spike/Spike Dup RPD is above acceptable range.
MDL Minimum Detection Limit
LOQ Limit of Quantitation

LONG ISLAND ANALYTICAL LABORATORIES INC.
"TOMORROWS ANALYTICAL SOLUTIONS TODAY"
110 Colin Drive • Holbrook, New York 11741 • Phone (631) 472-3400 • Fax (631) 472-8505 • Email: LIAL@lialinc.com

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS DOCUMENT

5102714

CLIENT NAME/ADDRESS: Associated Env Sves

CONTACT: John S

PHONE: 631 234 4280

FAX: 631 234 4297

EMAIL: johns@associatedenvsves.com

PROJECT LOCATION: 109-17 72nd Rd

SAMPLER (SIGNATURE)

SAMPLER NAME (PRINT)

SAMPLE(S) SEALED YES / NO

CORRECT CONTAINER(S) YES / NO

SAMPLES RECEIVED AT 2.7 °C

TERMS & CONDITIONS: Accounts are payable in full within thirty days, outstanding balances accrue service charges of 1.5% per month. Tendering of samples to LIAL for analytical testing constitutes agreement by buyer/sampler to LIAL's Standard terms

LABORATORY ID # (For Laboratory Use Only)	MATRIX	TYPE	pH	RES. CHLORINE	PRES.	DATE	TIME	SAMPLE # LOCATION	ANALYSIS REQUIRED: 8260	8270	5035/5032	6010 *	7471/TAL	# OF CONTAINERS
1. 5102714-01	G				Le	10/22	1030	GW01	X		X	X	X	
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														
11.														
12.														
13.														
14.														

Sample Preserved w/HNO3 By: Client

MATRIX: S=SOIL; SL=SLUDGE; DW=DRINKING WATER; A=AIR; W=WIPE; PC=PAINT CHIPS; BM= BULK MATERIAL, O=OIL, WW=WASTE WATER
TYPE: G=GRAB; C=COMPOSITE; SS=SPLIT SPOON
PRES: (1) ICE; (2) HCL; (3) H_2SO_4; (4) NAOH; (5) $NA_2S_3O_3$; (6) HNO_3; (7) OTHER

TURNAROUND REQUIRED: ☐ NORMAL ☐ STAT BY / /

COMMENTS / INSTRUCTIONS: * Filtered + Unfiltered

RELINQUISHED BY (SIGNATURE)	DATE / TIME	PRINTED NAME	RECEIVED BY (SIGNATURE)	DATE / TIME	PRINTED NAME
	10/23 1225			10-23-15 2:25PM	BEN LAMBERSON
RELINQUISHED BY (SIGNATURE)	DATE / TIME	PRINTED NAME	RECEIVED BY SAMPLE CUSTODIAN	DATE / TIME	PRINTED NAME
				10-24-15 3:50PM	Ben Lamberson

WHITE - OFFICE / CANARY - SAMPLE CUSTODIAN / PINK - CLIENT

APPENDIX 6

SOIL VAPOR LABORATORY ANALYTICAL REPORT

PHOENIX
Environmental Laboratories, Inc.

Thursday, November 05, 2015

Attn: Mr. John Schretzmayer
Associated Environmental Services
25 Central Ave.
Hauppauge, NY 11788

Project ID: 109-17 72ND RD., QUEENS
Sample ID#s: BK13527 - BK13531

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #MA-CT-007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

November 05, 2015

FOR: Attn: Mr. John Schretzmayer
Associated Environmental Services
25 Central Ave.
Hauppauge, NY 11788

Sample Information		Custody Information		Date	Time
Matrix:	AIR	Collected by:	JF	10/23/15	14:53
Location Code:	AESHAUP	Received by:	LB	10/26/15	16:24
Rush Request:	72 Hour	Analyzed by:	see "By" below		
P.O.#:					
Canister Id:	230				

Laboratory Data

SDG ID: GBK13527
Phoenix ID: BK13527

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV05

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/26/15	KCA	1	1
1,1,1-Trichloroethane	ND	*0.183*	ND	*1.00*	10/26/15	KCA	1	
1,1,2,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/26/15	KCA	1	
1,1,2-Trichloroethane	ND	*0.183*	ND	*1.00*	10/26/15	KCA	1	
1,1-Dichloroethane	ND	*0.247*	ND	*1.00*	10/26/15	KCA	1	
1,1-Dichloroethene	ND	*0.252*	ND	*1.00*	10/26/15	KCA	1	
1,2,4-Trichlorobenzene	ND	*0.135*	ND	*1.00*	10/26/15	KCA	1	
1,2,4-Trimethylbenzene	0.964	*0.204*	4.74	*1.00*	10/26/15	KCA	1	
1,2-Dibromoethane(EDB)	ND	*0.130*	ND	*1.00*	10/26/15	KCA	1	
1,2-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/26/15	KCA	1	
1,2-Dichloroethane	ND	*0.247*	ND	*1.00*	10/26/15	KCA	1	
1,2-dichloropropane	ND	*0.217*	ND	*1.00*	10/26/15	KCA	1	
1,2-Dichlorotetrafluoroethane	ND	*0.143*	ND	*1.00*	10/26/15	KCA	1	
1,3,5-Trimethylbenzene	0.367	*0.204*	1.80	*1.00*	10/26/15	KCA	1	
1,3-Butadiene	ND	*0.452*	ND	*1.00*	10/26/15	KCA	1	
1,3-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/26/15	KCA	1	
1,4-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/26/15	KCA	1	
1,4-Dioxane	ND	*0.278*	ND	*1.00*	10/26/15	KCA	1	
2-Hexanone(MBK)	23.2	*0.244*	95.0	*1.00*	10/26/15	KCA	1	1
4-Ethyltoluene	0.490	*0.204*	2.41	*1.00*	10/26/15	KCA	1	1
4-Isopropyltoluene	ND	*0.182*	ND	*1.00*	10/26/15	KCA	1	1
4-Methyl-2-pentanone(MIBK)	ND	*0.244*	ND	*1.00*	10/26/15	KCA	1	
Acetone	24.7	*0.421*	58.6	*1.00*	10/26/15	KCA	1	
Acrylonitrile	ND	*0.461*	ND	*1.00*	10/26/15	KCA	1	
Benzene	2.82	*0.313*	9.00	*1.00*	10/26/15	KCA	1	
Benzyl chloride	ND	*0.193*	ND	*1.00*	10/26/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV05

