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February 16, 2006

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NYSDEC – Region 2
Division of Environmental Remediation
47-40 21st Street
Long Island City, New York 11101

Ms. Julia Guastella
Bureau of Environmental Exposure Investigation
Division of Environmental Health Investigation
NYSDOH
547 River Street, Room 300
Troy, NY 12180

Subject: **Interim Remedial Measure Work Plan**
BCP ID No. 231043
West 61st Street Site
New York, New York

Dear Mr. Singh and Ms. Guastella:

AKRF, Inc. (AKRF) is pleased to submit the enclosed Interim Remedial Measure (IRM) Work Plan and proposed Fact Sheet (No. 2) for the West 61st Street Site, New York, New York. This plan addresses the investigation and removal of five of the seven Areas of Concern (AOCs) identified in the January 2006 Remedial Investigation Report. This IRM will allow the Volunteer provide a quick solution to several small areas of concern prior to and in preparation of implementing a remedial action work plan. The Interim remedial Measure will address several areas, including, the lead-contaminated soil at location MW-3 (0-2') near the northeastern corner parking lot (AOC-1), the tanks in the two locations in the parking lot (AOC-2 and AOC-3), beneath the concrete slab on Lot 53 (AOC-4), and the acetone-affected soil at location MW-4 (12'-14') in Lot 55. The results of the Interim Remedial Measure will provide additional information regarding possible leakage from the underground storage tanks before implementation of the Remedial Action Work Plan. In addition, removal of the tanks and contaminated soil will accelerate the Volunteer's ability to conduct the major waste removal operations (e.g., fill material, contaminated soil and groundwater along West 60th Street [AOC-5], and the removal of fill material on Lot 8 to locate the 1,050-gallon vaulted tank [AOC-6]) upon approval of the Remedial Action Work Plan. This will expedite the excavation process, thereby accelerating the project's benefit of protecting human health and the environment.

The IRM activities will be undertaken in conformance with an Interim Remedial Measure Health and Safety Plan (IRM HASP), included in Appendix A of this IRM Work Plan. The IRM HASP also contains an Expanded Community Air Monitoring Plan, included as Appendix F. This same Expanded Community Air Monitoring Plan was previously included in the NYSDEC/NYSDOH-approved June 2005 Revised HASP. The IRM HASP expands the previously approved June 2005 Revised HASP to include health and safety issues relating to the excavation, storage, and removal of tanks and contaminated soil of known chemical composition.

If you have any questions, please contact Project Manager Richard Gardineer, P.E. at 914-922-2369, or me at 646-388-9520.

Sincerely,
AKRF, Inc.

Michelle Lapin, P.E.
Senior Vice President

AKRF, Inc.
440 Park Avenue South New York, NY 10016
212-696-0670

Submitted to:

Algin Management Co., LLC
64-35 Yellowstone Boulevard
Forest Hills, NY 11375

INTERIM REMEDIAL MEASURE WORK PLAN

West 61st Street Site

New York, New York

Project Number: 10321
BCP ID 231043

FEBRUARY 2006

West 61st Street

NEW YORK, NEW YORK

Interim Remedial Measure Work Plan

AKRF Project Number: 10321

Prepared for:

Algin Management Co., LLC
64-35 Yellowstone Boulevard

Forest Hills, NY 11375

Prepared by:

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New York, NY 10016
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FEBRUARY 2006

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1.0 INTRODUCTION

The West 61st Street Site (the "Site") consists of approximately 62,500 square feet of land located on West 60th and 61st Streets between West End Avenue and Amsterdam Avenue in Manhattan, New York (Figure 1). Specifically, the study Site consists of Block 1152, Lots 5, 8, 10, 11, 12, 13, 43, 52, 53, and 55 (Figure 2). These parcels are currently occupied by vacant land, except for the northeastern corner of the Site, which is presently used as a commercial parking lot. Residential, industrial, institutional (school), and commercial properties are present in the surrounding neighborhood.

A Phase I Environmental Site Assessment (ESA) performed by AKRF, Inc. (AKRF) in June 2003 identified Recognized Environmental Conditions (RECs) for the Site, including former and current land use and potential underground storage tanks. In October 2004, West 60th Street Associates, LLC, and West End Enterprises, LLC (the "Volunteer"), submitted an application to participate in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). The Brownfield Cleanup Agreement for the Site was signed by the Volunteer in March 2005 and subsequently executed by the NYSDEC. Under this agreement, the Volunteer prepared and submitted a Remedial Investigation Work Plan (RIWP), dated April 2005 (which included the Phase I ESA), and a subsequent RIWP Addendum dated June 2005, which were approved by the NYSDEC. These documents were prepared in compliance with NYSDEC Division of Environmental Remediation guidance document DER-10 and included digital submittals.

The Remedial Investigation (RI) commenced in the late summer of 2005 and was completed in early November. The RI was performed in conformance with the BCP Guidance Document, the Brownfields Cleanup Guidance DER-10, and a NYSDEC-prepared Cross-Reference Check List, included as Table 1 in the Remedial Investigation Report (RIR), which was submitted in January 2006. The RIR is currently under review by the NYSDEC and NYSDOH. The RI identified several Areas of Concern (AOCs) that must be addressed through either further investigation or remediation. These areas include: one area of elevated lead in the soil; two locations where underground storage tanks were identified through the observation of fill pipes; one location where suspected tank(s) were identified through a geophysical survey; one location where a vaulted tank was previously identified but its removal was not documented; one location where acetone-contaminated soil was identified; and one location where contaminated soil and groundwater were detected.

In an effort to hasten the cleanup of the Site, the Volunteer has proposed the undertaking of an Interim Remedial Measure (IRM) to investigate and remove some of the AOCs identified in the RIR. Specifically, this IRM would address the lead-contaminated soil, the elevated acetone soil, and the identified underground storage tanks. This will provide additional information about possible leaking tanks and contaminated soil prior to commencement of the Site remediation. In addition, this would result in an expeditious removal of the on-site fill material, thereby accelerating the project's benefit of protecting public health and the environment.

2.0 SITE DESCRIPTION

2.1 Site Location

The 1.43-acre Site is located in western Manhattan, approximately 500 feet east of the Hudson River. It is contiguous between West 60th and West 61st Streets, and is situated on the block between West End Avenue and Amsterdam Avenue. The Site consists of Block 1152, Lots 5, 8, 10, 11, 12, 13, 43, 52, 53, and 55. The eastern boundary of Lot 5 is approximately 100 feet east of West End Avenue, as shown on Figure 2.

2.2 Site and Vicinity Characteristics

The Site is located in an area currently going through a transformation from residential, industrial, and commercial establishments to schools and residential buildings containing retail uses on the first floor. Past and present commercial establishments in the area have included gasoline stations, automobile repair shops, a fabric/button manufacturer that generated hazardous wastes, and a rail yard. The immediate area around the Site currently contains residential buildings, three schools, a community center, and an auto repair shop.

2.3 Site Geology, Hydrogeology, and Subsurface Characteristics

The surface topography at the Site and the surrounding area slopes downward from east to west towards the Hudson River. Based on a Site survey by True North Surveyors, Inc., the property lies at an elevation of approximately 61 feet at its highest point, sloping westerly to an elevation of approximately 32 feet at its lowest point, based on the Borough of Manhattan Datum. Geotechnical engineering borings performed by RA Consultants indicate that the bedrock surface is variable and ranges from elevation 40.8 on the northeastern corner to elevation 0 at a point along West 61st Street, near the northwest corner of the Site. Depth to bedrock varies from 9.5 to 45 feet below ground surface. The geotechnical investigation indicated that the bedrock appears to undulate as well as slope. The bedrock consists of highly-weathered schist that is part of the Manhattan Formation.

The information gathered from the overburden and bedrock groundwater monitoring wells identified groundwater at depths of approximately 10 to 16 feet below grade. In the bedrock aquifer, the groundwater elevations ranged from elevation 51 in the northeastern corner of the Site to elevation 31 in the southeastern corner. Based on this information, the estimated flow direction in the bedrock aquifer appears to be slightly towards the southwest. In the overburden aquifer, groundwater was not encountered in the eastern section of the Site. In the central portion to the western perimeter of the Site, the groundwater ranged from elevation 30 to elevation 15. Groundwater in the overburden aquifer appears to flow from the northeast to the southwest, ultimately discharging into the Hudson River. The groundwater flow at the Site may be affected by one or more factors, including current and past pumping of groundwater; past filling activities; underground utilities and other subsurface openings, or obstructions such as basements or underground parking garages; bedrock geology; and other factors. Groundwater in New York County is not used as a source of potable water.

2.4 Nearby Public Areas of Concern

There are a number of residences and schools in close proximity to the Site. Residences and a public school are located across West 61st Street from the Site. Another public school is located adjacent to Lot 43, along West 61st Street, at the intersection of West 61st Street and Amsterdam Avenue. A residential building is being constructed adjacent to Lot 13, along West 60th Street. A New York City Parks Department pool is located across West 60th Street. A charter school is located on West 60th Street adjacent to Lot 5. There is presently new building construction at the southeastern corner of West 60th Street and West End Avenue and on the west side of West End Avenue between West 60th Street and West 61st Street. The immediate surrounding area is shown on Figure 2.

2.5 Site History

The regulatory databases, Fire Department records, electronic Buildings Department records, historical land-use maps, and visual inspections indicated that the subject block was developed prior to 1907 as residential, transitioned from primarily residential to commercial and industrial

uses by the 1950s, and has remained commercial and industrial through the present. During the June 2003 Phase I Environmental Site Assessment (ESA) Site inspection, buildings were present on seven of the ten Site lots. Since that time, the Site buildings have been demolished; the concrete slabs have been left in place on Lots 5 and 53. After demolition of the buildings, the Site was graded with on-site construction and demolition debris to match the surrounding ground surface elevation. Three aboveground storage tanks from Lots 5 and 12 were closed and disposed of off-site prior to the demolition.

2.6 Off-Site History

The area around the Site contained tenement houses and some commercial establishments, such as an auto repair shop, a parking garage with gasoline tanks, a gasoline station, a brewing company, a junk yard, a bakery, and a public bathhouse. In subsequent years, two public schools were constructed on West 61st Street and a charter school was constructed on West 60th Street. From 1926 to approximately June 2003, Emsig Manufacturing, a factory that produced buttons and fabrics, was in operation adjacent to Lot 13. Emsig Manufacturing, listed as a hazardous waste generator, used acetone and styrene in their manufacturing process, generating wastes such as ignitable, corrosive, solvents, plating wastes, and metals including barium and chromium. The property contained two 3,000-gallon fuel oil storage tanks. The original structure was demolished and the property is presently being developed as an apartment building.

2.7 Previous Studies

2.7.1 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) was performed by AKRF on the Project Site in June 2003. The ESA report included the findings of a Site inspection, the evaluation of available historical information, and the interpretation of relevant federal and State environmental databases. The findings of the Phase I ESA pertaining to this proposed Interim Remedial Measure (IRM) Work Plan are as follows:

Lot 13 was occupied by a gravel parking lot used for taxi cab parking and a small elevated office in the rear of the lot. Historically, this parcel was occupied by a total of four separate four-story residential buildings with storefronts. The lot was then used for two separate periods as a two-story auto repair shop, and became a vacant lot in 2001. The 1926 historical (Sanborn) map indicated that a 1,000-gallon gasoline underground storage tank was located on the Site. This parcel was listed for three 550-gallon diesel underground storage tanks installed in 1969 on the regulatory database. Their registration expired in 1993. Records maintained by the Fire Department revealed that a permit for three 550-gallon tanks filed in 1984 expired in 1989. These are likely the same tanks listed in the regulatory database. It is unknown whether or not these tanks had been removed or remained on the parcel at the time of the Site inspection. During the Site visit, no evidence of on-site tanks, such as fill caps or vent pipes, was observed. The Phase I ESA noted the presence of a manufacturer directly uphill and adjacent to this lot. Discharges from this adjacent off-site property, the former Emsig Manufacturing, may have affected on-site conditions. The building was demolished during the Remedial Investigation (RI) field activities.

Lot 43 is presently occupied by a gravel and paved lot used for commercial parking. Historically, this parcel was occupied by nine five-story residential buildings with storefronts until 1926. The lot was then used for parking and as a gasoline station with a small one-story office. It was then a vacant lot from 1976 to 1986, at which time it became a commercial parking lot. NYC Buildings Department records indicated that an

unspecified number of gasoline tank installation permits were applied for in 1947. These permits are most likely associated with the former on-site gasoline station noted on the 1951 Sanborn map. The Phase I ESA stated that these tanks apparently remained in place. The one-story office has not been demolished.

Lot 52 contained a one-story concrete block and brick building used by 3G Studio Corporation for sound stage and set building activities. This building was constructed sometime between 1907 and 1926. There was no evidence to indicate the current presence of petroleum or chemical storage tanks on-site. Historically, this parcel was occupied by a one- to two-story building with a storefront, then a one-story auto repair shop, followed by a metal works factory (circa 1951), and then a one-story building with unknown occupants just prior to its most recent use by 3G Studios. Storage tanks may have been in use on-site in the past, but there were no records to indicate any such tanks. The building was demolished during the RI field activities.

Lot 53 contained a one-story brick building with a basement. It was attached to the building on Lot 52 and was also most recently used by 3G Studio Corporation for sound stage and set building activities. This building was constructed between 1926 and 1951, and was occupied by two five-story residential buildings, followed by a one- to two-story garage, and finally the one- to two-story sound stage. NYC Buildings Department records indicated that a gasoline tank installation permit was applied for in 1950. Site interviews indicated that there were no active gasoline tanks on-site. The Phase I ESA was unable to ascertain whether this tank was installed, and if so, whether it was subsequently removed. The building was demolished during RI field activities.

Lot 55 was most recently occupied by a gravel and paved lot containing parked trucks and cars. This parking area was used by the east-adjacent 3G Studio Corporation. There was no evidence to suggest the presence of chemical or petroleum storage tanks. Historically, this parcel was occupied by a five-story residential building, and was then used as a parking lot. The former residential building may have utilized a fuel oil storage tank; however, no records indicated such usage.

2.7.2 February 22, 2005, Geotechnical Investigation Report

A geotechnical investigation was undertaken at the Site in February 2005 by RA Consultants. Sixteen borings were advanced to bedrock at various locations throughout the Site using rotary drills. Four borings were drilled on the southern portion of the Site along West 60th Street: one boring (B-10) was placed in the southeastern corner of Lot 13; the second boring (B-12) was placed in the southwest corner of Lot 13; one boring (B-14) was located in the southern portion of Lot 8; and one boring (B-16) was placed in the sidewalk near the southwestern corner of Lot 3. The report and boring location map are included in Appendix P of the January 2006 Remedial Investigation Report (RIR). Petroleum odors were noted in three of the boring logs (B-12, B-14, and B-16) and the report narrative. The petroleum odors were noted at depths ranging from 15 to 22 feet below the surface.

2.7.3 January 2006 Remedial Investigation Report

Prior to the Remedial Investigation (RI), three storage tanks were identified and removed. A 550-gallon aboveground storage tank and a 1,080-gallon vaulted basement tank were removed from Lot 5. A 550-gallon tank was removed from the basement of Lot 12. No other tanks were discovered inside the buildings on Lots 5, 11, 12, 52, or 53 prior to the demolition of the buildings. During the RI, the geophysical survey and

subsurface soil sampling program identified seven on-site Areas of Concern (AOCs). These included the following:

AOC-1: Soil containing an elevated concentration of lead, located in the northeastern corner of Lot 43 (B/MW-3 [0-2']). The collected soil sample exceeded the characteristic hazardous waste limit for lead in 6 NYCRR Section 371-3(3).

AOC-2: Underground storage tank(s) located near the parking lot attendant guard house in Lot 43. Fill pipes were identified during the geophysical survey.

AOC-3: Suspected underground storage tank(s) in the southwest corner of the parking lot portion of Lot 43. This was identified during the geophysical survey.

AOC-4: Underground storage tanks located on Lot 53, beneath a concrete slab near the western wall of the former building. This was identified during the geophysical survey.

AOC-5: Contaminated soil and groundwater, located on Lots 5, 8, 10, and 13, near West 60th Street. This was identified through the analysis of soil and groundwater samples collected from borings B-17 and groundwater monitoring wells MW-7, MW-7D, and MW-8.

AOC-6: Vaulted basement storage tank in Lot 8. This was identified during a previous Site inspection. Three test trenches excavated during the RI did not uncover the tank.

AOC-7: Soil containing acetone in a concentration above the allowable guidance value in NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046. This acetone concentration is suspect, but must be addressed in a Brownfields Program Track 1 Cleanup.

The AOCs have been located through a survey and are shown on Figure 4 of this report. The coordinates of each AOC are shown on Figure 5 of the January 2006 Remedial Investigation Report (RIR).