Phoenix I.D.: BK13527

Parameter	ppbv Result	ppbv RL		ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Bromodichloromethane	ND	*0.149*		ND	*1.00*	10/26/15	KCA	1	
Bromoform	ND	*0.097*		ND	*1.00*	10/26/15	KCA	1	
Bromomethane	ND	*0.258*		ND	*1.00*	10/26/15	KCA	1	
Carbon Disulfide	2.09	*0.321*		6.50	*1.00*	10/26/15	KCA	1	
Carbon Tetrachloride	0.078	*0.040*		0.49	*0.25*	10/26/15	KCA	1	
Chlorobenzene	ND	*0.217*		ND	*1.00*	10/26/15	KCA	1	
Chloroethane	ND	*0.379*		ND	*1.00*	10/26/15	KCA	1	
Chloroform	0.480	*0.205*		2.34	*1.00*	10/26/15	KCA	1	
Chloromethane	ND	*0.485*		ND	*1.00*	10/26/15	KCA	1	
Cis-1,2-Dichloroethene	ND	*0.252*		ND	*1.00*	10/26/15	KCA	1	
cis-1,3-Dichloropropene	ND	*0.221*		ND	*1.00*	10/26/15	KCA	1	
Cyclohexane	1.54	*0.291*		5.30	*1.00*	10/26/15	KCA	1	
Dibromochloromethane	ND	*0.118*		ND	*1.00*	10/26/15	KCA	1	
Dichlorodifluoromethane	0.344	*0.202*		1.70	*1.00*	10/26/15	KCA	1	
Ethanol	25.8	*0.531*		48.6	*1.00*	10/26/15	KCA	1	1
Ethyl acetate	ND	*0.278*		ND	*1.00*	10/26/15	KCA	1	1
Ethylbenzene	5.00	*0.230*		21.7	*1.00*	10/26/15	KCA	1	
Heptane	4.86	*0.244*		19.9	*1.00*	10/26/15	KCA	1	
Hexachlorobutadiene	ND	*0.094*		ND	*1.00*	10/26/15	KCA	1	
Hexane	6.20	*0.284*		21.8	*1.00*	10/26/15	KCA	1	
Isopropylalcohol	ND	*0.407*		ND	*1.00*	10/26/15	KCA	1	
Isopropylbenzene	0.239	*0.204*		1.17	*1.00*	10/26/15	KCA	1	
m,p-Xylene	17.3	*0.230*		75.1	*1.00*	10/26/15	KCA	1	
Methyl Ethyl Ketone	133	*3.39*		392	*10.0*	10/27/15	KCA	10	
Methyl tert-butyl ether(MTBE)	ND	*0.278*		ND	*1.00*	10/26/15	KCA	1	
Methylene Chloride	0.372	S	*0.288*	1.29	*1.00*	10/26/15	KCA	1	
n-Butylbenzene	ND	*0.182*		ND	*1.00*	10/26/15	KCA	1	1
o-Xylene	7.79	*0.230*		33.8	*1.00*	10/26/15	KCA	1	
Propylene	51.6	*5.81*		88.8	*10.0*	10/27/15	KCA	10	1
sec-Butylbenzene	ND	*0.182*		ND	*1.00*	10/26/15	KCA	1	1
Styrene	ND	*0.235*		ND	*1.00*	10/26/15	KCA	1	
Tetrachloroethene	0.068	*0.037*		0.46	*0.25*	10/26/15	KCA	1	
Tetrahydrofuran	0.894	*0.339*		2.64	*1.00*	10/26/15	KCA	1	1
Toluene	38.5	*0.266*		145	*1.00*	10/26/15	KCA	1	
Trans-1,2-Dichloroethene	ND	*0.252*		ND	*1.00*	10/26/15	KCA	1	
trans-1,3-Dichloropropene	ND	*0.221*		ND	*1.00*	10/26/15	KCA	1	
Trichloroethene	ND	*0.047*		ND	*0.25*	10/26/15	KCA	1	
Trichlorofluoromethane	0.224	*0.178*		1.26	*1.00*	10/26/15	KCA	1	
Trichlorotrifluoroethane	ND	*0.131*		ND	*1.00*	10/26/15	KCA	1	
Vinyl Chloride	ND	*0.098*		ND	*0.25*	10/26/15	KCA	1	
QA/QC Surrogates									
% Bromofluorobenzene	79	*%*		79	*%*	10/26/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV05

Phoenix I.D.: BK13527

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution

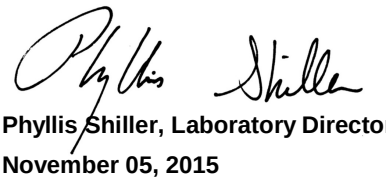
1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quanitation) ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

S - Laboratory solvent, contamination is possible.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.
This report must not be reproduced except in full as defined by the attached chain of custody.



Phyllis Shiller, Laboratory Director
November 05, 2015
Reviewed and Released by: Sarah Bell, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

November 05, 2015

FOR: Attn: Mr. John Schretzmayer
Associated Environmental Services
25 Central Ave.
Hauppauge, NY 11788

Sample Information		Custody Information		Date	Time
Matrix:	AIR	Collected by:	JF	10/23/15	14:50
Location Code:	AESHAUP	Received by:	LB	10/26/15	16:24
Rush Request:	72 Hour	Analyzed by:	see "By" below		
P.O.#:					
Canister Id:	465				

Laboratory Data

SDG ID: GBK13527
Phoenix ID: BK13528

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV04

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/26/15	KCA	1	1
1,1,1-Trichloroethane	ND	*0.183*	ND	*1.00*	10/26/15	KCA	1	
1,1,2,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/26/15	KCA	1	
1,1,2-Trichloroethane	ND	*0.183*	ND	*1.00*	10/26/15	KCA	1	
1,1-Dichloroethane	ND	*0.247*	ND	*1.00*	10/26/15	KCA	1	
1,1-Dichloroethene	ND	*0.252*	ND	*1.00*	10/26/15	KCA	1	
1,2,4-Trichlorobenzene	ND	*0.135*	ND	*1.00*	10/26/15	KCA	1	
1,2,4-Trimethylbenzene	5.63	*0.204*	27.7	*1.00*	10/26/15	KCA	1	
1,2-Dibromoethane(EDB)	ND	*0.130*	ND	*1.00*	10/26/15	KCA	1	
1,2-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/26/15	KCA	1	
1,2-Dichloroethane	ND	*0.247*	ND	*1.00*	10/26/15	KCA	1	
1,2-dichloropropane	ND	*0.217*	ND	*1.00*	10/26/15	KCA	1	
1,2-Dichlorotetrafluoroethane	ND	*0.143*	ND	*1.00*	10/26/15	KCA	1	
1,3,5-Trimethylbenzene	1.87	*0.204*	9.19	*1.00*	10/26/15	KCA	1	
1,3-Butadiene	ND	*0.452*	ND	*1.00*	10/26/15	KCA	1	
1,3-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/26/15	KCA	1	
1,4-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/26/15	KCA	1	
1,4-Dioxane	ND	*0.278*	ND	*1.00*	10/26/15	KCA	1	
2-Hexanone(MBK)	5.84	*0.244*	23.9	*1.00*	10/26/15	KCA	1	1
4-Ethyltoluene	1.72	*0.204*	8.45	*1.00*	10/26/15	KCA	1	1
4-Isopropyltoluene	ND	*0.182*	ND	*1.00*	10/26/15	KCA	1	1
4-Methyl-2-pentanone(MIBK)	0.983	*0.244*	4.02	*1.00*	10/26/15	KCA	1	
Acetone	33.6	*0.421*	79.8	*1.00*	10/26/15	KCA	1	
Acrylonitrile	ND	*0.461*	ND	*1.00*	10/26/15	KCA	1	
Benzene	1.78	*0.313*	5.68	*1.00*	10/26/15	KCA	1	
Benzyl chloride	ND	*0.193*	ND	*1.00*	10/26/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV04