2.8 Description of Contemplated Site Use

The proposed Project includes the construction of three new buildings that would include parking and mechanical spaces at the cellar and sub-cellar levels; retail, residential, and community uses on the first floor; and residential uses (rental and condominium) on the second story through the top of the buildings. Building A will contain nine floors, Building B will contain 14 floors, and Building C will contain 29 floors. The parking garage will be located beneath Buildings A and B. The Project will include the construction of a tennis court and surrounding track on the eastern portion of the Site, situated along West 61st Street. One undeveloped portion west of the buildings will become a landscaped area, referred to as a courtyard. The proposed development is shown on Figure 4. Figure 4 also includes the depths of excavation for the various features of the development.

3.0 CONSTRUCTION MEASURES

Urban fill material containing elevated concentrations of semi-volatile organic compounds (SVOCs) and metals is present underneath the Site and will be disturbed during excavation activities. Pockets of petroleum-contaminated soil and bedrock may be encountered in the vicinity of the historic gasoline underground storage tank(s) in Lot 43 and possibly in the tank(s) in Lot 53. In the event that petroleum-contaminated soil or bedrock is encountered during excavation in the vicinity of the former gasoline underground storage tank, measures are provided in Section 3.4 for appropriate handling, testing, and disposal of these materials during general excavation. All work outlined within the Interim Remedial Measure (IRM) Work Plan is subject to the Interim Remedial Measure Health and Safety Plan (IRM HASP), contained in Appendix A, and a Community Air Monitoring Plan (CAMP), contained in Appendix B.

3.1 Lead-Contaminated Soil Removal at Location B/MW-3

The soil sample collected at location B/MW-3 (0-2') contained lead at a concentration that classified it as a characteristic hazardous waste under 6 NYCRR Section 371.3(e). The remediation will consist of a "hot spot" removal by excavating a six foot by six foot square area around the sample location to a depth of six feet. A previous sample collected at a depth of seven to nine feet at this location contained lead at a lower concentration (not considered hazardous). Following hot spot removal, side wall samples will be collected at a depth of approximately two feet below the surface and one bottom sample will be collected. These samples will be analyzed for total lead and Toxicity Characteristic Leaching Procedure (TCLP) lead. The samples will also be tested for characterization parameters, based on the requirements of the disposal facility.

3.1.1 Soil Removal Procedures

The following procedures will be followed for excavation of the lead-contaminated soil:

1. Mark out the horizontal limits to be excavated.
2. Excavate the soil and place the approximately eight cubic yards of material either on a plastic sheet or directly onto the truck, depending on whether the material has been pre-approved by the disposal facility.
3. At a depth of six feet below the surface, have the machine operator scoop one additional bucket from the bottom of the pit. Collect a sample from the top of exposed material in the bucket. Using an appropriate disposable or decontaminated sampling device (trowel), collect samples separately from each of the four sidewalls at a depth of approximately two feet from the surface.
4. Sample collection, decontamination procedures (to avoid contamination or cross-contamination), sample identification, sample labeling and shipping, sample custody, and documentation will be undertaken consistent with the procedures outlined in Section 4.0.
5. If the material has not been pre-approved or pre-analyzed, take a composite sample from the excavated material by compositing ten samples collected from various locations around the pile. Pour the samples on top of one another on a plastic sheet and quarter the pile. Collect the sample for each bottle from the "quartered" material.

6. If the excavation is to be backfilled, place a plastic sheet in the pit, lining the four walls and the bottom. Place fill material on top of the sheet.
7. Photo-document all procedures and record all procedures in a bound field notebook.
8. Copies of all testing results, correspondence with disposal facilities concerning classification of materials, and permits/approvals will be maintained by the Project Manager and will be submitted to the NYSDEC in an Interim Remedial Measure (IRM) Summary Report.

3.1.2 Disposal

Disposal will be in accordance with all applicable federal, State, and local requirements, including those for hazardous waste. Manifests and truck tickets will be included in the IRM Report.

Letters of commitment will be obtained from the waste haulers and the treatment, disposal, or recovery facility to haul and accept shipments. The letter will indicate agreement to handle and accept the specified estimated quantities and types of material during the time period specified in the Project schedule and any time extension as deemed necessary. In the event that the identified and approved facility ceases to accept the stated materials or the facility ceases operations, alternate approved and permitted facility(s) for accepting materials will be located.

As applicable, manifest forms and shipment manifest records will be completed as required by the appropriate regulatory agencies for verifying the material and quantity of each load in unit of volume and weight.

3.1.3 Transportation/Manifest

Transportation of material leaving the Site for off-site disposal will be in accordance with federal, State, and local requirements (including 6 NYCRR Part 364 and U.S. Department of Transportation [DOT] regulations) covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc. An EPA Generator Identification Number will be obtained and a manifest will be prepared, listing the waste as EPA Hazardous Waste No. D008, and accompany the waste to the approved treatment and/or disposal facility, consistent with the applicable requirements of 6 NYCRR Part 372.

The schedule for truck arrival will be coordinated to meet the approved Project schedule. The schedule will be compatible with the availability of equipment and personnel for material handling operations at the job Site. Trucks will be protected against contamination by properly covering and lining them with compatible material (such as polyethylene) or by decontaminating them prior to any use other than hauling contaminated materials.

All vehicles leaving the Project Site will be inspected to ensure that contaminated soil adhering to the wheels or undercarriage are removed prior to the vehicle leaving the Site. Any situations involving material spilled in transit or mud and dust tracked off-site will be remedied. The access routes will be inspected by the contractor performing the Interim Remedial Measure (IRM) for road conditions, overhead clearance, and weight restrictions.

Contaminated materials from other projects will not be combined with material from the construction area. The transporter will not deliver waste to any facility other than the disposal facility(s) listed on the shipping manifest.

To minimize the traveling time and distance in Manhattan, the excavated material will be transported away from the Site through the Lincoln Tunnel to the New Jersey Turnpike, and then to the approved disposal facility. Each hauling vehicle will leave the Site, traveling east towards Amsterdam Avenue. At Amsterdam Avenue (10th Avenue), the vehicle will turn left, traveling north on Amsterdam Avenue. At West 66th Street, the vehicle will turn left, traveling east one block to West End Avenue (11th Avenue). At the intersection of West End Avenue, the vehicle will turn left traveling south on West End Avenue. At West 40th Street, the vehicle will turn left, traveling east to the entrance to the Lincoln Tunnel.

3.1.4 Dust Control

To prevent the potential off-site transport of dust that may contain contaminants above background levels, the following dust control measures will be implemented during all earth-disturbing operations:

- Water will be available (and used) on-site for sprinkling/wetting to suppress dust in dry weather or as necessary.
- The hauling truck will have tarp covers.
- A stabilized construction entrance (gravel pad) will be placed at an access point to prevent tracking out of dust.

3.1.5 Air Monitoring

An air monitoring program will be implemented to avoid or minimize exposure of the field personnel and the public to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed. The air monitoring program is detailed in Section 3.4.6.

3.2 Acetone-Affected Soil Removal at Location B/MW-4

The soil sample collected at location B/MW-4 (0-2') did not contain acetone; the subsurface soil sample collected at location B/MW-4 (12'-14') contained acetone at a concentration slightly above the Recommended Soil Cleanup Objective of the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046. The removal of this material would be needed to achieve a Track 1 cleanup under the Brownfields Cleanup Program (BCP). The remediation will consist of a "hot spot" removal by excavating a six foot by six foot square area around the sample location to a depth of 2 to 16 feet below the surface. Side wall samples will be collected at a depth of 14 feet below the surface and one bottom sample will be collected. These samples will be analyzed for volatile organic compounds (VOCs). Since the top two feet of soil do not contain acetone, it will be removed and stockpiled separately from the acetone-affected soil, and will be disposed of with other uncontaminated fill materials. The transportation and disposal of the acetone-affected soil will be consistent with the requirements for industrial non-hazardous waste.

3.2.1 Soil Removal Procedures

The following procedures will be followed for the acetone-affected soil:

1. Mark out the horizontal limits to be excavated.
2. Excavate the soil and place the approximately 18.7 cubic yards of material either on a plastic sheet or directly onto the truck, depending on whether the material has been pre-approved for off-site disposal.

3. At a depth of 16 feet below the surface, have the machine operator scoop one additional bucket from the bottom of the pit. Collect a sample from the top of exposed material in the bucket. Using the bucket, collect samples separately from each of the four sidewalls at a depth of approximately 14 feet from the surface.
4. Sample collection, decontamination procedures (to avoid contamination or cross-contamination), sample identification, sample labeling and shipping, sample custody, and documentation will be undertaken consistent with the procedures outlined in Section 4.0.
5. If the material has not been pre-approved or pre-analyzed, take a composite sample from the excavated material by compositing ten samples collected from various locations around the pile. Pour the samples on top of one another on a plastic sheet and quarter the pile. Collect the sample for each bottle from the "quartered" material. The volatile organic compound (VOC) sample will not be a composite sample. It will be collected directly from the bucket at a depth of approximately 14 feet below the surface.
6. If the excavation is to be backfilled, place a plastic sheet in the pit, lining the four walls and the bottom. Place backfill material on top of the sheet.
7. Photo-document all procedures and record all procedures in a bound field notebook.
8. Copies of all testing results, correspondence with disposal facilities concerning classification of materials, and permits/approvals will be maintained by the Project Manager, and will be submitted to the NYSDEC in an Interim Remedial Measure (IRM) Summary Report.

3.2.2 Disposal

Disposal will be in accordance with applicable federal, State, and local requirements, including those for hazardous waste.

Letters of commitment will be obtained from the waste haulers and the treatment, disposal, or recovery facility to haul and accept shipments. The letter will indicate agreement to handle and accept the estimated quantities and types of material during the time period specified in the Project schedule and any time extension as deemed necessary. In the event that the identified and approved facility ceases to accept the stated materials or the facility ceases operations, alternate approved and permitted facility(s) for accepting materials will be located.

As applicable, shipment manifest records will be completed as required by the appropriate regulatory agencies for verifying the material and quantity of each load in unit of volume and weight.

3.2.3 Transportation

Transportation of material leaving the Site for off-site disposal will be in accordance with federal, State, and local requirements (including 6 NYCRR Part 364 and U.S. Department of Transportation [DOT] regulations) covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.

The schedule for truck arrival will be coordinated to meet the approved Project schedule. The schedule will be compatible with the availability of equipment and personnel for material handling operations at the job Site. Trucks will be protected against

contamination by properly covering and lining them with compatible material (such as polyethylene), or decontaminating them prior to any use other than hauling contaminated materials.

All vehicles leaving the Project Site will be inspected to ensure that contaminated soil adhering to the wheels or undercarriage are removed prior to the vehicle leaving the Site. Any situations involving material spilled in transit or mud and dust tracked off-site will be remedied. The access routes will be inspected by the contractor for road conditions, overhead clearance, and weight restrictions.

Contaminated materials from other projects will not be combined with material from the construction area. The transporter will not deliver waste to any facility other than the disposal facility(s) listed on the shipping manifest.

To minimize the traveling time and distance in Manhattan, the excavated material will be transported away from the Site through the Lincoln Tunnel to the New Jersey Turnpike, and then to the approved disposal facility. Each hauling vehicle will leave the Site traveling east towards Amsterdam Avenue. At Amsterdam Avenue (10th Avenue), the vehicle will turn left, traveling north on Amsterdam Avenue. At West 66th Street, the vehicle will turn left, traveling east one block to West End Avenue. At the intersection of West End Avenue (11th Avenue), the vehicle will turn left traveling south on West End Avenue. At West 40th Street, the vehicle will turn left, traveling east to the entrance of the Lincoln Tunnel.

3.2.4 Dust Control

To prevent the potential off-site transport of dust that may contain contaminants above background levels, the following dust control measures will be implemented during all earth-disturbing operations:

- Water will be available (and used) on-site for sprinkling/wetting to suppress dust in dry weather or as necessary.
- The hauling truck will have tarp covers.
- Stabilized construction entrances (gravel pads) will be placed at access points to prevent tracking out of dust.

3.2.5 Air Monitoring

An air monitoring program will be implemented to avoid or minimize exposure of the field personnel and the public to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed. The air monitoring program is detailed in Section 3.4.6.

3.3 Underground Storage Tanks at Lot 43 (AOC-2 and AOC-3) and Lot 53 (AOC-4)

The tanks and any appurtenances will be cleaned, removed, and disposed of in accordance with accepted industry standards and applicable federal, State, and local regulatory agency requirements. Tank and soil removal from the vicinity of discovered underground storage tanks will be conducted in accordance with the New York State Department of Environmental Conservation (NYSDEC), Division of Spills Management, Spill Prevention Operations Technology Series (SPOTS) Memo No. 14 "Site Assessments at Bulk Storage Facilities," and in accordance with the NYSDEC, Bureau of Spill Response, Spills Technology and Remediation

Series (STARS) Memo No. 1, "Petroleum-Contaminated Soil Guidance Policy," August 1992. Laboratory testing of both characterization samples and samples obtained from the excavation areas will include STARS Method 8021 for volatile organic compounds (VOCs) and STARS Method 8270 for semi-volatile organic compounds (SVOCs) (see Section 3.4).

According to 6 NYCRR Part 612.2, the existing State Petroleum Bulk Storage listing for the Site must be updated to reflect the discovery and subsequent removal of any known or additional tanks from the Site. Tank removal activities and any associated petroleum-contaminated soil removal must be documented in a Spill Closure Report, which will be submitted to NYSDEC. In addition, the removal of any gasoline underground storage tanks must be reported to the New York City Fire Department.

3.3.1 Tank Removal

Typical tank removal procedures are summarized below:

1. Open fill cap or vent pipe and measure for product. Collect a sample of the product. Tank contents will be sampled in accordance with applicable federal, State, and local requirements and tested in accordance with the requirements of the receiving facility. Proper disposal of tank contents at an approved facility will be dictated by sample results.
2. Excavate to expose the tank. Vacuum liquid tank contents and pumpable tank bottom residue.
3. Excavate around the tank with care to avoid release of tank and piping contents. Hand excavation around the tank may be necessary. The sides of all excavated areas will be properly stabilized in accordance with OSHA regulations. Continuously monitor the excavated areas in the worker breathing zone for the presence of flammable, toxic, or oxygen-deficient atmosphere with a photoionization detector (PID), a combustible gas indicator (CGI), and an oxygen meter.
4. Inert the tank of flammable vapors using dry ice and verify using an oxygen meter (less than seven percent). An access hole will be cut in the tank and the tank will be thoroughly cleaned of residual liquids and sludges.
5. Entry of the tank, if necessary, will be conducted in conformance with OSHA confined space requirements.
6. Remaining fuels, loose slurry, sludge materials, and wastewater will be collected in Department of Transportation (DOT)-approved drums, sampled, and analyzed for disposal characterization. After disposal characterization, waste material will be removed and disposed of in accordance with applicable regulations.
7. Remove the tank and all associated piping from the ground and clean the outside of the tank. The tank and piping will be rendered "not reusable," removed from the Site, and disposed of according to applicable regulations with proper documentation (see Section 3.3.2). Remove and dispose of all concrete tank support structures or vaults as encountered.
8. Spills should be reported to the New York State Department of Environmental Conservation (NYSDEC) Spill Hotline (800-457-7362), as necessary.
9. After tank removal, examine for evidence of petroleum releases in accordance with NYSDEC, Division of Spills Management, Spill Prevention Operations

Technology Series (SPOTS) Memo No. 14 "Site Assessments at Bulk Storage Facilities." If there is evidence of petroleum release, follow procedures for Soil Contamination Plan in addition to the procedures below.

10. Suspect materials will be field-screened with a photoionization detector (PID). If soil contamination is present, excavate and remove contaminated soil from the tank areas in accordance with the stockpiling and/or direct-loading procedures presented in Sections 3.4.1 and 3.4.2. Material will be excavated until field screening with a PID yields concentrations of less than ten parts per million (ppm), and until there are no remaining visible signs of contamination or odors. After contaminated soil removal, collect endpoint samples at each sidewall and at the bottom of the excavation for analytical testing as specified in the NYSDEC, Bureau of Spill Response, Spills Technology and Remediation Series (STARS) Memo No. 1, "Petroleum-Contaminated Soil Guidance Policy," August 1992.
11. Photo-document all procedures and record all procedures in a bound field notebook.
12. Copies of all testing results, correspondence with disposal facilities concerning classification of materials, and permits/approvals will be maintained by the Project Manager and will be submitted to the NYSDEC in a Tank Closure Report.
13. A signed affidavit will be prepared by the licensed tank installation (removal) contractor and submitted to the New York City Fire Department certifying proper removal of the tank(s).

3.3.2 Tank Transportation and Disposal

The tank will be cleaned of all petroleum-related contaminants (decontaminated) at the Site and transported to a scrap metal recycler. The tank cannot be taken to a construction and demolition debris disposal facility. If the tank is determined to contain hazardous waste, it will be emptied at the Site into an approved tank vehicle and both the tank and the liquid/sludge inside the tank will be transported to an approved facility by a hauler with a valid Part 364 industrial waste transporter permit. If the tank is determined to contain an acute hazardous waste, it will be emptied at the Site into an approved tank vehicle; both the tank and the liquid/sludge removed from inside the tank will be transported to an approved facility by a hauler with a valid Part 364 industrial waste transporter permit and accompanied by a hazardous waste manifest.

The contractor may use different disposal facilities for the liquids or semi-solids in the tank, and a scrap metal dealer for the cleaned tank; all facilities are located in New York City, Long Island, or New Jersey. The route for each hauling vehicle will be north to the Cross Bronx Expressway, and then either east or west to the designated facility. Each vehicle will leave the Site traveling east to Amsterdam Avenue (10th Avenue). At the Amsterdam Avenue intersection, the vehicle will turn left, traveling north on Amsterdam Avenue to West 79th Street. At West 79th Street, the vehicle will turn left, traveling west. At the intersection of Riverside Drive, the vehicle will turn right, traveling north towards the George Washington Bridge. Approximately one block north of the West 165th Street Intersection, the vehicle will turn right, onto the access road to the Cross Bronx Expressway.

3.3.3 Air Monitoring

During the tank removal and cleaning processes, air monitoring consistent with Section 3.4.6 will be undertaken.

3.4 Soil and Bedrock Contamination Around Tanks at Lots 43 and 53

If soil or bedrock around or beneath the tanks showing evidence of potential contamination (such as discoloration, staining, or odors) is encountered during excavation activities, the following procedures will be implemented:

1. A spill will be reported to the New York State Department of Conservation (NYSDEC) Spill Hotline (800-457-7362), as necessary.
2. The suspected soil or bedrock at locations AOC-2 and AOC-3 will be sampled for laboratory analyses. Samples will be analyzed using Spills Technology and Remediation Series (STARS) Method 8021 for volatile organic compounds (VOCs), and STARS Method 8270 for semi-volatile organic compounds (SVOCs), along with any other parameters required by the intended disposal facility.
3. If the suspect soil or bedrock is contaminated based on sampling results, it will be excavated and removed in accordance with the stockpiling and/or direct-loading procedures presented in Sections 3.4.1 and 3.4.2. Soil and bedrock intended for off-site disposal will be disposed of in accordance with applicable federal, State, and local requirements and tested in accordance with the requirements of the receiving facility. Additional sample analysis may be required by alternative disposal facilities. Additional analysis may be conducted on existing sample material at the laboratory, as long as all holding time and preservation requirements have not been exceeded. If there are exceedances to these requirements, or if additional sampling material is required by the laboratory to complete the required analysis, additional samples may be collected.
4. The excavated soil and/or bedrock will then be disposed of in accordance with all applicable federal, State, and local regulations.
5. The excavation will continue vertically and laterally until no evidence of contamination is noted in the excavation, unless the excavation extends to the property boundary, solid bedrock, or the final depth required for the building foundation (varies from six to 16 feet below grade in Lot 43 and approximately 30 feet in Lots 53 and 55). Post-excavation endpoint samples will be collected from the sides and bottom of the excavated area, as required by the NYSDEC. Analytical parameters for post-excavation soil samples will include STARS Method 8021 for VOCs and STARS Method 8270 for SVOCs.
6. Copies of correspondence with disposal facilities concerning classification of materials, testing results, and permits/approvals will be maintained by the Project Manager and will be submitted to NYSDEC in a Spill Closure Report.

3.4.1 Stockpiling Procedures

Petroleum-contaminated material (e.g., native soil, bedrock, or urban fill material) intended for off-site disposal may be stockpiled or loaded directly onto trucks for off-site disposal, if pre-approved by the receiving facility. No excavated petroleum-contaminated material from the Site will be reused on-site for grading or other purposes. For soil or bedrock that will be stockpiled, the stockpiles will be placed on polyethylene sheeting. If the soil or bedrock is expected to remain on-site overnight or longer, the stockpiles will be covered with similar polyethylene sheeting and secured with large rocks or other

appropriate weights to protect against leaching or runoff of contaminants into groundwater or stormwater. The surface surrounding the stockpile will be graded to provide for positive drainage away from the pile. Stockpiles will be managed to minimize dust generation, runoff, and erosion, using water, plastic covers, silt fences, and/or hay bales, as necessary. The preferred method of disposal is direct-loading onto the trucks.

Soil and bedrock will be segregated and stockpiled based on whether it will be reused on-site (with no petroleum contamination) and its known or anticipated type and/or level of contamination (based on analytical data, photoionization detector [PID] readings, odor, staining, etc.). Stockpiles will be separated by a sufficient distance to ensure that mixing of dissimilar or potentially dissimilar materials does not occur. The location and classification of stockpiles will be tracked on Site drawings and updated, if necessary, at the end of each workday according to the following categories:

- Petroleum-contaminated soil or bedrock for off-site disposal;
- Non-contaminated bedrock for placement back into the excavated area; and
- Soil or bedrock pending analysis.

Copies of Site drawings will be kept in the field log book. Stockpiles intended for off-site disposal may be mixed with other compatible stockpiles on-site (compatibility will be determined by the requirements of the receiving disposal facility), but hazardous wastes will not be mixed with non-hazardous wastes.

3.4.2 Alternatives to Stockpiling

The preferred method to stockpiling is to obtain agreement(s) from the intended disposal or treatment facilities to accept boring and/or analytical data previously collected so that materials may be directly loaded onto trucks for shipment to the disposal facility.

3.4.3 Disposal of Petroleum-Contaminated Material

Disposal will be in accordance with applicable federal, State, and local requirements, including those for hazardous waste, industrial waste, petroleum-contaminated soil, construction and demolition debris, etc. Manifests and truck tickets will be submitted to the New York State Department of Environmental Conservation (NYSDEC) in the Interim Remedial Measure (IRM) Report.

The testing performed on the Site indicated that a majority of the fill material and native soil overlying the bedrock that would be disturbed during the development Project is historic urban fill. This material must be disposed of at a 6 NYCRR Part 360-permitted disposal facility, and cannot be sent to a Soil Recycling Facility (Part 360-16 Registration Facility) or reused off-site, except in accordance with a Beneficial Use Determination.

If excess excavated soil is intended for reuse off-site in New York State, approval of a generic or case-specific Beneficial Use Determination (under 6 NYCRR Part 360) from the NYSDEC may be required. Such alternatives may include, but are not limited to, cold mix and hot mix asphalt manufacture at permitted off-site facilities. Disposal of this material out of State would be subject to the requirements of the receiving facility and state.

Letters of commitment will be obtained from the waste haulers and the treatment, disposal, or recovery facility to haul and accept shipments. The letter will indicate

agreement to handle and accept the estimated quantities and types of materials during the time period specified in the Project schedule and any time extension as deemed necessary. In the event that the identified and approved facility ceases to accept the stated materials or the facility ceases operations, alternate approved and permitted facility(s) for accepting materials will be located.

As applicable, manifest forms and shipment manifest records will be completed as required by the appropriate regulatory agencies for verifying the material and quantity of each load in unit of volume and weight.

3.4.4 Transportation

Transportation of material leaving the Site for off-site disposal will be in accordance with federal, State, and local requirements (including 6 NYCRR Part 364 and U.S. Department of Transportation [DOT] regulations) covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.

The schedule for truck arrival will be coordinated to meet the approved Project schedule. The schedule will be compatible with the availability of equipment and personnel for material handling operations at the job Site. Trucks will be protected against contamination by properly covering and lining them with compatible material (such as polyethylene), or decontaminating them prior to any use other than hauling contaminated materials.

All vehicles leaving the Project Site will be inspected to ensure that contaminated soil adhering to the wheels or undercarriage is removed prior to the vehicle leaving the Site. Any situations involving material spilled in transit or mud and dust tracked off-site will be remedied. The access routes will be inspected by the contractor for road conditions, overhead clearance, and weight restrictions.

Contaminated materials from other projects will not be combined with material from the construction area. The transporter will not deliver waste to any facility other than the disposal facility(s) listed on the shipping manifest.

To minimize the traveling time and distance in Manhattan, the excavated material will be transported away from the Site through the Lincoln Tunnel to the New Jersey Turnpike, and then to the approved disposal facility. Each hauling vehicle will leave the Site traveling east towards Amsterdam Avenue. At Amsterdam Avenue (10th Avenue), the vehicle will turn left, traveling north on Amsterdam Avenue. At West 66th Street, the vehicle will turn left, traveling east one block to West End Avenue. At the intersection of West End Avenue (11th Avenue), the vehicle will turn left traveling south on West End Avenue. At West 40th Street, the vehicle will turn left, traveling east to the entrance of the Lincoln Tunnel.

3.4.5 Dust Control

To prevent the potential off-site transport of dust that may contain contaminants above background levels, the following dust control measures will be implemented during all earth-disturbing operations:

- Water will be available (and used) on-site for sprinkling/wetting to suppress dust in dry weather or as necessary.
- All haul trucks will have tarp covers.

- Stabilized construction entrances (gravel pads) will be placed at access points serving Lot 53 to prevent tracking out of dust.

3.4.6 Air Monitoring

An air monitoring program will be implemented to avoid or minimize exposure of the field personnel and the public to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed.

A Dust Trak® dust monitor or equivalent will be used to measure the concentration of total particulate matter during all excavation activities at the Project Site where on-site fill materials or potential petroleum-contaminated soil will be disturbed.

A photoionization detector (PID) will be used to perform air monitoring during sampling and excavation work at areas where petroleum or other volatile organic compounds (VOCs) are detected. The PID will be calibrated with isobutylene in accordance with the manufacturer's recommendations.

Measurements for particulate and VOCs will be taken prior to commencement of the work, and for at least one minute every 60 minutes during the work. The action levels developed for the Site are based upon 15-minute averages of the monitoring data. The measurements will be made as close to the workers as practicable and at the breathing height of the workers. The Site Safety Officer (SSO) will set up the equipment and confirm that it is working properly. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are shown in Table 1.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

All necessary analyses will be performed by a laboratory that has received approval from the New York State Department of Health's (NYSDOH) Environmental Laboratory Approval Program (ELAP) for the methods that require analysis.

4.1 Sample Collection

Samples will be collected in accordance with the following procedures:

1. Record sample observations (evidence of contamination, photoionization detector [PID] readings, soil classification) in a field log book.
2. Collect an aliquot of soil or groundwater using a dedicated and disposable plastic sample spoon or sample bailer and place in laboratory-supplied sample jars. One grab sample will be collected for volatile organic compound (VOC) analysis, if applicable. One composite sample will be collected for all other analyses.
3. Seal and label the sample jars as described in Section 4.4 and place in a chilled cooler.

4.2 Decontamination Procedures

To avoid contamination and cross-contamination of samples, only dedicated or disposable sampling equipment may be used to collect these samples. All non-disposable equipment

involved in field sampling must be decontaminated before being brought to the sampling location, and then must be properly decontaminated after use.

4.3 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents, and laboratory reports using an alpha-numeric or alpha-alpha code. For stockpiled soil, the alpha prefix will be "SP," and the numbers following the alpha prefix will correspond to excavated stockpiles, beginning with "1, 2, 3,...etc." For example, the first sample collected from the first stockpile will be labeled "SP1-1" and the first sample collected from the second stockpile will be labeled "SP2-1."

4.4 Sample Labeling and Shipping

All sample containers will be labeled with the following information:

1. Site identification
2. Sample identification
3. Date and time of collection
4. Analysis(es) to be performed
5. Sampler's initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. Soil samples will be shipped to the laboratory at a frequency that will not cause the exceedance of applicable holding times for sample methods. At the start and end of each workday, field personnel will add ice to the coolers, as needed.

The samples will be prepared for shipment by placing each sample jar in a sealable plastic bag, then wrapping each bag in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody (COC) form. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the coolers remain sealed during delivery.

4.5 Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on chain-of-custody (COC) forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, along with the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

4.6 Documentation

A sample log book will be maintained. The following information, as a minimum, will be recorded to the log.

1. Sample identification number
2. Sample location

3. Field observations
4. Sample type
5. Analyses
6. Date/time of collection
7. Collector's name
8. Sample procedures and equipment utilized
9. Date sent to laboratory/name of laboratory
10. Copies of Site drawings indicating stockpile numbers and locations.

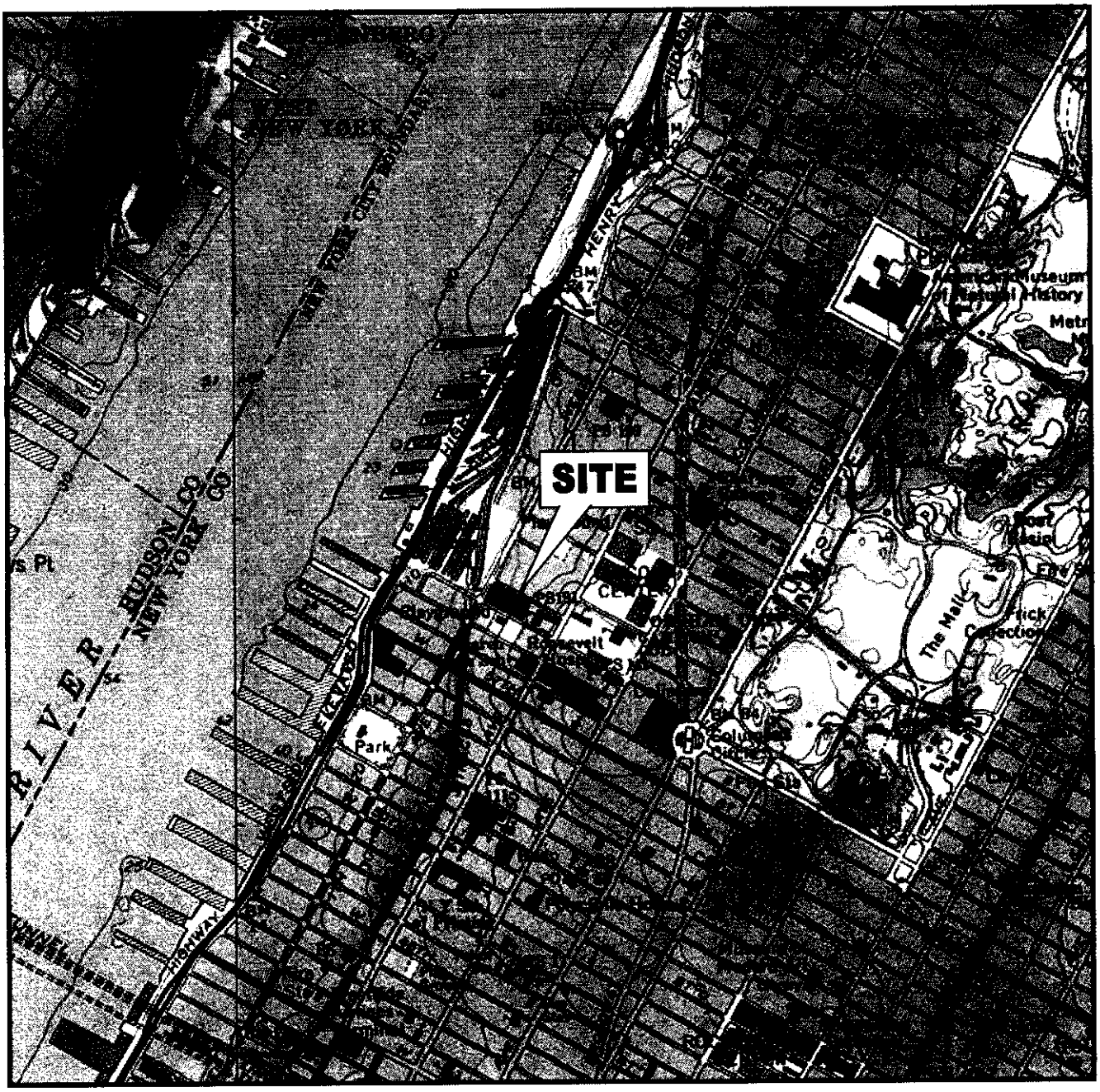
TABLES

Table 1
Action Levels and Required Responses
West 61st Street Site, New York, New York

Instrument	Action Level (Note 1)	Response Action
Particulate Monitoring (during all excavation activities disturbing on-site fill or petroleum-contaminated soil or bedrock)	Less than 5 mg/m^3	**Level D**
	Between 5 mg/m^3 (Note 2) and 125 mg/m^3	**Level C.** Apply dust suppression measures. If less than 2.5 mg/m^3, resume work using Level D. Otherwise, upgrade Level C.
	Above 125 mg/m^3	**Stop work.** Apply additional dust suppression measures. Resume work when less than 125 mg/m^3 and maintain Level C.
Volatile Organic Compound Monitoring (with PID, if necessary)	Less than 10 ppm (Note 3) in breathing zone.	**Level D or D-Modified** Requires coveralls and steel toe boots. (As applicable: chemical resistant gloves, chemical resistant boot covers, hard hat, safety glasses, face shield, or escape mask.)
	Between 10 and 100 ppm Half face mask to 50 ppm Full face mask to 100ppm	**Level C**. Requires full face or half face respirator, hooded chemical resistant two-piece Tyvek suite or overalls, chemical resistant inner and outer gloves, chemical resistant boot covers, steel toe and shank boots. (As applicable: hard hat, face shield, or escape mask.)
	More than 100 ppm	**Stop work.** Resume work when source of vapors is abated and readings are less than 20 ppm above background.