Phoenix I.D.: BK13528

Parameter	ppbv Result		ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Bromodichloromethane	ND		*0.149*	ND	*1.00*	10/26/15	KCA	1	
Bromoform	ND		*0.097*	ND	*1.00*	10/26/15	KCA	1	
Bromomethane	ND		*0.258*	ND	*1.00*	10/26/15	KCA	1	
Carbon Disulfide	0.763		*0.321*	2.37	*1.00*	10/26/15	KCA	1	
Carbon Tetrachloride	0.130		*0.040*	0.82	*0.25*	10/26/15	KCA	1	
Chlorobenzene	ND		*0.217*	ND	*1.00*	10/26/15	KCA	1	
Chloroethane	ND		*0.379*	ND	*1.00*	10/26/15	KCA	1	
Chloroform	7.90		*0.205*	38.5	*1.00*	10/26/15	KCA	1	
Chloromethane	ND		*0.485*	ND	*1.00*	10/26/15	KCA	1	
Cis-1,2-Dichloroethene	ND		*0.252*	ND	*1.00*	10/26/15	KCA	1	
cis-1,3-Dichloropropene	ND		*0.221*	ND	*1.00*	10/26/15	KCA	1	
Cyclohexane	0.707		*0.291*	2.43	*1.00*	10/26/15	KCA	1	
Dibromochloromethane	ND		*0.118*	ND	*1.00*	10/26/15	KCA	1	
Dichlorodifluoromethane	0.353		*0.202*	1.74	*1.00*	10/26/15	KCA	1	
Ethanol	2.07	S	*0.531*	3.90	*1.00*	10/26/15	KCA	1	1
Ethyl acetate	ND		*0.278*	ND	*1.00*	10/26/15	KCA	1	1
Ethylbenzene	6.67		*0.230*	28.9	*1.00*	10/26/15	KCA	1	
Heptane	3.60		*0.244*	14.7	*1.00*	10/26/15	KCA	1	
Hexachlorobutadiene	ND		*0.094*	ND	*1.00*	10/26/15	KCA	1	
Hexane	3.04		*0.284*	10.7	*1.00*	10/26/15	KCA	1	
Isopropylalcohol	ND		*0.407*	ND	*1.00*	10/26/15	KCA	1	
Isopropylbenzene	0.553		*0.204*	2.72	*1.00*	10/26/15	KCA	1	
m,p-Xylene	25.8		*0.230*	112	*1.00*	10/26/15	KCA	1	
Methyl Ethyl Ketone	24.9		*0.339*	73.4	*1.00*	10/26/15	KCA	1	
Methyl tert-butyl ether(MTBE)	ND		*0.278*	ND	*1.00*	10/26/15	KCA	1	
Methylene Chloride	ND		*0.288*	ND	*1.00*	10/26/15	KCA	1	
n-Butylbenzene	ND		*0.182*	ND	*1.00*	10/26/15	KCA	1	1
o-Xylene	10.4		*0.230*	45.1	*1.00*	10/26/15	KCA	1	
Propylene	15.7		*0.581*	27.0	*1.00*	10/26/15	KCA	1	1
sec-Butylbenzene	ND		*0.182*	ND	*1.00*	10/26/15	KCA	1	1
Styrene	ND		*0.235*	ND	*1.00*	10/26/15	KCA	1	
Tetrachloroethene	1.20		*0.037*	8.13	*0.25*	10/26/15	KCA	1	
Tetrahydrofuran	0.551		*0.339*	1.62	*1.00*	10/26/15	KCA	1	1
Toluene	33.7		*0.266*	127	*1.00*	10/26/15	KCA	1	
Trans-1,2-Dichloroethene	ND		*0.252*	ND	*1.00*	10/26/15	KCA	1	
trans-1,3-Dichloropropene	ND		*0.221*	ND	*1.00*	10/26/15	KCA	1	
Trichloroethene	ND		*0.047*	ND	*0.25*	10/26/15	KCA	1	
Trichlorofluoromethane	0.224		*0.178*	1.26	*1.00*	10/26/15	KCA	1	
Trichlorotrifluoroethane	ND		*0.131*	ND	*1.00*	10/26/15	KCA	1	
Vinyl Chloride	ND		*0.098*	ND	*0.25*	10/26/15	KCA	1	
QA/QC Surrogates									
% Bromofluorobenzene	84		*%*	84	*%*	10/26/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV04

Phoenix I.D.: BK13528

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution

1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quanitation) ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

S - Laboratory solvent, contamination is possible.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.
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Phyllis Shiller, Laboratory Director
November 05, 2015
Reviewed and Released by: Sarah Bell, Project Manager

PHOENIX

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Analysis Report

November 05, 2015

FOR: Attn: Mr. John Schretzmayer
Associated Environmental Services
25 Central Ave.
Hauppauge, NY 11788

Sample Information		Custody Information		Date	Time
Matrix:	AIR	Collected by:	JF	10/23/15	14:48
Location Code:	AESHAUP	Received by:	LB	10/26/15	16:24
Rush Request:	72 Hour	Analyzed by:	see "By" below		
P.O.#:					
Canister Id:	12868				

Laboratory Data

SDG ID: GBK13527
Phoenix ID: BK13529

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV03

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/27/15	KCA	1	1
1,1,1-Trichloroethane	ND	*0.183*	ND	*1.00*	10/27/15	KCA	1	
1,1,2,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/27/15	KCA	1	
1,1,2-Trichloroethane	ND	*0.183*	ND	*1.00*	10/27/15	KCA	1	
1,1-Dichloroethane	ND	*0.247*	ND	*1.00*	10/27/15	KCA	1	
1,1-Dichloroethene	ND	*0.252*	ND	*1.00*	10/27/15	KCA	1	
1,2,4-Trichlorobenzene	ND	*0.135*	ND	*1.00*	10/27/15	KCA	1	
1,2,4-Trimethylbenzene	3.46	*0.204*	17.0	*1.00*	10/27/15	KCA	1	
1,2-Dibromoethane(EDB)	ND	*0.130*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichloroethane	ND	*0.247*	ND	*1.00*	10/27/15	KCA	1	
1,2-dichloropropane	ND	*0.217*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichlorotetrafluoroethane	ND	*0.143*	ND	*1.00*	10/27/15	KCA	1	
1,3,5-Trimethylbenzene	1.13	*0.204*	5.55	*1.00*	10/27/15	KCA	1	
1,3-Butadiene	ND	*0.452*	ND	*1.00*	10/27/15	KCA	1	
1,3-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,4-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,4-Dioxane	ND	*0.278*	ND	*1.00*	10/27/15	KCA	1	
2-Hexanone(MBK)	12.1	*0.244*	49.5	*1.00*	10/27/15	KCA	1	1
4-Ethyltoluene	1.24	*0.204*	6.09	*1.00*	10/27/15	KCA	1	1
4-Isopropyltoluene	ND	*0.182*	ND	*1.00*	10/27/15	KCA	1	1
4-Methyl-2-pentanone(MIBK)	ND	*0.244*	ND	*1.00*	10/27/15	KCA	1	
Acetone	9.32	*0.421*	22.1	*1.00*	10/27/15	KCA	1	
Acrylonitrile	ND	*0.461*	ND	*1.00*	10/27/15	KCA	1	
Benzene	6.37	*0.313*	20.3	*1.00*	10/27/15	KCA	1	
Benzyl chloride	ND	*0.193*	ND	*1.00*	10/27/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV03