Notes: 1. 15-minute time-weighted average
2. milligrams per cubic meter (mg/m^3)
3. parts per million (ppm)

FIGURES



QUADRANGLE

SCALE IN FEET

0' 1000' 2000' 4000'

SCALE: 1"=2000'

N

SOURCE:

USGS TOPOGRAPHIC MAP - CENTRAL PARK, N.Y.
QUADRANGLE - DATED 1966, PHOTOREVISED 1979.

West 61st Street Site
New York, New York

PROJECT SITE LOCATION

AKRF

Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
12.08.05

PROJECT No.
10321

FIGURE No.
1

PUBLIC SCHOOL

OFFICE

N

W. 61st STREET

WEST END AVENUE

(BLOCK 1152)

MW-1

55

53
Former gas tank

52
Former auto repair shop and a metal works factory

43

MW-2

Former gas station
Former gasoline tank(s)

MW-3

B-12

B-10

B-11

MW-4

MW-5

PUBLIC SCHOOL

PLAYGROUND

5
Former auto repair
1 UST
4 ASTs
Chemical storage
Listed as an ADF

8
1 UST
1 AST
Chemical storage

10
1 AST
Former auto repair and mfg
Former gas tank

11
Former auto repair and mfg
Chemical storage

12
Former iron works

13
Former auto repair
3-4 Former USTs

B-18

B-16

B-14

B-15

MW-6

MW-7

MW-8

MW-9

CHARTER SCHOOL

Manufacturing facility 1926-2003 (Emsig Mfg)
Listed as TRIS, RCRA generator, and ADF
Former USTs and AST

W. 60th STREET

SIDEWALK

AUTO REPAIR

OFFICES

8 - 550-gallon gasoline tanks

GARAGE

(BLOCK 1151)

Otis Elevator

WAREHOUSE

NYC PARKS

NYC PARKS

POOL

0 25 50 100 (FEET)

Legend:

- PROJECT SITE BOUNDARY
- LOT LINE
- 13 LOT NUMBER
- APPROVED BORING LOCATION IN REMEDIAL INVESTIGATION WORK PLAN
- APPROVED MONITORING WELL LOCATION IN REMEDIAL INVESTIGATION WORK PLAN

AKRF
Environmental Consultants
440 Park Avenue South, New York, NY 10016

West 61st Street Site
New York, New York

PROJECT SITE DETAIL AND SITE ABUTTERS

DATE
06.13.05

APPROX SCALE
As Shown

PROJECT No.
10321

FIGURE No.
2

WEST 61st STREET

WEST END AVENUE

LOT 56

AOC–4
SUSPECTED TANKS

AOC–7
B/MW–4
ACETONE – AFFECTED SOIL

AOC–2
SUSPECTED TANKS

AOC–1
B/MW–3
LEAD–CONTAMINATED SOIL

AOC–3
SUSPECTED TANKS

LOT 17

WEST 60th STREET

Locations surveyed by:

True North Surveyors, Inc.
John J. Vida – N.Y.P.L.S. Lic. 050298
PROFESSIONAL LAND SURVEYORS

Legend:

- PROPERTY BOUNDARY
- LOT BOUNDARY
- AOC-1 AREA OF CONCERN
- SUSPECTED UNDERGROUND STORAGE TANK(S)
- MONITORING WELL / SOIL BORING

N

0 20 40 80 (FEET)

M:\AKRF Project Files\10321 - Agin Properties W. 60th St\Figures\F19_Environmental_Sampling_Locs.dwg

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

WEST 61st STREET SITE
New York, New York

AREAS OF CONCERN TO BE REMEDIATED UNDER THE INTERIM REMEDIAL MEASURE

DATE
02.13.06

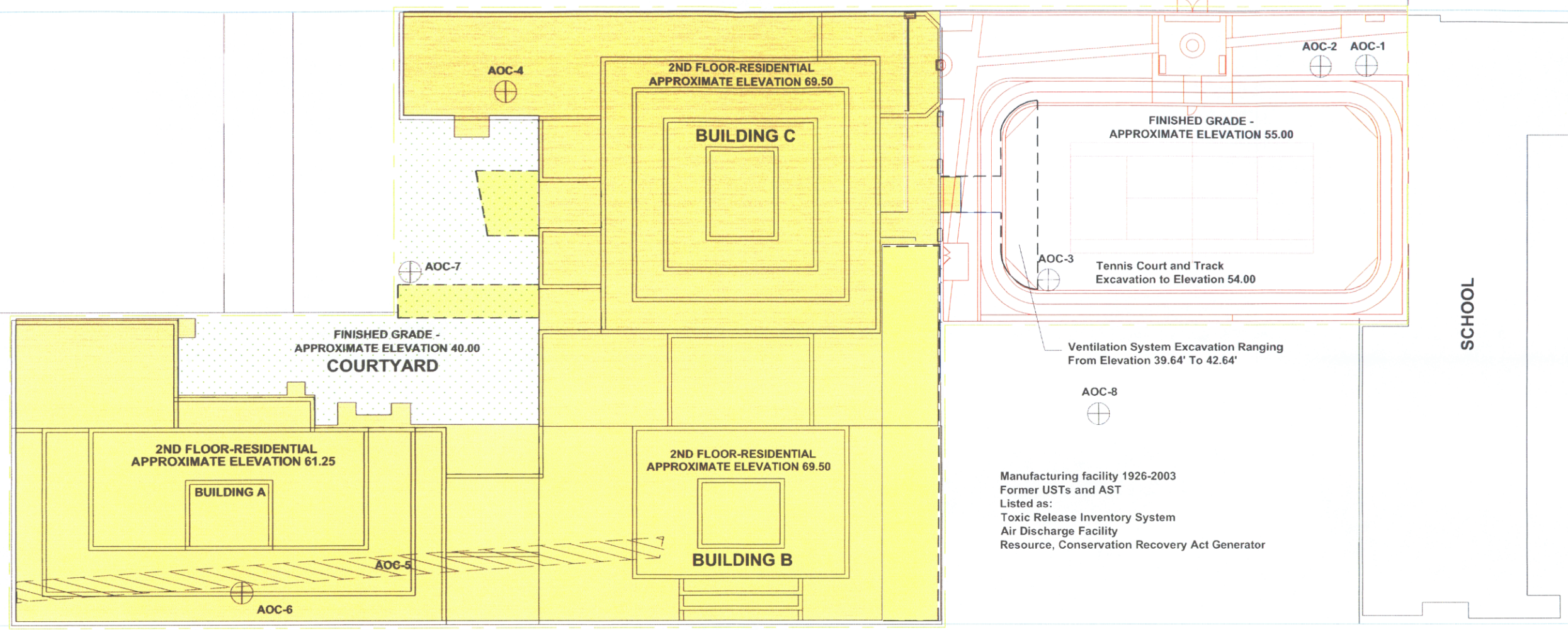
SCALE
As Shown

PROJECT No.
10321

FIGURE No.
3

WEST 61ST STREET

SIDEWALK



Manufacturing facility 1926-2003
Former USTs and AST
Listed as:
Toxic Release Inventory System
Air Discharge Facility
Resource, Conservation Recovery Act Generator

SIDEWALK

WEST 6OTH STREET

Legend:

	PROPERTY LINE
+	AREA OF CONCERN
	PROPOSED BUILDING
UST	UNDERGROUND STORAGE TANK
AST	ABOVEGROUND STORAGE TANK
	COURTYARD EXCAVATION TO ELEVATION 37.00
	SUB-CELLAR EXVACATION TO ELEVATION 14.50 (MBD)
	CELLAR EXCAVATION TO ELEVATION 30.00 (MBD)

Notes:

AOC-1	ELEVATED LEAD IN SAMPLE B/MW-3 (0-2")
AOC-2	ONE OR MORE USTS NEAR GATEHOUSE
AOC-3	ONE OR MORE USTS IN SOUTHWEST CORNER OF PARKING LOT
AOC-4	ONE OR MORE POTENTIAL USTS ON LOT 53
AOC-5	ESTIMATED EXTENT OF PETROLEUM-CONTAMINATED SOIL AND/OR GROUNDWATER
AOC-6	POSSIBLE VAULTED 1,050-GALLON TANK IN BASEMENT OF LOT 8
AOC-7	ELEVATED ACETONE IN SAMPLE B/MW-4 (12-14)
AOC-8	POSSIBLE OFF-SITE SOURCE OF CONTAMINATION

N

0 20 40 80 (FEET)

NOTE: ELEVATIONS IN MANHATTAN BOROUGH DATUM

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

WEST 61st STREET SITE
New York, New York

PLANNED DEVELOPMENT AND AREAS OF CONCERN
IDENTIFIED THROUGH REMEDIAL INVESTIGATION FIELD ACTIVITIES

DATE
12.07.05

SCALE
As Shown

PROJECT No.
10321

FIGURE No.
4

Appendix A

Interim Remedial Measure Health and Safety Plan (IRMHASP)

INTERIM REMEDIAL MEASURE
HEALTH AND SAFETY PLAN

WEST 61ST STREET SITE

New York, New York

AKRF Project Number: 10321

BCP Site ID 231043

Prepared by:

AKRF

440 Park Avenue South, 7th Floor
New York, NY 10016
(212) 696-0670

Prepared for:

Algin Management Co., LLC
64-35 Yellowstone Blvd.
Forest Hills, NY 11375

February 2006

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FIGURES

APPENDICES

1.0 PURPOSE

The purpose of this Interim Remedial Measure Health and Safety Plan (IRM HASP) is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during remedial excavation activities at the Project Site. The IRM HASP is intended to minimize health and safety risks resulting from the known and potential presence of hazardous materials on the Site.

This plan is not designed to address potential geotechnical, mechanical, or structural safety concerns, nor to supersede or replace any OSHA regulation and/or local and State construction codes or regulations.

2.0 APPLICABILITY

This Interim Remedial Measure Health and Safety Plan (IRM HASP) has been developed for implementation of interim remedial measure activities conducted by all personnel on-site, both AKRF employees and others. This IRM HASP does not discuss other routine health and safety issues common to general construction/excavation, including but not limited to slips, trips, falls, shoring, and other physical hazards.

All AKRF employees are directed that all work must be performed in accordance with the Company's Generic HASP and all applicable OSHA regulations for the work activities required for the Project. All Project personnel are furthermore directed that they are not permitted to enter Permit Required Confined Spaces (as defined by OSHA). For issues unrelated to contaminated materials, all non-AKRF employees are to be bound by all applicable OSHA regulations and any more stringent requirements specified by their employer in their corporate HASP or otherwise. AKRF is not responsible for providing oversight for issues unrelated to contaminated materials for non-employees. This oversight will be the responsibility of the employer of that worker or other official designated by that employer.

The Volunteer, AKRF, and the parties performing this work, are completely responsible for the appropriate performance of work according to this IRM HASP. This plan covers only remedial investigation (RI) work, and will be updated after the RI is complete to include remedial activities and general construction work when the remedial action options are assessed. Work subject to this IRM HASP will be all activities that disturb the existing soil on-site. The contractors and their subcontractors involved in the construction of this Project will provide a copy of this IRM HASP to their employees whose work involves any potential exposure to the on-site chemical hazards, and will complete all work in accordance with this IRM HASP.

3.0 INTRODUCTION

The West 61st Street Site (the "Project Site" or "Site") consists of the ten parcels located at the intersection of West 61st Street and West End Avenue in Manhattan, New York (Figure 1). Specifically, the Site consists of Block 1152, Lots 5, 8, 10, 11, 12, 13, part of 43, 52, 53, and 55. These parcels are currently occupied by vacant land, except for the eastern section of Lot 43, which is used for an outdoor parking lot. Residential, industrial, and commercial properties are present in the surrounding neighborhood.

The proposed development Project includes the construction of three new buildings that would include parking and mechanical spaces at the cellar and subcellar levels; retail, residential, and community use on the first floor; and residential use (rental and condominium) from the second floor up. Building A will comprise nine floors, Building B will comprise 14 floors, and Building C will comprise 29 floors. The

proposed Project currently consists of the excavation of developed portions of the Site to the bedrock or within five to ten feet of the bedrock surface, which varies from a depth of approximately nine to 40 feet below existing grade. The two undeveloped portions totaling approximately 23,000 square feet is not anticipated to be disturbed as part of general construction, other than landscaping.

A Phase I Environmental Site Assessment (ESA) performed by AKRF, Inc. (AKRF), in June 2003 identified recognized environmental concerns (RECs) for the Site, including potential underground storage tanks. Geotechnical borings undertaken by RA Consultants (February 2005 letter report) detected petroleum odors at four locations along West 60th Street. A Remedial Investigation (RI), completed in November of 2005, identified seven Areas of Concern (AOCs). Three AOCs were identified in the eastern parking lot portion of Lot 43, along West 61st Street, including two suspected underground storage tank locations and one discrete location of subsurface lead-contaminated fill material. Two AOCs were identified in the northwestern portion of the Site on Lots 53 and 55; a suspected underground storage tank and a discrete location of acetone-affected soil. Two AOCs were identified along West 60th Street; a suspected fuel oil vaulted storage tank observed in the basement of a building on Lot 8.(the tank's removal was not verified prior to the demolition of the building, and the basement has been filled with debris from the building); and the possible presence of petroleum-contaminated subsurface soil and groundwater identified from the RA Consultant's observations during the drilling of the rock borings and the analytical results of the samples collected during the RI.

4.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES

4.1 Hazard Evaluation

A Remedial Investigation (RI) was performed in the Fall of 2005. The results were reported in the Remedial Investigation Report (RIR), dated January 2006. Urban fill is present throughout the Site, consisting of sand, gravel, concrete and brick fragments, wood, slag, and construction debris. Based on laboratory analytical results, the fill material contained semi-volatile organic compounds (SVOCs), including several carcinogenic SVOCs (benzo(a)pyrene, dibenzo(a,h)anthracene, chrysene, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene) (not petroleum contaminated). At some locations, the concentrations of one or more of the carcinogenic polycyclic aromatic hydrocarbons (cPAHs) were above the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) #4046 recommended soil cleanup objective values. Analytical results of the samples collected from the fill material revealed elevated concentrations of ten metals (aluminum, arsenic, barium, cadmium, calcium, magnesium, lead, mercury, nickel, and zinc) in concentrations above Eastern US background range concentrations at one or more locations. No significant impact from volatile organic compounds (VOCs) or pesticides was detected in the soil. One area along West 60th Street did indicate the presence of possible petroleum-related compounds in the lower level of the fill material and the native soil beneath the urban fill material. VOCs (xylene and acetone) and SVOCs (all seven cPAHs) were present in the fill material and native soil along West 60th Street (Lots 5, 8, 10, 11, and 13).

The groundwater in the northeastern corner of the Site did not contain VOCs, SVOCs, pesticides, or PCBs. Four metals (aluminum, iron, selenium, and sodium) were detected in the unfiltered samples collected from the bedrock groundwater monitoring wells at concentrations above groundwater quality standards. Groundwater was found only in the bedrock in the northeastern corner of the Site; no groundwater was detected in the fill material on top of the bedrock during the remedial investigation. Groundwater was detected in the overburden (fill material and native

soil) along West 61st Street. Six metals (aluminum, iron, manganese mercury, sodium, and selenium) were detected in unfiltered samples collected from one or more groundwater monitoring wells in this portion of the Site above groundwater quality standards. The samples collected from these wells did not contain VOCs, SVOCs, pesticides, or PCBs in concentrations above groundwater quality standards. Analysis of groundwater samples collected from groundwater monitoring wells along West 60th Street revealed the potential presence of petroleum-related compounds. Five VOCs (acetone, benzene, toluene, ethylbenzene, and total xylenes) and one SVOC (naphthalene) were detected in concentrations above groundwater quality standards in one or more groundwater monitoring wells. Two pesticides (heptachlor epoxide and 4,4'-DDD) collected from the groundwater monitoring wells in this portion of the Site were detected in concentrations above groundwater quality standards. Ten metals (aluminum, cadmium, chromium, iron, lead, magnesium, manganese, nickel, selenium, and sodium) were detected in one or more unfiltered samples at concentrations above groundwater quality standards.

Soil vapor probes were installed at five locations around the perimeter of the Site. VOCs were detected in all of the samples. The concentrations detected for the identified VOCs ranged up to 390 micrograms per cubic meter ($\mu g/m^3$). The highest reading along West 60th Street was 14,000 parts per billion by volume (ppbv) for an unknown detected compound. This is in the area of the suspected petroleum contamination.