Phoenix I.D.: BK13529

Parameter	ppbv Result	ppbv RL		ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Bromodichloromethane	ND	*0.149*		ND	*1.00*	10/27/15	KCA	1	
Bromoform	ND	*0.097*		ND	*1.00*	10/27/15	KCA	1	
Bromomethane	ND	*0.258*		ND	*1.00*	10/27/15	KCA	1	
Carbon Disulfide	0.770	*0.321*		2.40	*1.00*	10/27/15	KCA	1	
Carbon Tetrachloride	0.069	*0.040*		0.43	*0.25*	10/27/15	KCA	1	
Chlorobenzene	ND	*0.217*		ND	*1.00*	10/27/15	KCA	1	
Chloroethane	ND	*0.379*		ND	*1.00*	10/27/15	KCA	1	
Chloroform	6.33	*0.205*		30.9	*1.00*	10/27/15	KCA	1	
Chloromethane	ND	*0.485*		ND	*1.00*	10/27/15	KCA	1	
Cis-1,2-Dichloroethene	ND	*0.252*		ND	*1.00*	10/27/15	KCA	1	
cis-1,3-Dichloropropene	ND	*0.221*		ND	*1.00*	10/27/15	KCA	1	
Cyclohexane	1.69	*0.291*		5.81	*1.00*	10/27/15	KCA	1	
Dibromochloromethane	ND	*0.118*		ND	*1.00*	10/27/15	KCA	1	
Dichlorodifluoromethane	0.353	*0.202*		1.74	*1.00*	10/27/15	KCA	1	
Ethanol	5.34	*0.531*		10.1	*1.00*	10/27/15	KCA	1	1
Ethyl acetate	ND	*0.278*		ND	*1.00*	10/27/15	KCA	1	1
Ethylbenzene	6.56	*0.230*		28.5	*1.00*	10/27/15	KCA	1	
Heptane	4.28	*0.244*		17.5	*1.00*	10/27/15	KCA	1	
Hexachlorobutadiene	ND	*0.094*		ND	*1.00*	10/27/15	KCA	1	
Hexane	7.70	*0.284*		27.1	*1.00*	10/27/15	KCA	1	
Isopropylalcohol	ND	*0.407*		ND	*1.00*	10/27/15	KCA	1	
Isopropylbenzene	0.433	*0.204*		2.13	*1.00*	10/27/15	KCA	1	
m,p-Xylene	23.2	*0.230*		101	*1.00*	10/27/15	KCA	1	
Methyl Ethyl Ketone	41.5	*1.70*		122	*5.01*	10/27/15	KCA	5	
Methyl tert-butyl ether(MTBE)	ND	*0.278*		ND	*1.00*	10/27/15	KCA	1	
Methylene Chloride	0.913	S	*0.288*	3.17	*1.00*	10/27/15	KCA	1	
n-Butylbenzene	ND	*0.182*		ND	*1.00*	10/27/15	KCA	1	1
o-Xylene	9.40	*0.230*		40.8	*1.00*	10/27/15	KCA	1	
Propylene	37.0	*0.581*		63.6	*1.00*	10/27/15	KCA	1	1
sec-Butylbenzene	ND	*0.182*		ND	*1.00*	10/27/15	KCA	1	1
Styrene	ND	*0.235*		ND	*1.00*	10/27/15	KCA	1	
Tetrachloroethene	0.136	*0.037*		0.92	*0.25*	10/27/15	KCA	1	
Tetrahydrofuran	0.655	*0.339*		1.93	*1.00*	10/27/15	KCA	1	1
Toluene	35.5	*0.266*		134	*1.00*	10/27/15	KCA	1	
Trans-1,2-Dichloroethene	ND	*0.252*		ND	*1.00*	10/27/15	KCA	1	
trans-1,3-Dichloropropene	ND	*0.221*		ND	*1.00*	10/27/15	KCA	1	
Trichloroethene	0.048	*0.047*		0.26	*0.25*	10/27/15	KCA	1	
Trichlorofluoromethane	0.224	*0.178*		1.26	*1.00*	10/27/15	KCA	1	
Trichlorotrifluoroethane	ND	*0.131*		ND	*1.00*	10/27/15	KCA	1	
Vinyl Chloride	ND	*0.098*		ND	*0.25*	10/27/15	KCA	1	
QA/QC Surrogates									
% Bromofluorobenzene	94	*%*		94	*%*	10/27/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV03

Phoenix I.D.: BK13529

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution

1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quanitation) ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

S - Laboratory solvent, contamination is possible.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.
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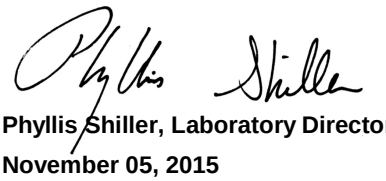


Phyllis Shiller, Laboratory Director
November 05, 2015
Reviewed and Released by: Sarah Bell, Project Manager

PHOENIX

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

November 05, 2015

FOR: Attn: Mr. John Schretzmayer
Associated Environmental Services
25 Central Ave.
Hauppauge, NY 11788

Sample Information		Custody Information		Date	Time
Matrix:	AIR	Collected by:	JF	10/23/15	14:40
Location Code:	AESHAUP	Received by:	LB	10/26/15	16:24
Rush Request:	72 Hour	Analyzed by:	see "By" below		
P.O.#:					
Canister Id:	350				

Laboratory Data

SDG ID: GBK13527
Phoenix ID: BK13530

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV02

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/27/15	KCA	1	1
1,1,1-Trichloroethane	0.408	*0.183*	2.22	*1.00*	10/27/15	KCA	1	
1,1,2,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/27/15	KCA	1	
1,1,2-Trichloroethane	ND	*0.183*	ND	*1.00*	10/27/15	KCA	1	
1,1-Dichloroethane	ND	*0.247*	ND	*1.00*	10/27/15	KCA	1	
1,1-Dichloroethene	ND	*0.252*	ND	*1.00*	10/27/15	KCA	1	
1,2,4-Trichlorobenzene	ND	*0.135*	ND	*1.00*	10/27/15	KCA	1	
1,2,4-Trimethylbenzene	0.465	*0.204*	2.28	*1.00*	10/27/15	KCA	1	
1,2-Dibromoethane(EDB)	ND	*0.130*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichloroethane	ND	*0.247*	ND	*1.00*	10/27/15	KCA	1	
1,2-dichloropropane	ND	*0.217*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichlorotetrafluoroethane	ND	*0.143*	ND	*1.00*	10/27/15	KCA	1	
1,3,5-Trimethylbenzene	ND	*0.204*	ND	*1.00*	10/27/15	KCA	1	
1,3-Butadiene	ND	*0.452*	ND	*1.00*	10/27/15	KCA	1	
1,3-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,4-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,4-Dioxane	ND	*0.278*	ND	*1.00*	10/27/15	KCA	1	
2-Hexanone(MBK)	10.9	*0.244*	44.6	*1.00*	10/27/15	KCA	1	1
4-Ethyltoluene	0.231	*0.204*	1.13	*1.00*	10/27/15	KCA	1	1
4-Isopropyltoluene	ND	*0.182*	ND	*1.00*	10/27/15	KCA	1	1
4-Methyl-2-pentanone(MIBK)	0.251	*0.244*	1.03	*1.00*	10/27/15	KCA	1	
Acetone	23.0	*0.421*	54.6	*1.00*	10/27/15	KCA	1	
Acrylonitrile	ND	*0.461*	ND	*1.00*	10/27/15	KCA	1	
Benzene	1.24	*0.313*	3.96	*1.00*	10/27/15	KCA	1	
Benzyl chloride	ND	*0.193*	ND	*1.00*	10/27/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV02

Phoenix I.D.: BK13530

Parameter	ppbv Result		ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Bromodichloromethane	ND		*0.149*	ND	*1.00*	10/27/15	KCA	1	
Bromoform	ND		*0.097*	ND	*1.00*	10/27/15	KCA	1	
Bromomethane	ND		*0.258*	ND	*1.00*	10/27/15	KCA	1	
Carbon Disulfide	0.431		*0.321*	1.34	*1.00*	10/27/15	KCA	1	
Carbon Tetrachloride	ND		*0.040*	ND	*0.25*	10/27/15	KCA	1	
Chlorobenzene	ND		*0.217*	ND	*1.00*	10/27/15	KCA	1	
Chloroethane	ND		*0.379*	ND	*1.00*	10/27/15	KCA	1	
Chloroform	1.54		*0.205*	7.51	*1.00*	10/27/15	KCA	1	
Chloromethane	ND		*0.485*	ND	*1.00*	10/27/15	KCA	1	
Cis-1,2-Dichloroethene	ND		*0.252*	ND	*1.00*	10/27/15	KCA	1	
cis-1,3-Dichloropropene	ND		*0.221*	ND	*1.00*	10/27/15	KCA	1	
Cyclohexane	0.520		*0.291*	1.79	*1.00*	10/27/15	KCA	1	
Dibromochloromethane	ND		*0.118*	ND	*1.00*	10/27/15	KCA	1	
Dichlorodifluoromethane	0.305		*0.202*	1.51	*1.00*	10/27/15	KCA	1	
Ethanol	6.56		*0.531*	12.4	*1.00*	10/27/15	KCA	1	1
Ethyl acetate	ND		*0.278*	ND	*1.00*	10/27/15	KCA	1	1
Ethylbenzene	3.77		*0.230*	16.4	*1.00*	10/27/15	KCA	1	
Heptane	2.25		*0.244*	9.22	*1.00*	10/27/15	KCA	1	
Hexachlorobutadiene	ND		*0.094*	ND	*1.00*	10/27/15	KCA	1	
Hexane	2.10	S	*0.284*	7.40	*1.00*	10/27/15	KCA	1	
Isopropylalcohol	0.641	S	*0.407*	1.57	*1.00*	10/27/15	KCA	1	
Isopropylbenzene	ND		*0.204*	ND	*1.00*	10/27/15	KCA	1	
m,p-Xylene	12.4		*0.230*	53.8	*1.00*	10/27/15	KCA	1	
Methyl Ethyl Ketone	61.4		*1.70*	181	*5.01*	10/27/15	KCA	5	
Methyl tert-butyl ether(MTBE)	ND		*0.278*	ND	*1.00*	10/27/15	KCA	1	
Methylene Chloride	ND		*0.288*	ND	*1.00*	10/27/15	KCA	1	
n-Butylbenzene	ND		*0.182*	ND	*1.00*	10/27/15	KCA	1	1
o-Xylene	4.86		*0.230*	21.1	*1.00*	10/27/15	KCA	1	
Propylene	30.9		*0.581*	53.1	*1.00*	10/27/15	KCA	1	1
sec-Butylbenzene	ND		*0.182*	ND	*1.00*	10/27/15	KCA	1	1
Styrene	ND		*0.235*	ND	*1.00*	10/27/15	KCA	1	
Tetrachloroethene	0.231		*0.037*	1.57	*0.25*	10/27/15	KCA	1	
Tetrahydrofuran	0.544		*0.339*	1.60	*1.00*	10/27/15	KCA	1	1
Toluene	21.9		*0.266*	82.5	*1.00*	10/27/15	KCA	1	
Trans-1,2-Dichloroethene	ND		*0.252*	ND	*1.00*	10/27/15	KCA	1	
trans-1,3-Dichloropropene	ND		*0.221*	ND	*1.00*	10/27/15	KCA	1	
Trichloroethene	ND		*0.047*	ND	*0.25*	10/27/15	KCA	1	
Trichlorofluoromethane	0.283		*0.178*	1.59	*1.00*	10/27/15	KCA	1	
Trichlorotrifluoroethane	ND		*0.131*	ND	*1.00*	10/27/15	KCA	1	
Vinyl Chloride	ND		*0.098*	ND	*0.25*	10/27/15	KCA	1	
QA/QC Surrogates									
% Bromofluorobenzene	97		*%*	97	*%*	10/27/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV02

Phoenix I.D.: BK13530

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution

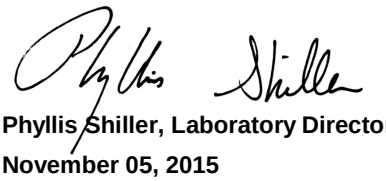
1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quanitation) ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

S - Laboratory solvent, contamination is possible.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.
This report must not be reproduced except in full as defined by the attached chain of custody.



Phyllis Shiller, Laboratory Director
November 05, 2015
Reviewed and Released by: Sarah Bell, Project Manager

PHOENIX

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587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

November 05, 2015

FOR: Attn: Mr. John Schretzmayer
Associated Environmental Services
25 Central Ave.
Hauppauge, NY 11788

Sample Information		Custody Information		Date	Time
Matrix:	AIR	Collected by:	JF	10/23/15	14:42
Location Code:	AESHAUP	Received by:	LB	10/26/15	16:24
Rush Request:	72 Hour	Analyzed by:	see "By" below		
P.O.#:					
Canister Id:	220				

Laboratory Data

SDG ID: GBK13527
Phoenix ID: BK13531

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV01

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Volatiles (TO15)								
1,1,1,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/27/15	KCA	1	1
1,1,1-Trichloroethane	ND	*0.183*	ND	*1.00*	10/27/15	KCA	1	
1,1,2,2-Tetrachloroethane	ND	*0.146*	ND	*1.00*	10/27/15	KCA	1	
1,1,2-Trichloroethane	ND	*0.183*	ND	*1.00*	10/27/15	KCA	1	
1,1-Dichloroethane	ND	*0.247*	ND	*1.00*	10/27/15	KCA	1	
1,1-Dichloroethene	ND	*0.252*	ND	*1.00*	10/27/15	KCA	1	
1,2,4-Trichlorobenzene	ND	*0.135*	ND	*1.00*	10/27/15	KCA	1	
1,2,4-Trimethylbenzene	0.738	*0.204*	3.63	*1.00*	10/27/15	KCA	1	
1,2-Dibromoethane(EDB)	ND	*0.130*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichloroethane	ND	*0.247*	ND	*1.00*	10/27/15	KCA	1	
1,2-dichloropropane	ND	*0.217*	ND	*1.00*	10/27/15	KCA	1	
1,2-Dichlorotetrafluoroethane	ND	*0.143*	ND	*1.00*	10/27/15	KCA	1	
1,3,5-Trimethylbenzene	0.301	*0.204*	1.48	*1.00*	10/27/15	KCA	1	
1,3-Butadiene	ND	*0.452*	ND	*1.00*	10/27/15	KCA	1	
1,3-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,4-Dichlorobenzene	ND	*0.166*	ND	*1.00*	10/27/15	KCA	1	
1,4-Dioxane	ND	*0.278*	ND	*1.00*	10/27/15	KCA	1	
2-Hexanone(MBK)	35.8	*2.44*	147	*10.0*	10/27/15	KCA	10	1
4-Ethyltoluene	0.334	*0.204*	1.64	*1.00*	10/27/15	KCA	1	1
4-Isopropyltoluene	ND	*0.182*	ND	*1.00*	10/27/15	KCA	1	1
4-Methyl-2-pentanone(MIBK)	0.579	*0.244*	2.37	*1.00*	10/27/15	KCA	1	
Acetone	55.3	*4.21*	131	*10.0*	10/27/15	KCA	10	
Acrylonitrile	ND	*0.461*	ND	*1.00*	10/27/15	KCA	1	
Benzene	1.66	*0.313*	5.30	*1.00*	10/27/15	KCA	1	
Benzyl chloride	ND	*0.193*	ND	*1.00*	10/27/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV01