The most likely routes of exposure are breathing of SVOCs or metals in the particulate-laden air released during soil disturbing activities, dermal contact, and accidental ingestion. Appendix A includes specific health effects from the known on-site chemicals. The remaining sections of this IRM HASP address procedures (including training, air monitoring, work practices, and emergency response) to reduce the potential for unnecessary and unacceptable exposure to these contaminants.

The potential adverse health effects from these detected contaminants are diverse. Many of these compounds are known or suspected to result in chronic illness from long-term exposures. However, due to the limited nature of the proposed construction, only acute effects are a potential concern.

4.1.1 Hazards of Concern

Check all that apply		
(x) Organic Chemicals	(x) Inorganic Chemicals	( ) Radiological
( ) Biological	( ) Explosive/Flammable	( ) Oxygen Deficient Atmosphere
(x) Heat Stress	(x) Cold Stress	( ) Other
Comments: No personnel are permitted to enter Permit Required Confined Spaces.		

4.1.2 Physical Characteristics

Check all that apply		
(x) Liquid	(x) Solid (soil)	(x) Sludge from tanks
(x) Vapors	( ) Unknown	( ) Other
Comments:		

4.1.3 Hazardous Materials

Check all that apply					
Chemicals	**Solids**	**Sludges**	**Solvents**	**Oils**	**Other**
( ) Acids	(x) Ash	( ) Paints	( ) Halogens	(x) Transformer	( ) Lab
( ) Caustics	( ) Asbestos	( ) Metals	(x) Petroleum	( ) Other DF	( ) Pharm
(x) Pesticides	( ) Tailings	( ) POTW	( ) Other	(x) Motor or Hydraulic Oil	( ) Hospital
(x) Petroleum	(x) Other	( ) Other		( ) Other	( ) Rad
( ) Inks		(x) Petroleum sludge in tanks			( ) MGP
( ) PCBs					( ) Mold
(x) Metals					( ) Other
(x)Other: VOCs & SVOCs					

4.1.4 Chemicals of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL – 5 ppm	Irritated eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Toluene	REL = 100 ppm PEL = 200 ppm STEL – 300 ppm	Irritated eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritated eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritated eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Naphthalene	REL = 10 ppm PEL = 10 ppm	Irritated eyes; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritated bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage.
Lead	REL=0.1 mg/m^3 PEL=0.05 mg/m^3	Weak, lassitude, insomnia; facial pallor, pale eye, anorexia, low weight, malnutrition, constipation, abdominal pain, colic; anemia; gingival lead line; tremors, paralysis writs and ankles; encephalopathy; kidney disease; irritation eyes; hypotension.
PCBs / Pesticides	REL = 0.001 mg/m^3 PEL = 0.5 mg/m^3	Irritated eyes, chloracne (skin); liver damage; reproductive effects; potential occupational carcinogen..

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Particulate	PEL = 15 mg/m^3 (total) PEL = 5 mg/m^3 (respirable)	Irritated eyes, skin, throat, upper respiratory system.
Comments: REL = NIOSH Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL – OSHA Short Term Exposure Limit		

The potential health effects from on-site contamination are detailed in the fact sheets attached as Appendix A. Other environmental risks are outlined in the West Nile Virus and St. Louis Encephalitis Prevention information outlined in Appendix B.

4.2 Designated Personnel

AKRF has appointed Jessica Leber as the on-site Site Safety Officer (SSO). Ms. Leber will be responsible for the implementation of the Health and Safety Plan (HASP). The SSO has a four-year college degree in a scientific field, and experience in implementation of air monitoring and hazardous materials sampling programs. Ms. Leber's resume is provided in Appendix C. Health and safety training required for the SSO and all field personnel is outlined in Section 4.3 of this HASP.

4.3 Training

All personnel who enter the work area while intrusive activities are being performed will have completed a 40-hour training course that meets the OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. All personnel will also have up-to-date eight-hour refresher training. The training will allow personnel to recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in the above objectives before he/she goes onto the Site. A Site safety meeting will be conducted at the start of the Project. Additional meetings will be conducted, as necessary, for new personnel working at the Site.

4.4 Medical Surveillance Program

All AKRF and subcontractor personnel performing field work involving subsurface disturbance at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physician's medical release for work will be confirmed by the Site Safety Officer (SSO) before an employee can begin Site activities. The medical release will consider the type of work to be performed and the required personal protection equipment (PPE). The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste Site work.

indicate the exceedance of an action level. The VOC work zone action levels and required responses are listed in the table in Section 4.6.4.

4.6.2 Dust Particulates

A particulate monitor will be used to measure airborne levels of respirable particulates (less than ten microns) during soil disturbing activities. The particulate monitor will be used in accordance with the manufacturer's specifications. The dust particulate work zone action levels and required responses are listed in the table in Section 4.6.4.

4.6.3 Oxygen and Combustible Gases

A combined combustible gas indicator and oxygen meter (CGI/O_2) or a multi-gas meter that measures the lower explosion limit of combustible gases (LEL), oxygen (O_2), carbon monoxide (CO), and hydrogen sulfide (H_2S) will be used to measure oxygen and combustible gases during tank removal. The combustible gas indicator and/or the multi-gas meter will be calibrated daily in accordance with manufacturers' specifications. The CGI and O_2 work zone action levels and required responses are listed in the table in Section 4.6.4.

4.6.4 Work Zone Action Levels and Response Actions

Instrument	Task to be monitored	Action Level (Note 1)	Response Action
PID	All soil disturbance tasks	Less than 10 ppm in breathing zone.	Level D or D-Modified
		Between 10 and 100 ppm Half-face mask to 50 ppm (max.) Full-face mask to 100 ppm	Level C
		More than 100 ppm	Stop work. Resume work when readings are less than 500 ppm.
Particulate monitor	All soil disturbance tasks	Less than 5 mg/m^3	Level D
		Between 5 mg/m^3 and 125 mg/m^3	Level C. Apply dust suppression measures. If <2.5 mg/m^3, resume work using Level D. Otherwise, use Level C.
		Above 125 mg/m^3	Stop work. Apply additional dust suppression measures. Resume work when less than 125 mg/m^3.
Combustible Gas Indicator (CGI) or Equivalent (Note 2)	Tank Removal	Less than 20 percent LEL	Continue work.
		Between 20 and 80 percent LEL	Stop work. Resume work when less than 20 percent LEL.
		Above 80 percent LEL	Evacuate Exclusion Zone.
Oxygen Monitor	Tank Removal	Above 19.5 percent	Continue work.
		Below 19.5 percent	Stop work. Resume work when greater than 19.5 percent.

Notes:
1 – 15-minute time-weighted average, except for CGI, which is instantaneous reading.
2 – CGI or equivalent must measure oxygen (O_2), carbon monoxide (CO), hydrogen sulfide (H_2S), and combustible gas (LEL).

ppm – parts per million
mg/m^3 – milligrams per cubic meter
LEL – lower explosive limit

4.7 Community Air Monitoring

Perimeter community air monitoring for volatile organic compounds (VOCs) and dust particulates will be conducted during soil disturbance activities, including removal of liquids from tanks (if found), excavation and removal of underground storage tanks, excavation and removal of contaminated soil around the underground storage tanks, and drilling operations. At the start of work, air monitoring stations will be established upwind and downwind of the work activities. Exceedances of community air monitoring action levels will be reported in the daily report to the New York State Department of Environmental Conservation (NYSDEC) Project Manager.

4.7.1 Volatile Organic Compounds

Monitoring for volatile organic compounds (VOCs) will be conducted using a photoionization detector (PID). Monitoring for VOCs at both the upwind and downwind stations will be conducted at the start of each workday and every time the wind direction changes, to establish background conditions. Monitoring for VOCs at the downwind station will be continuous during soil excavation. If readings approach the Work Zone Action Levels shown in the table in Section 4.6.4, the location of the community monitoring downwind station will be moved to the downwind perimeter of the Site. Background readings and any readings that trigger response actions will be recorded in the Project log book, which will be available on-site for NYSDEC and NYSDOH review. The VOC community action levels and required responses are listed in the table in Section 4.7.3.

Downwind odor monitoring will be performed during the excavation and loading of contaminated soil. If nuisance odors are noted, corrective actions will be implemented in accordance with Section 4.8 and the Expanded Community Air Monitoring and Odor/Vapor Control Plan provided in Appendix F.

4.7.2 Dust Particulates

Community air monitoring for dust particulates will be conducted using a real time particulate monitor that measures the concentration of airborne respirable particulates less than ten micrometers in size (PM_{10}). The monitor will be capable of calculating 15-minute running average concentrations and will be equipped with an audible alarm to indicate exceedance of action levels. Monitoring for particulates at the upwind location will be conducted at the start of each workday and every time the wind direction changes, to establish background conditions. Monitoring at the downwind station will be continuous during soil excavation. If readings approach the Work Zone Action Levels shown in the table in Section 4.6.4, the location of the community monitoring downwind station will be moved to the downwind perimeter of the Site. Background readings and any readings that trigger response actions will be recorded in the Project log book, which will be available on-site for NYSDEC and NYSDOH review. The dust particulate community action levels and required responses are listed in the table in Section 4.7.3.

"General Description and Discussion of the Levels of Protection and Protective Gear." AKRF field personnel and other Site personnel will wear, at a minimum, Level D PPE. The protection will be based on the air monitoring described in Section 4.6 of this HASP.

LEVEL OF PROTECTION and PPE		Soil Boring and Excavation
Level D (x) Steel Toe Shoes (x) Hard Hat (within 25 ft of drill rig/excavator) (x) Work Gloves	(x) Safety Glasses ( ) Face Shield (x) Ear Plugs (within 25 ft of drill rig/excavator) (x) Nitrile Gloves	Yes
Level C *(in addition to Level D)* ( ) Half Face Respirator (x) Full Face Respirator ( ) Full Face PAPR	( ) Particulate Cartridge ( ) Organic Cartridge (x) Dual Organic/Particulate Cartridge	If PID >10 ppm (breathing zone)
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breath, any odors detected, etc.).		

4.10 General Work Practices

To protect the health and safety of the field personnel, field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the Site. These areas will be designated by the Site Safety Officer (SSO).
- Workers must wash their hands and face thoroughly on leaving the work area and before eating, drinking, or any other such activity.
- The workers should shower as soon as possible after leaving the Site. Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

4.11 Contingency Plan

In the event that an underground storage tank, drum, odor, stained-soil, spill, or evidence of a previous spill or release is identified at a location, which has not been designated as an Area of Concern (AOC) in the Interim Remedial Measure (IRM) Work Plan, that location will be considered to be the center of a new work zone. All applicable work zone requirements of Section 4.0 will apply, including but not limited to: hazardous characterization and evaluation, work zone delineation, work zone air monitoring, adherence to action levels, community air monitoring, personnel protection training requirements, and general work practices.

If the identified material is unknown or the apparent chemical has not been identified in this Interim Remedial Measure Health and Safety Plan (IRM HASP), the workers will withdraw to the edge of the exclusion zone and conduct monitoring consistent with Sections 4.7 and 4.8. The contractor will then contact the NYSDEC Spill Hotline and the other emergency contacts listed in Section 5.2.

5.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the Site Safety Officer (SSO) will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be driven to a hospital by on-site personnel. Directions to the hospital are provided below, and a hospital route map is attached.

5.1 Hospital Directions

Hospital Name:	St. Luke's Roosevelt Hospital
Phone Number:	(212) 523-4000
Address/Location:	1000 10th Avenue, New York, NY The entrance to the Emergency Room is on West 59th Street between 10th Avenue (Amsterdam Avenue) and 11th Avenue (West End Avenue).
Directions:	Go EAST on West 60th Street Turn RIGHT onto Columbus Avenue (9th Avenue) Turn RIGHT onto West 59th Street

A map to the hospital from the Site is attached as Figure 1.

5.2 Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF	Michelle Lapin	Project Director	646-388-9520 (office)
	Richard Gardineer	Project Manager	914-949-7336 (office)
	Jessica Leber	Site Safety Officer	646-388-9533 (office) 917-612-6175 (cell)
Algin Management Co., LLC	Larry Ginsberg	Client	718-896-9600
Subcontractors (driller, tank removal, etc.)	TBD – will be provided prior to the start of work	TBD	TBD
Ambulance, Fire Department, & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

NYSDEC	Shaminder Chawla	Project Manager	718-482-4897
NYSDOH	Julia Guastella	Project Manager	800-485-1158 x27780

6.0 APPROVAL & ACKNOWLEDGEMENTS OF IRM HASP

APPROVAL

Signed:	Date:
AKRF Project Manager	
Signed:	Date:
AKRF Health and Safety Officer	

Below is an affidavit that must be signed by all workers who enter the Site. A copy of the IRM HASP must be on-site at all times and will be kept by the Site Safety Officer (SSO).

AFFIDAVIT

I,_____(name), of_____(company name), have read the Interim Remedial Measure Health and Safety Plan (IRM HASP) for the West 61st Street Site. I agree to conduct all on-site work in accordance with the requirements set forth in this IRM HASP and understand that failure to comply with this HASP could lead to my removal from the Site.

Signed:	Company:	Date:
Signed:	Company:	Date:
Signed:	Company:	Date:
Signed:	Company:	Date:
Signed:	Company:	Date:
Signed:	Company:	Date:
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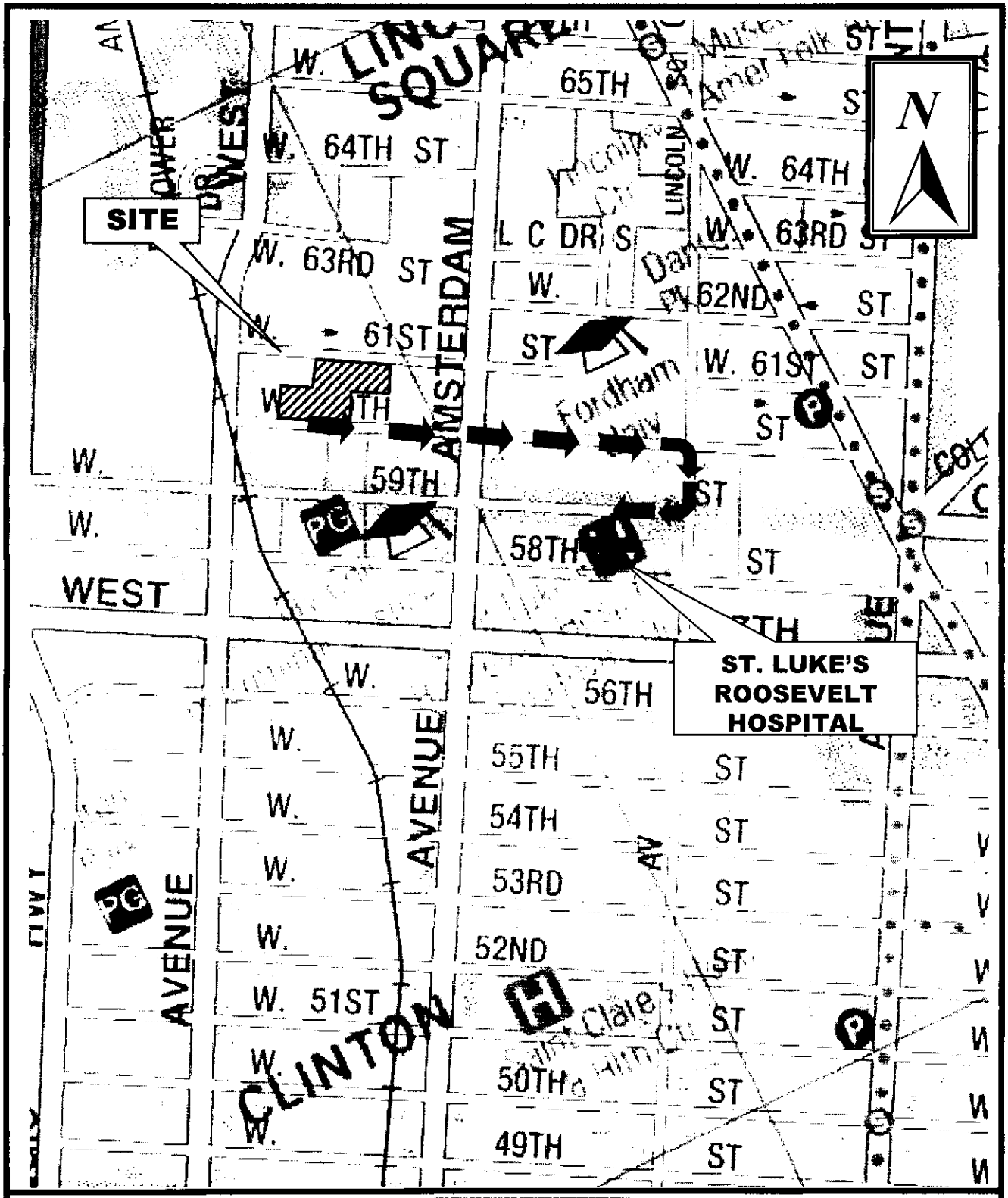
FIGURE



West 61st Street Site
New York, New York

PROJECT SITE MAP
AND NEAREST HOSPITAL

AKRF, Inc.