Phoenix I.D.: BK13531

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution	
Bromodichloromethane	ND	*0.149*	ND	*1.00*	10/27/15	KCA	1	
Bromoform	ND	*0.097*	ND	*1.00*	10/27/15	KCA	1	
Bromomethane	ND	*0.258*	ND	*1.00*	10/27/15	KCA	1	
Carbon Disulfide	1.44	*0.321*	4.48	*1.00*	10/27/15	KCA	1	
Carbon Tetrachloride	0.078	*0.040*	0.49	*0.25*	10/27/15	KCA	1	
Chlorobenzene	ND	*0.217*	ND	*1.00*	10/27/15	KCA	1	
Chloroethane	ND	*0.379*	ND	*1.00*	10/27/15	KCA	1	
Chloroform	ND	*0.205*	ND	*1.00*	10/27/15	KCA	1	
Chloromethane	ND	*0.485*	ND	*1.00*	10/27/15	KCA	1	
Cis-1,2-Dichloroethene	ND	*0.252*	ND	*1.00*	10/27/15	KCA	1	
cis-1,3-Dichloropropene	ND	*0.221*	ND	*1.00*	10/27/15	KCA	1	
Cyclohexane	0.725	*0.291*	2.49	*1.00*	10/27/15	KCA	1	
Dibromochloromethane	ND	*0.118*	ND	*1.00*	10/27/15	KCA	1	
Dichlorodifluoromethane	0.373	*0.202*	1.84	*1.00*	10/27/15	KCA	1	
Ethanol	26.5	*0.531*	49.9	*1.00*	10/27/15	KCA	1	1
Ethyl acetate	ND	*0.278*	ND	*1.00*	10/27/15	KCA	1	1
Ethylbenzene	4.17	*0.230*	18.1	*1.00*	10/27/15	KCA	1	
Heptane	3.56	*0.244*	14.6	*1.00*	10/27/15	KCA	1	
Hexachlorobutadiene	ND	*0.094*	ND	*1.00*	10/27/15	KCA	1	
Hexane	3.51	*0.284*	12.4	*1.00*	10/27/15	KCA	1	
Isopropylalcohol	ND	*0.407*	ND	*1.00*	10/27/15	KCA	1	
Isopropylbenzene	0.212	*0.204*	1.04	*1.00*	10/27/15	KCA	1	
m,p-Xylene	13.4	*0.230*	58.1	*1.00*	10/27/15	KCA	1	
Methyl Ethyl Ketone	296	*3.39*	872	*10.0*	10/27/15	KCA	10	
Methyl tert-butyl ether(MTBE)	ND	*0.278*	ND	*1.00*	10/27/15	KCA	1	
Methylene Chloride	ND	*0.288*	ND	*1.00*	10/27/15	KCA	1	
n-Butylbenzene	ND	*0.182*	ND	*1.00*	10/27/15	KCA	1	1
o-Xylene	5.49	*0.230*	23.8	*1.00*	10/27/15	KCA	1	
Propylene	64.9	*5.81*	112	*10.0*	10/27/15	KCA	10	1
sec-Butylbenzene	ND	*0.182*	ND	*1.00*	10/27/15	KCA	1	1
Styrene	ND	*0.235*	ND	*1.00*	10/27/15	KCA	1	
Tetrachloroethene	0.409	*0.037*	2.77	*0.25*	10/27/15	KCA	1	
Tetrahydrofuran	ND	*0.339*	ND	*1.00*	10/27/15	KCA	1	1
Toluene	30.8	*0.266*	116	*1.00*	10/27/15	KCA	1	
Trans-1,2-Dichloroethene	ND	*0.252*	ND	*1.00*	10/27/15	KCA	1	
trans-1,3-Dichloropropene	ND	*0.221*	ND	*1.00*	10/27/15	KCA	1	
Trichloroethene	ND	*0.047*	ND	*0.25*	10/27/15	KCA	1	
Trichlorofluoromethane	0.277	*0.178*	1.56	*1.00*	10/27/15	KCA	1	
Trichlorotrifluoroethane	ND	*0.131*	ND	*1.00*	10/27/15	KCA	1	
Vinyl Chloride	ND	*0.098*	ND	*0.25*	10/27/15	KCA	1	
QA/QC Surrogates								
% Bromofluorobenzene	79	*%*	79	*%*	10/27/15	KCA	1	

Project ID: 109-17 72ND RD., QUEENS
Client ID: SV01

Phoenix I.D.: BK13531

Parameter	ppbv Result	ppbv RL	ug/m3 Result	ug/m3 RL	Date/Time	By	Dilution

1 = This parameter is not certified by NY NELAC for this matrix. NY NELAC does not offer certification for all parameters at this time.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quanitation) ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

Phyllis Shiller, Laboratory Director
November 05, 2015
Reviewed and Released by: Sarah Bell, Project Manager

PHOENIX

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

QA/QC Report

November 05, 2015

QA/QC Data

SDG I.D.: GBK13527

Parameter	Blk ppbv	Blk RL ppbv	Blk ug/m3	Blk RL ug/m3	LCS %	Sample Result ug/m3	Sample Dup ug/m3	Sample Result ppbv	Sample Dup ppbv	DUP RPD	% Rec Limits	% RPD Limits
QA/QC Batch 324809 (ppbv), QC Sample No: BK13532 (BK13527 (1X, 10X) , BK13528, BK13529 (1X, 5X) , BK13530 (1X, 5X) , BK13531 (1X, 10X))												
Volatiles												
1,1,1,2-Tetrachloroethane	ND	0.146	ND	1.00	119	ND	ND	ND	ND	NC	70 - 130	20
1,1,1-Trichloroethane	ND	0.183	ND	1.00	102	ND	ND	ND	ND	NC	70 - 130	20
1,1,2,2-Tetrachloroethane	ND	0.146	ND	1.00	96	ND	ND	ND	ND	NC	70 - 130	20
1,1,2-Trichloroethane	ND	0.183	ND	1.00	107	ND	ND	ND	ND	NC	70 - 130	20
1,1-Dichloroethane	ND	0.247	ND	1.00	97	ND	ND	ND	ND	NC	70 - 130	20
1,1-Dichloroethene	ND	0.252	ND	1.00	94	ND	ND	ND	ND	NC	70 - 130	20
1,2,4-Trichlorobenzene	ND	0.135	ND	1.00	125	ND	ND	ND	ND	NC	70 - 130	20
1,2,4-Trimethylbenzene	ND	0.204	ND	1.00	95	2.19	2.13	0.446	0.433	3.0	70 - 130	20
1,2-Dibromoethane(EDB)	ND	0.130	ND	1.00	103	ND	ND	ND	ND	NC	70 - 130	20
1,2-Dichlorobenzene	ND	0.166	ND	1.00	90	ND	ND	ND	ND	NC	70 - 130	20
1,2-Dichloroethane	ND	0.247	ND	1.00	97	ND	ND	ND	ND	NC	70 - 130	20
1,2-dichloropropane	ND	0.216	ND	1.00	83	ND	ND	ND	ND	NC	70 - 130	20
1,2-Dichlorotetrafluoroethane	ND	0.143	ND	1.00	101	ND	ND	ND	ND	NC	70 - 130	20
1,3,5-Trimethylbenzene	ND	0.204	ND	1.00	96	ND	ND	ND	ND	NC	70 - 130	20
1,3-Butadiene	ND	0.452	ND	1.00	153	ND	ND	ND	ND	NC	70 - 130	20
1,3-Dichlorobenzene	ND	0.166	ND	1.00	93	ND	ND	ND	ND	NC	70 - 130	20
1,4-Dichlorobenzene	ND	0.166	ND	1.00	91	ND	ND	ND	ND	NC	70 - 130	20
1,4-Dioxane	ND	0.278	ND	1.00	117	ND	ND	ND	ND	NC	70 - 130	20
2-Hexanone(MBK)	ND	0.244	ND	1.00	87	ND	ND	ND	ND	NC	70 - 130	20
4-Ethyltoluene	ND	0.204	ND	1.00	102	ND	ND	ND	ND	NC	70 - 130	20
4-Isopropyltoluene	ND	0.182	ND	1.00	105	ND	ND	ND	ND	NC	70 - 130	20
4-Methyl-2-pentanone(MIBK)	ND	0.244	ND	1.00	102	ND	ND	ND	ND	NC	70 - 130	20
Acetone	ND	0.421	ND	1.00	82	28.0	29.2	11.8	12.3	4.1	70 - 130	20
Acrylonitrile	ND	0.461	ND	1.00	104	ND	ND	ND	ND	NC	70 - 130	20
Benzene	ND	0.313	ND	1.00	99	ND	ND	ND	ND	NC	70 - 130	20
Benzyl chloride	ND	0.193	ND	1.00	87	ND	ND	ND	ND	NC	70 - 130	20
Bromodichloromethane	ND	0.149	ND	1.00	104	ND	ND	ND	ND	NC	70 - 130	20
Bromoform	ND	0.097	ND	1.00	112	ND	ND	ND	ND	NC	70 - 130	20
Bromomethane	ND	0.257	ND	1.00	104	ND	ND	ND	ND	NC	70 - 130	20
Carbon Disulfide	ND	0.321	ND	1.00	97	ND	ND	ND	ND	NC	70 - 130	20
Carbon Tetrachloride	ND	0.040	ND	0.25	106	0.50	0.52	0.080	0.083	3.7	70 - 130	20
Chlorobenzene	ND	0.217	ND	1.00	103	ND	ND	ND	ND	NC	70 - 130	20
Chloroethane	ND	0.379	ND	1.00	105	ND	ND	ND	ND	NC	70 - 130	20
Chloroform	ND	0.205	ND	1.00	96	ND	ND	ND	ND	NC	70 - 130	20
Chloromethane	ND	0.484	ND	1.00	112	1.33	1.29	0.645	0.623	3.5	70 - 130	20
Cis-1,2-Dichloroethene	ND	0.256	ND	1.01	97	ND	ND	ND	ND	NC	70 - 130	20
cis-1,3-Dichloropropene	ND	0.220	ND	1.00	103	ND	ND	ND	ND	NC	70 - 130	20
Cyclohexane	ND	0.291	ND	1.00	102	1.71	1.75	0.497	0.510	2.6	70 - 130	20
Dibromochloromethane	ND	0.117	ND	1.00	113	ND	ND	ND	ND	NC	70 - 130	20
Dichlorodifluoromethane	ND	0.202	ND	1.00	102	1.98	2.06	0.401	0.416	3.7	70 - 130	20

QA/QC Data

SDG I.D.: GBK13527

Parameter	Blk ppbv	Blk RL ppbv	Blk ug/m3	Blk RL ug/m3	LCS %	Sample Result ug/m3	Sample Dup ug/m3	Sample Result ppbv	Sample Dup ppbv	DUP RPD	% Rec Limits	% RPD Limits	
Ethanol	ND	0.531	ND	1.00	87	110	116	58.2	61.5	5.5	70 - 130	20	
Ethyl acetate	ND	0.278	ND	1.00	83	2.73	2.71	0.759	0.753	0.8	70 - 130	20	
Ethylbenzene	ND	0.230	ND	1.00	104	1.01	1.04	0.233	0.239	2.5	70 - 130	20	
Heptane	ND	0.244	ND	1.00	101	1.22	1.32	0.298	0.323	8.1	70 - 130	20	
Hexachlorobutadiene	ND	0.094	ND	1.00	125	ND	ND	ND	ND	NC	70 - 130	20	
Hexane	ND	0.284	ND	1.00	97	1.76 S	1.92 S	0.499 S	0.545 S	8.8	70 - 130	20	
Isopropylalcohol	ND	0.407	ND	1.00	92	12.7	13.0	5.18	5.28	1.9	70 - 130	20	
Isopropylbenzene	ND	0.204	ND	1.00	113	ND	ND	ND	ND	NC	70 - 130	20	
m,p-Xylene	ND	0.230	ND	1.00	107	4.03	3.95	0.928	0.911	1.8	70 - 130	20	
Methyl Ethyl Ketone	ND	0.339	ND	1.00	96	1.73	1.69	0.588	0.573	2.6	70 - 130	20	
Methyl tert-butyl ether(MTBE)	ND	0.277	ND	1.00	103	ND	ND	ND	ND	NC	70 - 130	20	
Methylene Chloride	ND	0.288	ND	1.00	92	ND	ND	ND	ND	NC	70 - 130	20	
n-Butylbenzene	ND	0.182	ND	1.00	103	ND	ND	ND	ND	NC	70 - 130	20	
o-Xylene	ND	0.230	ND	1.00	105	1.18	1.25	0.271	0.288	6.1	70 - 130	20	
Propylene	ND	0.581	ND	1.00	111	ND	ND	ND	ND	NC	70 - 130	20	
sec-Butylbenzene	ND	0.182	ND	1.00	107	ND	ND	ND	ND	NC	70 - 130	20	
Styrene	ND	0.235	ND	1.00	127	ND	ND	ND	ND	NC	70 - 130	20	
Tetrachloroethene	ND	0.037	ND	0.25	110	0.62	0.83	0.091	0.122	29.1	70 - 130	20	r
Tetrahydrofuran	ND	0.339	ND	1.00	81	ND	ND	ND	ND	NC	70 - 130	20	
Toluene	ND	0.266	ND	1.00	104	2.73	2.74	0.725	0.728	0.4	70 - 130	20	
Trans-1,2-Dichloroethene	ND	0.252	ND	1.00	98	ND	ND	ND	ND	NC	70 - 130	20	
trans-1,3-Dichloropropene	ND	0.220	ND	1.00	112	ND	ND	ND	ND	NC	70 - 130	20	
Trichloroethene	ND	0.047	ND	0.25	113	ND	ND	ND	ND	NC	70 - 130	20	
Trichlorofluoromethane	ND	0.178	ND	1.00	105	1.44	1.44	0.256	0.256	0.0	70 - 130	20	
Trichlorotrifluoroethane	ND	0.131	ND	1.00	98	ND	ND	ND	ND	NC	70 - 130	20	
Vinyl Chloride	ND	0.098	ND	0.25	111	ND	ND	ND	ND	NC	70 - 130	20	
% Bromofluorobenzene	102	%	102	%	103	103	104	103	104	1.0	70 - 130	20	