Environmental Consultants

440 Park Avenue S., New York, New York 10016

DATE
April 2005

DRAWING No.

PROJECT No.
10321

FIGURE No.
1

APPENDIX A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE
CAS # 71-43-2

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness. Long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 587 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

(Pronounced bĕn′zēn′)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mgL). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

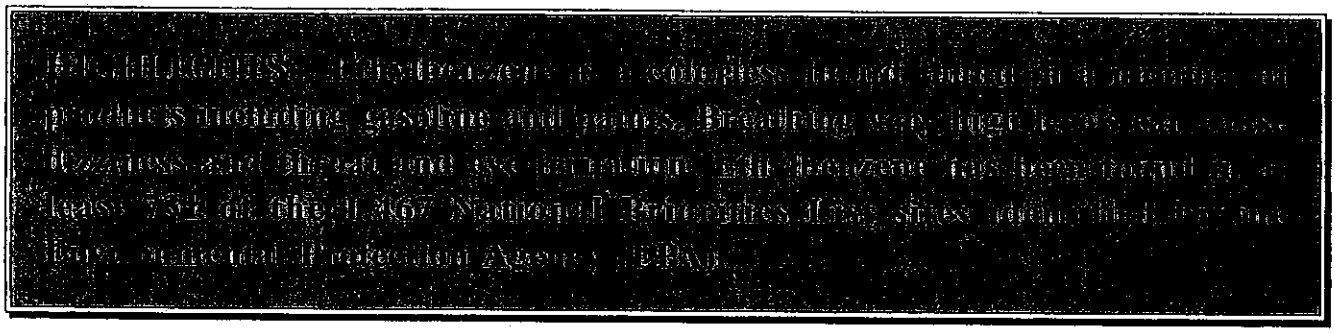
This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ETHYLBENZENE
CAS # 100-41-4

This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is ethylbenzene?

(Pronounced ĕth′ əl bĕn′ zēn′)

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- ❑ Ethylbenzene moves easily into the air from water and soil.
- ❑ It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- ❑ Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- ❑ In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- ❑ In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- ❑ Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- ❑ Drinking contaminated tap water.
- ❑ Working in an industry where ethylbenzene is used or made.
- ❑ Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

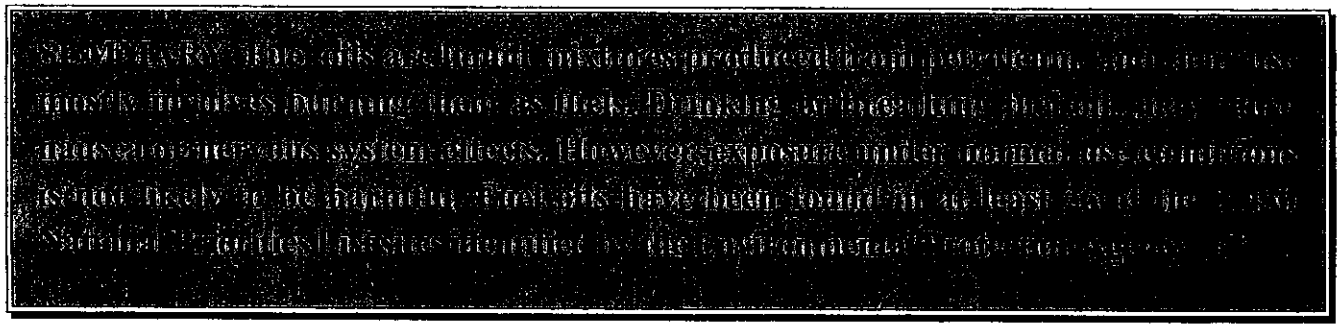
Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

FUEL OILS

CAS # 8008-20-6, 70892-10-3, 68476-30-2, 68476-34-6, 68476-31-3

This fact sheet answers the most frequently asked health questions (FAQs) about fuel oils. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What are fuel oils?

(Pronounced fyo͞o′əl oilz)

Fuel oils are a variety of yellowish to light brown liquid mixtures that come from crude petroleum. Some chemicals found in fuel oils may evaporate easily, while others may more easily dissolve in water.

Fuel oils are produced by different petroleum refining processes, depending on their intended uses. Fuel oils may be used as fuel for engines, lamps, heaters, furnaces, and stoves, or as solvents.

Some commonly found fuel oils include kerosene, diesel fuel, jet fuel, range oil, and home heating oil. These fuel oils differ from one another by their hydrocarbon compositions, boiling point ranges, chemical additives, and uses.

What happens to fuel oils when they enter the environment?

- Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.
- Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.
- Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.
- Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.
- Some of the chemicals found in fuel oils may build up significantly in plants and animals.

How might I be exposed to fuel oils?

- Using a home kerosene heater or stove, or using fuel oils at work.
- Breathing air in home or building basements that has been contaminated with fuel oil vapors entering from the soil.
- Drinking or swimming in water that has been contaminated with fuel oils from a spill or a leaking underground storage tank.
- Touching soil contaminated with fuel oils.
- Using fuel oils to wash paint or grease from skin or equipment.

How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene

stoves for cooking do not seem to have any health problems related to their exposure.

Breathing some fuel oils for short periods may cause nausea, eye irritation, increased blood pressure, headache, lightheadedness, loss of appetite, poor coordination, and difficulty concentrating. Breathing diesel fuel vapors for long periods may cause kidney damage and lower your blood's ability to clot.

Drinking small amounts of kerosene may cause vomiting, diarrhea, coughing, stomach swelling and cramps, drowsiness, restlessness, painful breathing, irritability, and unconsciousness. Drinking large amounts of kerosene may cause convulsions, coma, or death. Skin contact with kerosene for short periods may cause itchy, red, sore, or peeling skin.

How likely are fuel oils to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans, but for other fuel oils (light) there is not enough information to make a determination. IARC has also determined that occupational exposures to fuel oils during petroleum refining are probably carcinogenic in humans.

Some studies with mice have suggested that repeated contact with fuel oils may cause liver or skin cancer. However, other mouse studies have found this not to be the case. No studies are available in other animals or in people on the carcinogenic effects of fuel oils.

Is there a medical test to show whether I've been exposed to fuel oils?

There is no medical test that shows if you have been exposed to fuel oils. Tests are available to determine if some of the chemicals commonly found in fuel oils are in your blood. However, the presence of these chemicals in blood may not necessarily mean that you have been exposed to fuel oils.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) and the Air Force Office of Safety and Health (AFOSH) have set a permissible exposure level (PEL) of 400 parts of petroleum distillates per million parts of air (400 ppm) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m^3) for a 40-hour workweek.

The Department of Transportation (DOT) lists fuel oils as hazardous materials and, therefore, regulates their transportation.

Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for fuel oils. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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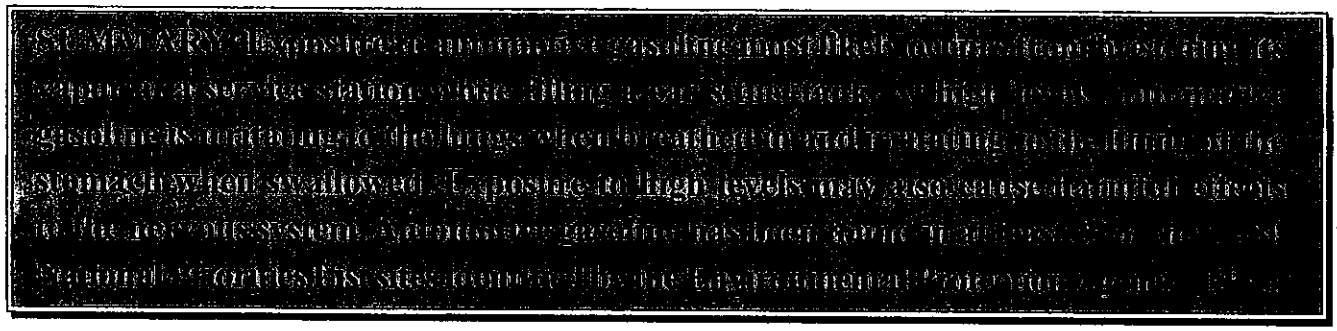
AUTOMOTIVE GASOLINE
CAS # 8006-61-9

This fact sheet answers the most frequently asked health questions (FAQs) about automobile gasoline. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is automotive gasoline?

(Pronounced ô'tə-mō'tĭv găs'ə-lēn')

The gasoline discussed in this fact sheet is automotive used as a fuel for engines in cars. Gasoline is a colorless, pale brown, or pink liquid, and is very flammable.

Gasoline is a manufactured mixture that does not exist naturally in the environment. Gasoline is produced from petroleum in the refining process.

Typically, gasoline contains more than 150 chemicals, including small amounts of benzene, toluene, xylene, and sometimes lead. How the gasoline is made determines which chemicals are present in the gasoline mixture and how much of each is present. The actual composition varies with the source of the crude petroleum, the manufacturer, and the time of year.

What happens to automotive gasoline when it enters the environment?

- Small amounts of the chemicals present in gasoline evaporate into the air when you fill the gas tank in your car or when gasoline is accidentally spilled onto surfaces and soils or into surface waters.
- Other chemicals in gasoline dissolve in water after spills to surface waters or underground storage tank leaks into the groundwater.
- In surface releases, most chemicals in gasoline will probably evaporate; others may dissolve and be carried away by water; a few will probably stick to soil.
- The chemicals that evaporate are broken down by sunlight and other chemicals in the air.
- The chemicals that dissolve in water also break down quickly by natural processes.

How might I be exposed to automotive gasoline?

- Breathing vapors at a service station when filling the car's fuel tank is the most likely way to be exposed.
- Working at a service station.
- Using equipment that runs on gasoline, such as a lawn mower.
- Drinking contaminated water.
- Being close to a spot where gasoline has spilled or leaked into the soil.

How can automotive gasoline affect my health?

Many of the harmful effects seen after exposure to gasoline are due to the individual chemicals in the gasoline mix-

ture, such as benzene and lead. Inhaling or swallowing large amounts of gasoline can cause death.

Inhaling high concentrations of gasoline is irritating to the lungs when breathed in and irritating to the lining of the stomach when swallowed. Gasoline is also a skin irritant. Breathing in high levels of gasoline for short periods or swallowing large amounts of gasoline may also cause harmful effects on the nervous system.

Serious nervous system effects include coma and the inability to breathe, while less serious effects include dizziness and headaches.

There is not enough information available to determine if gasoline causes birth defects or affects reproduction.

How likely is automotive gasoline to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified automotive gasoline for carcinogenicity. Automotive gasoline is currently undergoing review by the EPA for cancer classification.

Some laboratory animals that breathed high concentrations of unleaded gasoline vapors continuously for 2 years developed liver and kidney tumors. However, there is no evidence that exposure to gasoline causes cancer in humans.

Is there a medical test to show whether I've been exposed to automotive gasoline?

Laboratory tests are available that can measure elevated blood or urine levels of lead (as an indication of exposure to leaded gasoline only), benzene, or other substances that may result from exposure to gasoline or other sources. These methods are sensitive enough to measure background levels and levels where health effects may occur. These tests aren't available in most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has established many regulations to control air pollution. These are designed to protect the public from the possible harmful health effects of gasoline.

The American Conference of Governmental Industrial Hygienists (ACGIH) set a maximum level of 890 milligrams of gasoline per cubic meter of air (890 mg/m^3) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Crude petroleum: Petroleum that has not been processed.

Dissolve: To disappear gradually.

Evaporate: To change into a vapor or a gas.

Irritant: A substance that causes an abnormal reaction.

Mixture: A combination of two or more components.

Refining process: The process by which petroleum is purified to form gasoline.

Tumor: An abnormal mass of tissue.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for automotive gasoline. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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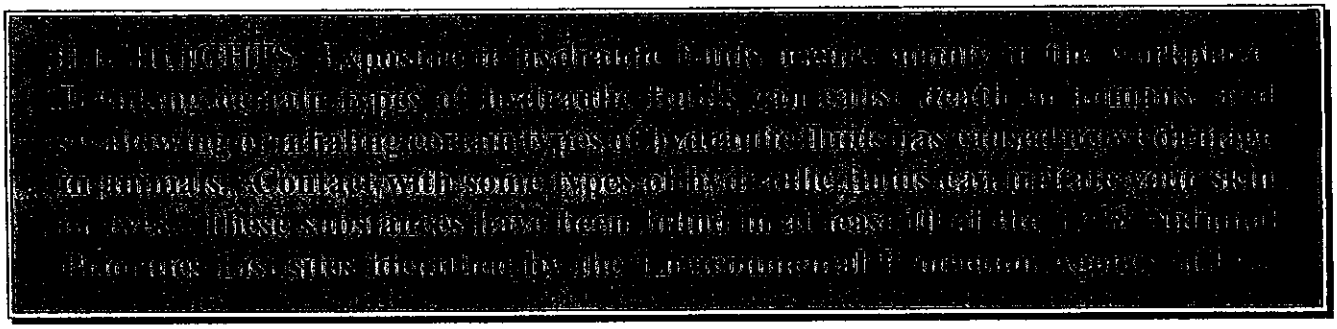
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

HYDRAULIC FLUIDS

CAS # 55957-10-3; 68937-40-6; 50815-84-4; 55962-27-1; 66594-31-8; 63848-94-2; 107028-44-4; 28777-70-0

This fact sheet answers the most frequently asked health questions (FAQs) about hydraulic fluids. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What are hydraulic fluids?

(Pronounced hī-drô'lĭk flōō'ĭdz)

Hydraulic fluids are a large group of liquids made of many kinds of chemicals. They are used in automobile automatic transmissions, brakes, and power steering; fork lift trucks; tractors; bulldozers; industrial machinery; and airplanes. The three most common types of hydraulic fluids are mineral oil, organophosphate ester, and polyalphaolefin. Some of the trade names for hydraulic fluids include Durad®, Fyrquel®, Skydrol®, Houghton-Safe®, Pydraul®, Reofos®, Reolube®, and Quintolubric®. (Use of trade names is for identification only and does not imply endorsement by the Agency for Toxic Substances and Disease Registry, the Public Health Service, or the U.S. Department of Health and Human Services.)

Some hydraulic fluids have a bland, oily smell and others have no smell; some will burn and some will not burn. Certain hydraulic fluids are produced from crude oil and others are manufactured.

What happens to hydraulic fluids when they enter the environment?

- Hydraulic fluids can enter the environment from spills, leaks in machines that use them, or from storage areas and waste sites.
- If spilled on soil, some of the ingredients in hydraulic fluids will stay on top and others will sink into the groundwater.
- In water, some hydraulic fluids' ingredients will transfer to the bottom and can stay there for more than a year.
- Certain chemicals in hydraulic fluids may break down in air, soil, or water, but how much breaks down isn't known.
- Fish may contain some hydraulic fluids if they live in contaminated water.

How might I be exposed to hydraulic fluids?

- Touching or swallowing hydraulic fluids.
- Breathing hydraulic fluids in the air near machines where hydraulic fluids are used.
- Touching contaminated water or soil near hazardous waste sites or industrial manufacturing facilities that use or make hydraulic fluids.

How can hydraulic fluids affect my health?

Little is known about how hydraulic fluids can affect your health. Since hydraulic fluids are actually mixtures of chemicals, some of the effects seen may be caused by additives in the hydraulic fluids.

HYDRAULIC FLUIDS

CAS # 55957-10-3; 68937-40-6; 50815-84-4; 55962-27-1; 66594-31-8; 63848-94-2; 107028-44-4; 28777-70-0

In people, the effects of breathing air with high levels of hydraulic fluids are not known. Drinking large amounts of some types of hydraulic fluids can cause pneumonia, intestinal bleeding, or death in humans. Weakness of the hands was seen in a worker who touched a lot of hydraulic fluids.

Rabbits that inhaled very high levels of one type of hydraulic fluid had trouble breathing, congested lungs, and became drowsy. The nervous systems of animals that swallowed or inhaled other hydraulic fluids were affected immediately with tremors, diarrhea, sweating, breathing difficulty, and sometimes several weeks later with weakness of the limbs, or paralysis. The immediate effects are caused because hydraulic fluids stop the action of certain enzymes, called cholinesterases, in the body. There are no reports of people swallowing or breathing the types of hydraulic fluids that cause these effects. When certain types of hydraulic fluids were put into the eyes of animals or allowed to touch the skin of people or animals for short periods of time, redness and swelling occurred. It is not known whether hydraulic fluids can cause birth defects or reproductive effects.

How likely are hydraulic fluids to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified hydraulic fluids as to their carcinogenicity.

Is there a medical test to show whether I've been exposed to hydraulic fluids?

Hydraulic fluids can't be measured in blood, urine, or feces, but certain chemicals in the hydraulic fluids can be measured. Some of the hydraulic fluids stop the activity of certain enzymes, called cholinesterases, in blood and this activity can be measured. However, many other chemicals also cause this effect. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

There are no federal government recommendations to protect humans from the health effects of the major hydraulic fluids. However, mineral oil, the major chemical ingredient of one type of hydraulic fluid, is part of the petroleum distillate class of chemicals and there are regulations for these chemicals.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 2,000 milligram per cubic meter (mg/m^3) petroleum distillates for an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) recommends an exposure limit of 350 mg/m^3 petroleum distillates for a 10-hour workday, 40-hour workweek.

Glossary

Additive: Substance added to another in small amounts to improve its properties.

CAS: Chemical Abstracts Service.

Carcinogenicity: Ability to cause cancer.

Petroleum Distillate: A chemical fraction of petroleum.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Hydraulic Fluids produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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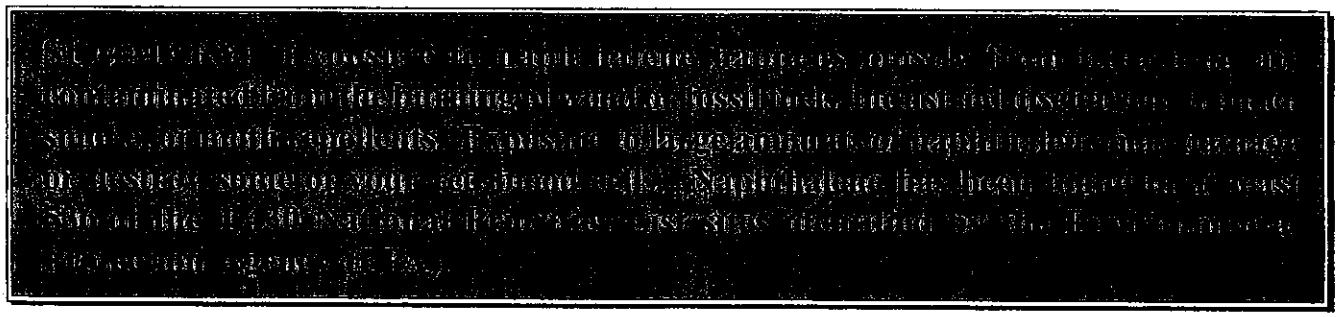
NAPHTHALENE
CAS # 91-20-3

This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is naphthalene?

(Pronounced năf'thə-lēn')

Naphthalene is a white solid that is found naturally in fossil fuels. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell.

The major products made from naphthalene are moth repellents. It is also used for making dyes, resins, leather, tanning agents, and the insecticide, carbaryl.

What happens to naphthalene when it enters the environment?

- Naphthalene enters the environment from industrial uses, and from its use as a moth repellent.
- It also enters from the burning of wood or tobacco, and from accidental spills.
- Naphthalene evaporates easily.
- In air, moisture and sunlight break it down, often within 1 day.
- Naphthalene in water is destroyed by bacteria or evaporates into the air.
- Naphthalene binds weakly to soils and sediment.
- It does not accumulate in animals or fish.
- If dairy cows are exposed to naphthalene, some of it will be in their milk.
- If laying hens are exposed, some of it will be in their eggs.

How might I be exposed to naphthalene?

- Breathing low levels in outdoor air.
- Breathing air contaminated from industrial discharges or from burning wood or fossil fuels.
- Breathing air in homes or businesses where cigarettes are smoked, wood is burned, or moth repellents are used.
- Drinking water from contaminated wells.
- Touching clothing, blankets, or coverlets that are treated with naphthalene.

How can naphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. People, particularly children, have developed this problem after eating naphthalene-containing mothballs or deodorant blocks. Some of the symptoms of this

problem are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin.

Animals sometimes develop cloudiness in their eyes after swallowing naphthalene. It is not clear if this also develops in people.

When mice were repeatedly exposed to naphthalene vapors for 2 years, their noses and lungs became inflamed and irritated.

How likely is naphthalene to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC) and the EPA have not classified naphthalene as to its human carcinogenicity.

No studies are available in people. Naphthalene has caused cancer in studies in female mice, but not in male mice or in rats of either sex.

Is there a medical test to show whether I've been exposed to naphthalene?

Tests are available that measure levels of naphthalene and its breakdown products in urine, stool, blood, or maternal milk. A small sample of your body fat can also be removed and analyzed for naphthalene. These tests are not routinely available in a doctor's office. However, a sample taken in a doctor's office can be sent to a special laboratory, if needed.

These tests cannot determine exactly how much naphthalene you were exposed to or predict whether harmful effects will occur.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water containing over 0.5 parts of naphthalene per million parts of water (0.5 ppm) for more than 10 days, or 0.4 ppm for longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime, the EPA suggests it contain no more than 0.02 ppm naphthalene. The EPA requires that discharges or spills into the environment of 100 pounds or more be reported.

The Occupational Safety and Health Administration (OSHA) has set a limit of 10 parts per million (10 ppm) for the level of naphthalene in workplace air over an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) considers more than 250 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Carcinogenicity: Ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Insecticide: A substance that kills insects.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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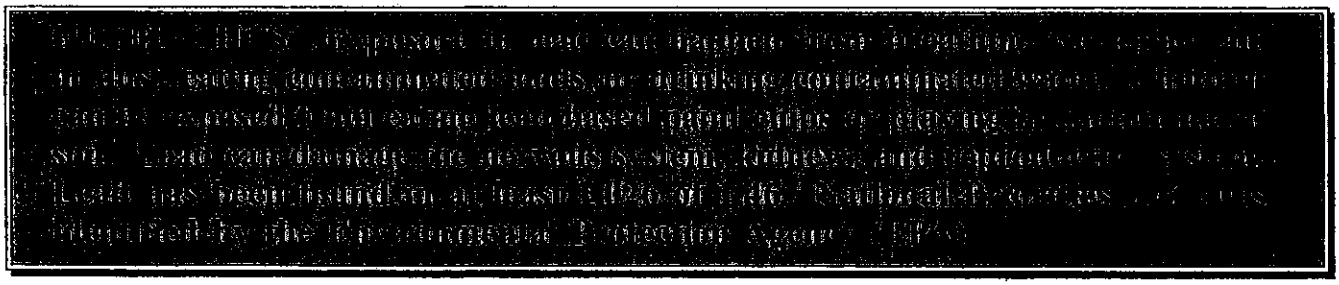
LEAD
CAS # 7439-92-1

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is lead?

(Pronounced lĕd)

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays.

Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.
- Much of the lead in inner-city soils comes from old houses painted with lead-based paint.

How might I be exposed to lead?

- Eating food or drinking water that contains lead.
- Spending time in areas where lead-based paints have been used and are deteriorating.
- Working in a job where lead is used.
- Using health-care products or folk remedies that contain lead.
- Engaging in certain hobbies in which lead is used (for example, stained glass).

How can lead affect my health?

Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

At high levels, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can also damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.

How likely is lead to cause cancer?

The Department of Health and Human Services has determined that lead acetate and lead phosphate may reasonably

be anticipated to be carcinogens based on studies in animals. There is inadequate evidence to clearly determine lead's carcinogenicity in people.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. A large amount of lead might get into a child's body if the child ate small pieces of old paint that contained large amounts of lead. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead.

How can families reduce the risk of exposure to lead?

Avoid exposure to sources of lead. Do not allow children to chew or mouth painted surfaces that may have been painted with lead-based paint (homes built before 1978). Run your water for 15 to 30 seconds before drinking or cooking with it. This will get rid of lead that may have leached out of pipes. Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children. Wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to show whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth and bones can be measured with X-rays, but this test is not as readily available. Medical treatment may be necessary in children if the lead concentration in blood is higher than 45 micrograms per deciliter (45 µg/dL).

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that children ages 1 and 2 be screened for lead poisoning. Children who are 3 to 6 years old should be tested for lead if they have never been tested for lead before and if they receive services from public assistance programs; if they live in or regularly visit a building built before 1950; if they live in or visit a home built before 1978 that is being remodeled; or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers children to have an elevated level of lead if the amount in the blood is 10 µg/dL.

The EPA requires lead in air not to exceed 1.5 micrograms per cubic meter (1.5 $\mu g/m^3$) averaged over 3 months. EPA limits lead in drinking water to 15 µg per liter.

The Occupational Health and Safety Administration (OSHA) develops regulations for workers exposed to lead. The Clean Air Act Amendments of 1990 banned the sale of leaded gasoline. The Federal Hazardous Substance Act bans children's products that contain hazardous amounts of lead.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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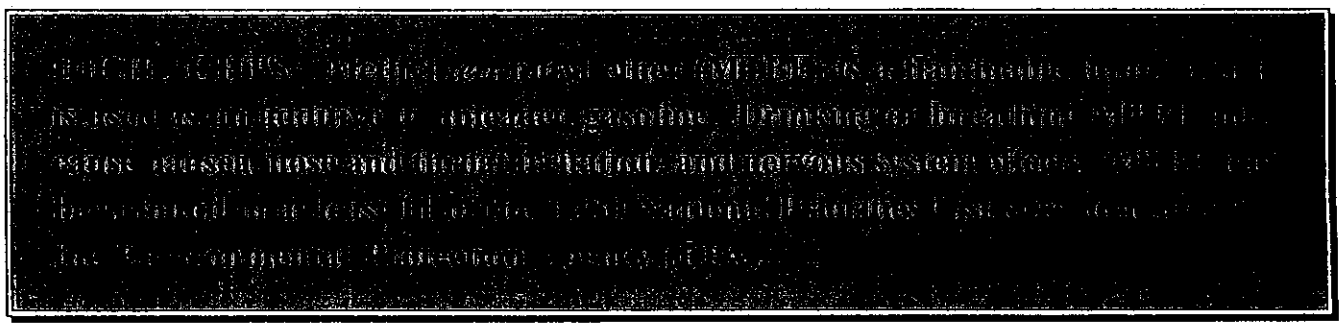
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

METHYL *TERT*-BUTYL ETHER (MTBE) CAS # 1634-04-4

This fact sheet answers the most frequently asked health questions (FAQs) about methyl *tert*-butyl ether (MTBE). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is methyl *tert*-butyl ether?

(Pronounced měth′əl tûr′shē-ĕr′ē byo͞ot′l ē′thər)

Methyl *tert*-butyl ether (MTBE) is a flammable liquid with a distinctive, disagreeable odor. It is made from blending chemicals such as isobutylene and methanol, and has been used since the 1980s as an additive for unleaded gasolines to achieve more efficient burning.

MTBE is also used to dissolve gallstones. Patients treated in this way have MTBE delivered directly to their gall bladders through special tubes that are surgically inserted.

What happens to MTBE when it enters the environment?

- MTBE quickly evaporates from open containers and surface water, so it is commonly found as a vapor in the air.
- Small amounts of MTBE may dissolve in water and get into underground water.
- It remains in underground water for a long time.
- MTBE may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- MTBE may be broken down quickly in the air by sunlight.
- MTBE does not build up significantly in plants and animals.

How might I be exposed to MTBE?

- Touching the skin or breathing contaminated air while pumping gasoline.
- Breathing exhaust fumes while driving a car.
- Breathing air near highways or in cities.
- Drinking, swimming, or showering in water that has been contaminated with MTBE.
- Receiving MTBE treatment for gallstones.

How can MTBE affect my health?

Breathing small amounts of MTBE for short periods may cause nose and throat irritation. Some people exposed to MTBE while pumping gasoline, driving their cars, or working

in gas stations have reported having headaches, nausea, dizziness, and mental confusion. However, the actual levels of exposure in these cases are unknown. In addition, these symptoms may have been caused by exposure to other chemicals.

There are no data on the effects in people of drinking MTBE. Studies with rats and mice suggest that drinking MTBE may cause gastrointestinal irritation, liver and kidney damage, and nervous system effects.

How likely is MTBE to cause cancer?

There is no evidence that MTBE causes cancer in humans. One study with rats found that breathing high levels of MTBE for long periods may cause kidney cancer. Another study with mice found that breathing high levels of MTBE for long periods may cause liver cancer.

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified MTBE as to its carcinogenicity.

Is there a medical test to show whether I've been exposed to MTBE?

MTBE and its breakdown product, butyl alcohol, can be detected in your breath, blood, or urine for up to 1 or 2 days after exposure. These tests aren't available at most doctors' offices, but can be done at special laboratories that have the right equipment. There is no other test specific to determining MTBE exposure.

Has the federal government made recommendations to protect human health?

The EPA has issued guidelines recommending that, to protect children, drinking water levels of MTBE not exceed 4 milligrams per liter of water (4 mg/L) for an exposure of 1-10 days, and 3 mg/L for longer-term exposures.

The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended an exposure limit of 40 parts of MTBE per million parts of air (40 ppm) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or gas.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

This ToxFAQs information is taken from the 1996 Toxicological Profile for Methyl *tert*-Butyl Ether produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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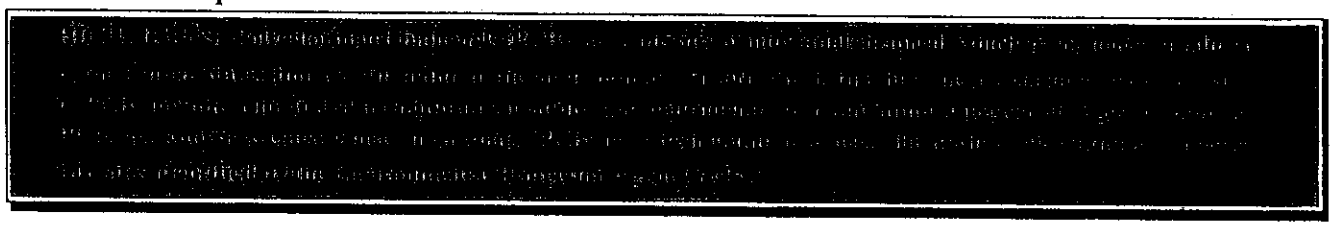
POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❑ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❑ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❑ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❑ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❑ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❑ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❑ Breathing air near hazardous waste sites and drinking contaminated well water.

❑ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❑ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❑ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❑ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❑ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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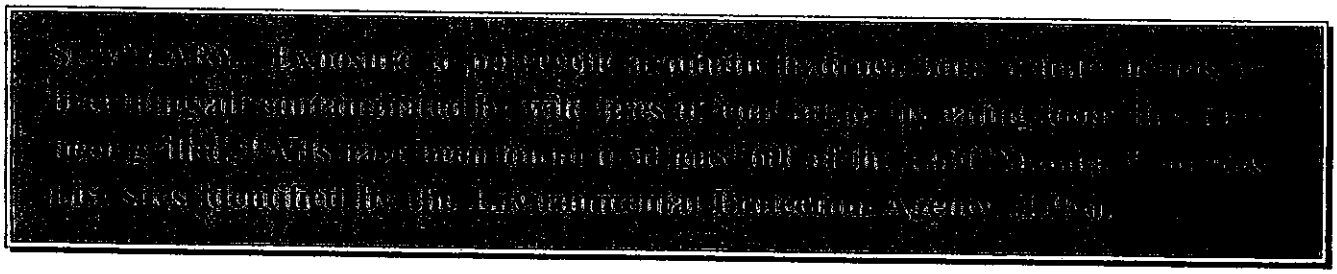
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ĭ-sī'klĭk ăr'ə-măt'ĭk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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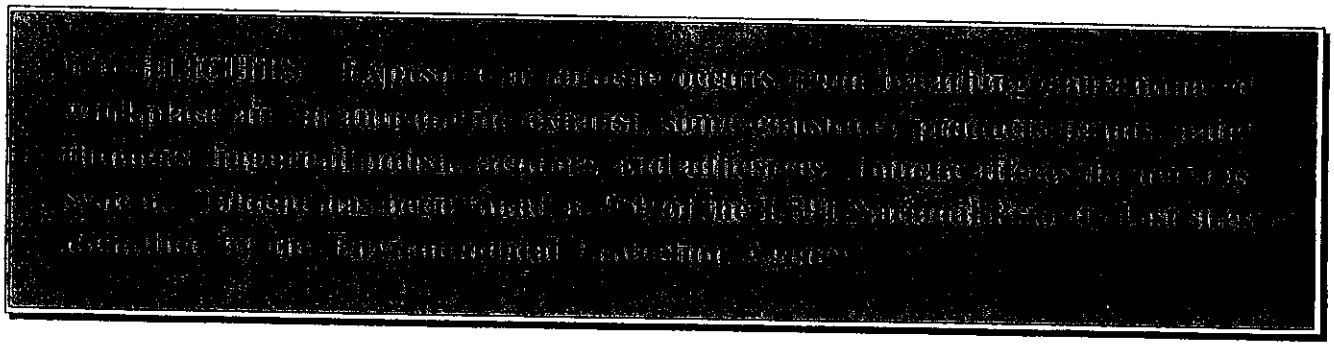
TOLUENE

CAS # 108-88-3

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about toluene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

What happens to toluene when it enters the environment?