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
r = This parameter is outside laboratory RPD specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
November 05, 2015

Sample Criteria Exceedences Report

GBK13527 - AESHAUP

Criteria: None

State: NY

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

PHOENIX Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Telephone: 860.645.1102 • Fax: 860.645.0823

CHAIN OF CUSTODY RECORD
AIR ANALYSES
800-827-5426
email: greg@phoenixlabs.com

P.O. # Page of

Data Delivery:
☐ Fax #:
☐ Email:
☐ Phone #:

Report to: John
Customer: AES
Address:

Invoice to: Associated Engineers

Sampled by: JF

Project Name: 109-17 72nd Rd Queens

Requested Deliverable:
RCP ☐ ASP CAT B ☐
MCP ☐ NJ Deliverables ☐

State where samples collected:

Phoenix ID #	Client Sample ID	Canister ID #	Canister Size (L)	Outgoing Canister Pressure (" Hg)	Incoming Canister Pressure ("Hg)	Flow Regulator ID #	Flow Controller Setting (mL/min)	Sampling Start Time	Sampling End Time	Sample Start Date	Canister Pressure at Start (" Hg)	Canister Pressure at End ("Hg)	Ambient/Indoor Air	Soil Gas	Grab (G) Composite (C)	TO-14	TO-15
		THIS SECTION FOR LAB USE ONLY											MATRIX			ANALYSES	
13527	SV05	230	6.0	-30	-7	4494	4117	1307	1453	10/23/15	-30	-8					X
13528	SV04	465	6.0	-30	-9	5654	✓	1302	1450	10/23/15	-30	-10					X
~~13529~~ TF 101260	~~SV05~~	493	6.0	-30		4993	✓										
13530	SV03	12868	6.0	-30	-8	5707	✓	1300	1448	10/23/15	-30	-9					X
13531	SV02	350	6.0	-30	-9	5711	✓	1257	1440	10/23/15	-29	-8					X
	SV01	220	6.0	-30	-7	3407	✓	1250	1442	10/23/15	-30	-10					X
	6L 2hrs																

Relinquished by:

Accepted by: Date: Time:
10/26/15 1012
TFCMMS 101260 1602

Data Format:
Excel ☐ Equis ☐ GISKey ☐
PDF ☐ Other: ☐

SPECIAL INSTRUCTIONS, QC REQUIREMENTS, REGULATORY INFORMATION:

Requested Criteria

Quote Number:

I attest that all media released by Phoenix Environmental Laboratories, Inc. have been received in good working condition and agree to the terms and conditions as listed on the back of this document:

Signature: Date:

APPENDIX 5

VAPOR BARRIER/WATERPROOFING SPECIFICATIONS

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN INDUSTRIES

Product Description

VaporBlock® Plus™ 20 is a seven-layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission. VaporBlock® Plus™ 20 is a highly resilient underslab / vertical wall barrier designed to restrict naturally occurring gases such as radon and/or methane from migrating through the ground and concrete slab. VaporBlock® Plus™ 20 is more than 100 times less permeable than typical high-performance polyethylene vapor retarders against Methane, Radon and other harmful VOCs.

VaporBlock® Plus™ 20 is one of the most effective underslab gas barriers in the building industry today far exceeding ASTM E-1745 (Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs) Class A, B and C requirements. Available in a 20 (Class A) mil thicknesses designed to meet the most stringent requirements. VaporBlock® Plus™ 20 is produced within the strict guidelines of our ISO 9001:2008 Certified Management System.

Product Use

VaporBlock® Plus™ 20 resists gas and moisture migration into the building envelop when properly installed to provide protection from toxic/harmful chemicals. It can be installed as part of a passive or active control system extending across the entire building including floors, walls and crawl spaces. When installed as a passive system it is recommended to also include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans.

VaporBlock® Plus™ 20 works to protect your flooring and other moisture-sensitive furnishings in the building's interior from moisture and water vapor migration, greatly reducing condensation, mold and degradation.

Size & Packaging

VaporBlock® Plus™ 20 is available in 10' x 150' rolls to maximize coverage. All rolls are folded on heavy-duty cores for ease in handling and installation. Other custom sizes with factory welded seams are available based on minimum volume requirements. Installation instructions and ASTM E-1745 classifications accompany each roll.

Under-Slab Vapor/Gas Retarder

Product	Part #
VaporBlock Plus 20	VBP 20

APPLICATIONS

- Radon Barrier
- Methane Barrier
- VOC Barrier
- Under-Slab Vapor Retarder
- Foundation Wall Vapor Retarder

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VAPORBLOCK® PLUS™ VBP20

ISO 9001:2008 CERTIFIED MANAGEMENT SYSTEM

Under-Slab Vapor / Gas Barrier

		VAPORBLOCK PLUS 20	
PROPERTIES	**TEST METHOD**	**IMPERIAL**	**METRIC**
Appearance		White/Gold	
Thickness, Nominal		20 mil	0.51 mm
Weight		102 lbs/MSF	498 g/m²
Classification	ASTM E 1745	CLASS A, B & C	
Tensile Strength lbf/in (N/cm) average MD & TD (new material)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
Impact Resistance	ASTM D 1709	2600 g	
Maximum Use Temperature		180° F	82° C
Minimum Use Temperature		-70° F	-57° C
Permeance (new material)	ASTM E 154 Section 7 ASTM E 96 Procedure B	0.0051 Perms grains/(ft²·hr·in·Hg)	0.0034 Perms g/(24hr·m²·mm Hg)
Radon Diffusion Coeffiecient	K124/02/95	$< 1.1 \times 10^{-13}$ m²/s	
Methane Permeance	ASTM D 1434	$< 1.7 \times 10^{-10}$ m²/d• atm 0.32 GTR (Gas Transmission Rate) ml/m²•D•ATM	

VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.
Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.
ASTM E-1643 also provides general installation information for vapor retarders.

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VaporBlock® Plus™ is a seven-layer co-extruded barrier made using high quality virgin-grade polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission.

RAVEN INDUSTRIES
Engineered Films Division
P.O. Box 5107
Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333

Toll Free: **800-635-3456**
Email: **efdsales@ravenind.com**
www.ravenefd.com

Limited Warranty available at www.RavenEFD.com

APPENDIX 6

CITIZEN PARTICIPATION PLAN

APPENDIX 1

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and PSRS Realty have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, PSRS Realtywill maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Katherine Glass , who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

Project Contact List: OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the

Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at brownfields@cityhall.nyc.gov.

Repositories: A document repository is maintained online. Internet access to view OER's document repositories is available at public libraries. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. The library nearest the Site is:

Forest Hills Library

10819 71st Ave, Forest Hills, New York 11375

718-268-7934

Repository Hours of Operation

Monday: 9-8
Tuesday: 2-7
Wednesday: 11-7
Thursday: 11-7
Friday: 11-7
Saturday 10-5:30
Sunday: Closed

Digital Documentation: NYC OER requires the use of digital documents in our repository as a means of minimizing paper use while also increasing convenience in access and ease of use.

Issues of Public Concern: Fugitive dust emissions from soil removal activities.

Public Notice and Public Comment: Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be reviewed and approved by OER prior to distribution and mailed by the Enrollee. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

Citizen Participation Milestones: Public notice and public comment activities occur at several steps during a typical NYC VCP project. These steps include:

- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.
- **Public Notice announcing the approval of the RAWP and the start of remediation:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.
- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.