❑ Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petrolieum products as well as from leasking underground storage tanks at gasoline stations and other facilities.

❑ When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.

❑ Toluene does not usually stay in the environment long.

❑ Toluene does not concentrate or buildup to high levels in animals.

How might I be exposed to toluene?

❑ Breathing contaminated workplace air or automobile exhaust.

❑ Working with gasoline, kerosene, heating oil, paints, and lacquers.

❑ Drinking contaminated well-water.

❑ Living near uncontrolled hazardous waste sites containing toluene products.

How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

How likely is toluene to cause cancer?

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

How can toluene affect children?

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults. Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

How can families reduce the risk of exposure to toluene?

❑ Use toluene-containing products in well-ventilated areas.

❑ When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

Is there a medical test to show whether I've been exposed to toluene?

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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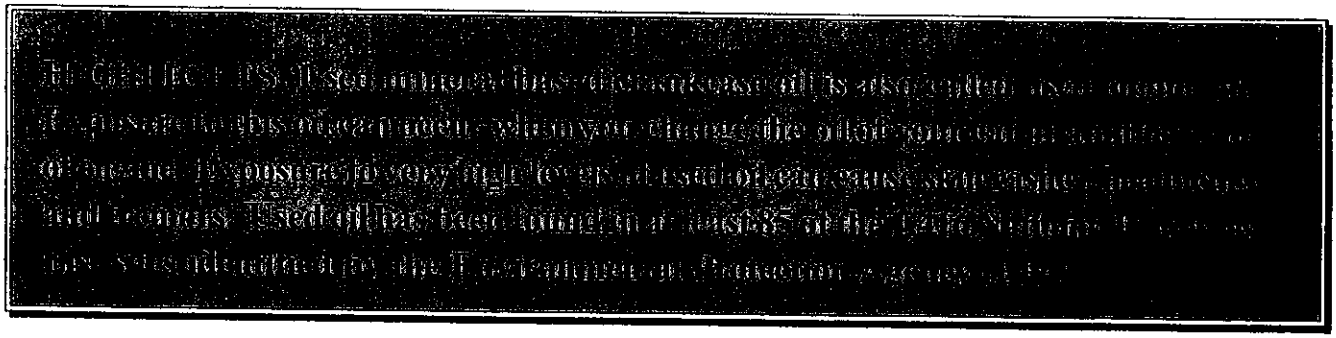
USED MINERAL-BASED CRANKCASE OIL CAS # 8002-05-9

This fact sheet answers the most frequently asked health questions (FAQs) about used mineral-based crankcase oil. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is used mineral-based crankcase oil?

Used mineral-based crankcase oil is the brown-to-black, oily liquid removed from the engine of a motor vehicle when the oil is changed. It is similar to unused oil except it contains additional chemicals from its use as an engine lubricant.

The chemicals in oil include hydrocarbons, which are distilled from crude oil, and various additives that improve the oil's performance. Used oil also contains chemicals formed when the oil is exposed to high temperatures and pressures inside an engine. It also contains some metals from engine parts and small amounts of gasoline, antifreeze, and chemicals that come from gasoline when it burns inside the engine.

The chemicals found in used mineral-based crankcase oil vary depending on the brand and type of oil, whether gasoline or diesel fuel was used, the mechanical condition of the engine that the oil came from, and the amount of use between oil changes. Used oil is not naturally found in the environment.

What happens to used mineral-based crankcase oil when it enters the environment?

- Used mineral-based crankcase oil enters the air through the exhaust system during engine use.
- It may enter water or soil when disposed of improperly.
- The hydrocarbon components of the oil generally stick to the soil surface.
- Some hydrocarbons evaporate into the air very quickly, and others evaporate more slowly.
- Hydrocarbon components of the oil that enter surface water bind to small particles in the water and eventually settle to the bottom.
- Hydrocarbons from used mineral-based crankcase oil may build up in shellfish or other organisms.
- Some metals in used mineral-based crankcase oil dissolve in water and move through the soil easily and may be found in surface water and groundwater.

How might I be exposed to used mineral-based crankcase oil?

- When you change the engine oil in your car.
- Breathing a small amount of the chemicals from the oil in exhaust fumes or from burning the oil as heating fuel.
- Touching contaminated soil or drinking contaminated water.

How can used mineral-based crankcase oil affect my health?

The health effects of used mineral-based crankcase oil vary depending on the brand and type of oil used and the

characteristics of the engine it came from.

Mechanics and other auto workers who are exposed to used mineral-based crankcase oil from a large number of cars have experienced skin rashes, blood effects (anemia), and headaches and tremors. However, these workers are also exposed to other chemicals, which may have caused these health effects.

Volunteers who breathed mists of used mineral-based crankcase oil for a few minutes had slightly irritated noses, throats, and eyes. Animals that ate large amounts of this oil developed diarrhea. Thus, people who swallow used mineral-based crankcase oil may also have diarrhea.

Some cows that ate used oil containing metals such as molybdenum and lead in contaminated pastures experienced anemia and tremors. Some of the cows died.

We do not know if exposure to used mineral-based crankcase oil affects the reproductive ability of men or women or whether it causes birth defects.

How likely is used mineral-based crankcase oil to cause cancer?

Long-term exposure (365 days or longer) of the skin to used mineral-based crankcase oil causes skin cancer in mice. Oils contain PAHs. Some PAHs have been identified as the cancer-causing agents. Animal tests have shown that the higher the PAH content in oil, the more likely for the oil to be carcinogenic.

The **Department of Health and Human Services (DHHS)**, the **International Agency for Research on Cancer (IARC)**, and the **EPA** have not classified used mineral-based crankcase oil with regard to its carcinogenicity in people.

Is there a medical test to show whether I've been exposed to used mineral-based crankcase oil?

Used mineral-based crankcase oil is a mixture of a large number of chemicals. Its composition depends on the brand of oil and the characteristics of the engine in which it was used. However, there are methods for determining if you have been exposed to some of the chemicals in used oil. These tests aren't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA and most states have developed regulations regarding disposal of used oil, its recycling, spraying used oil onto road surfaces for dust control, or burning it as a fuel.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To enter the air as a vapor.

PAHs: Polyaromatic hydrocarbons; a group of chemicals found in oil and other minerals.

References

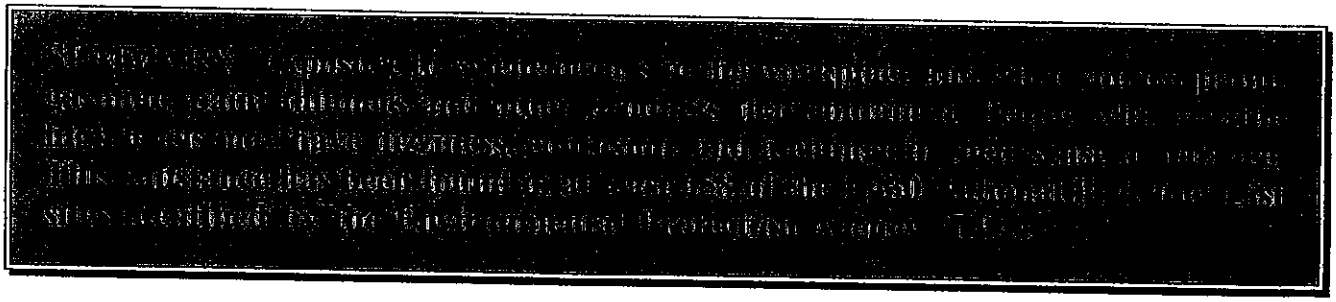
This ToxFAQs information is taken from the 1997 Toxicological Profile for Used Mineral-based Crankcase Oil produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

XYLENE
CAS # 1330-20-7

This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is xylene?

(Pronounced zī'lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

What happens to xylene when it enters the environment?

- Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- It evaporates quickly from the soil and surface water into the air.
- In the air, it is broken down by sunlight into other less harmful chemicals.
- It is broken down by microorganisms in soil and water.
- Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

How might I be exposed to xylene?

- Breathing xylene in workplace air or in automobile exhaust.
- Breathing contaminated air.
- Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- Breathing cigarette smoke that has small amounts of xylene in it.
- Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- The amount of xylene in food is likely to be low.

How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of

people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

Is there a medical test to show whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

APPENDIX B

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

The following section is based upon information provided by the CDC Division of Vector-Borne Infectious Diseases. Symptoms of West Nile Virus include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands, with most infections being mild. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. Most infections of St. Louis encephalitis are mild without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially infants), and spastic (but rarely flaccid) paralysis. The only way to avoid infection of West Nile Virus and St. Louis encephalitis is to avoid mosquito bites. To reduce the chance of mosquito contact:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (N, N-diethyl-meta-toluamide), since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35 percent DEET. DEET in high concentrations (greater than 35 percent) provides no additional protection.
- Repellents may irritate the eyes and mouth.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's directions for use, as printed on the product.

APPENDIX C
SITE SAFETY OFFICER RESUME

JESSICA E. LEBER

ENVIRONMENTAL SCIENTIST

Ms. Leber is an environmental scientist with about one year of professional environmental consulting experience. Her range of experience includes completing environmental site assessments, subsurface investigations, hazardous materials impact studies, and preparing sampling protocols and health and safety plans. Ms. Leber's fieldwork experience includes soil boring installation and sampling, groundwater monitoring well installation and sampling, test pit oversight, and air monitoring.

Prior to joining AKRF, Ms. Leber graduated cum laude from Columbia University with a degree in Environmental Chemistry. She has past experience working in organic and environmental chemistry research laboratories at Columbia University and Stony Brook University. Prior to her graduation, she completed an internship at a small environmental consulting firm in Nassau County.

BACKGROUND

Education

B.A., Environmental Chemistry, Columbia University

Certifications

40 Hour Hazardous Waste Operations Site Worker

New York State-Licensed Asbestos Inspector

RELEVANT EXPERIENCE

Atlantic Yards Arena, Brooklyn, NY

As part of the New York City CEQR process, Ms. Leber served on a team of Hazmat staff conducting Phase I Environmental Site Assessments in accordance with ASTM E-1527-00 related to the potential development of eight city blocks for the Atlantic Yards Arena. Ms. Leber coordinated with clients, property owners, and tenants to conduct the site inspections, historical research, regulatory records review, and preparation of the Phase I report.

Flushing, Queens, NY

Ms. Leber is serving on a team conducting an investigation and remediation of a large PCB-contaminated former utility property in Flushing, Queens. She has completed field work for several hundred soil boring installations in the contaminant delineation phase of the project and has aided in preparing documents for the site's transfer from the State Voluntary Cleanup Program to the State Brownfield Cleanup Program.

Queens West, Long Island City, NY

Ms. Leber conducted field work for a supplemental remedial investigation at this former Blau Gas manufacturing facility on a portion of the Queens West Development site in Long Island City. The work is being conducted as part of a Voluntary Cleanup Agreement with the NYSDEC. Field work activities have included soil boring installation, test pit oversight, and monitoring well installation and sampling. Ms. Leber will analyze the laboratory analytical data and aid in preparing a report of the findings of the investigation.

West - Chambers Street, New York, NY

Ms. Leber completed a subsurface investigation for this property currently in the CEQR process to allow residential and commercial development at the site. Ms. Leber's work included the installation and sampling of soil borings and groundwater monitoring wells, analysis of analytical laboratory data, and preparation of an investigation report. Based on the findings of this study, Ms. Leber prepared a Remedial Action Plan and Construction Phase Health and Safety Plan currently pending approval by the New York City Department of Environmental Protection.

APPENDIX D
REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: _____ Project Name/Number: _____

Report Date: _____ Project Manager Name: _____

Summary of any violations of procedures occurring that week:_____

_____

_____

_____

Summary of any job related injuries, illnesses, or near misses that week:_____

_____

_____

_____

_____

Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

_____

_____

_____

Comments:

_____

_____

_____

Name: _____ Company: _____

Signature: _____ Title: _____

INCIDENT REPORT FORM

Date of Report: _____

Injured: _____

Employer: _____

Site: _____ Site Location: _____

Report Prepared By: _____ _____

Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

___Injury	___ Illness	___ Near Miss
__ Property Damage	___ Fire	___ Chemical Exposure
__ On-site Equipment	___ Motor Vehicle	___ Electrical
__ Mechanical	___ Spill	___ Other

DATE AND TIME OF ACCIDENT/INCIDENT: Narrative report of Accident/Incident: Identify: 1) actions leading to or contributing to the accident/incident; 2) the accident/incident occurrence; and 3) actions following the accident/incident.

_____

_____

_____

_____

_____

_____

_____

_____

_____

WITNESS TO ACCIDENT/INCIDENT:

Name _____ Company: _____

Address: _____

Phone No.: _____

Name _____ Company: _____

Address: _____

Phone No.: _____

INJURED - ILL:

Name: _____ SSN: _____

Address: _____ Age: _____

Length of Service: _____ Time on Present Job: _____

Time/Classification: _____

SEVERITY OF INJURY OR ILLNESS:

____ Disabling ___ Non-disabling ___ Fatality

____ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: _____

NATURE OF INJURY OR ILLNESS: _____

_____

_____

_____

CLASSIFICATION OF INJURY:

__ Abrasions	_____ Dislocations	____ Punctures
__ Bites	_____ Faint/Dizziness	____ Radiation Burns
__ Blisters	_____ Fractures	____ Respiratory Allergy
__ Bruises	_____ Frostbite	____ Sprains
__ Chemical Burns	_____ Heat Burns	____ Toxic Resp. Exposure
__ Cold Exposure	_____ Heat Exhaustion	____ Toxic Ingestion
__ Concussion	_____ Heat Stroke	____ Dermal Allergy
__ Lacerations		

Part of Body Affected: _____

Degree of Disability: _____

Date Medical Care was Received: _____

Where Medical Care was Received: _____

Address (if off-site): _____

(If two or more injuries, record on separate sheets)

PROPERTY DAMAGE:

Description of Damage: _____

_____

Cost of Damage: $ _____

ACCIDENT/INCIDENT LOCATION: _____

ACCIDENT/INCIDENT ANALYSIS: Causative agent most directly related to accident/incident (Object, substance, material, machinery, equipment, conditions)

_____

_____

_____

_____

Was weather a factor?: _____

_____

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

_____

_____

_____

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

_____

_____

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

_____

_____

Modifications:

_____

Was injured using required equipment?:

_____

_____

If not, how did actual equipment use differ from plan?:

_____

_____

ACTION TAKEN TO PREVENT RECURRENCE: (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?

_____

_____

_____

_____

_____

ACCIDENT/INCIDENT REPORT REVIEWED BY:

_____ _____

SSO Name Printed SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

_____ _____

Signature Title

_____ _____

Signature Title

_____ _____

Signature Title

ACCIDENT/INCIDENT FOLLOW-UP: Date: _____

Outcome of accident/incident: _____

_____

_____

_____

Physician's recommendations: _____

_____

_____

_____

Date injured returned to work: _____

Follow-up performed by:

_____ _____

Signature Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

APPENDIX E
EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH!

Hand gripping throat

LEAVE AREA IMMEDIATELY, NO DEBATE!

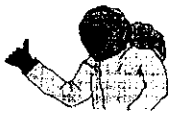
(No Picture) Grip partner's wrist or place both hands around waist

NEED ASSISTANCE!

Hands on top of head

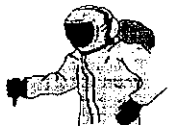
OKAY! – I'M ALL RIGHT!

- I UNDERSTAND!



Thumbs up

NO! - NEGATIVE!



Thumbs down

APPENDIX F

EXPANDED COMMUNITY AIR MONITORING AND ODOR/VAPOR CONTROL PLAN

EXPANDED COMMUNITY AIR MONITORING AND ODOR/VAPOR CONTROL PLAN

WEST 61ST STREET SITE

New York, New York

AKRF Project Number: 10321

BCP Site ID 231043

Prepared by:

AKRF

440 Park Avenue South, 7th Floor
New York, NY 10016
(212) 696-0670

Prepared for:

Algin Management Co., LLC
64-35 Yellowstone Blvd.
Forest Hills, NY 11375

February 2006

TABLE OF CONTENTS

1.0 INTRODUCTION

This Expanded Community Air Monitoring and Odor/Vapor Control Plan specifies the following:

- Expanded procedures to be implemented to control emissions of vapors, particulate matter, or odors resulting from operations on the Site;
- Expanded procedures for monitoring to detect any emissions from operations on the Site which may impact the surrounding community; and
- The appropriate response measures to be implemented if such emissions are detected.

This Plan shall be implemented during the Remedial Investigation (RI) activities only when the air monitoring and response action measures described in Section 4.7 of the Interim Remedial Measure Health and Safety Plan (IRMHASP) are insufficient in preventing repeated exceedances of perimeter monitoring action levels or in preventing off-site nuisance odor impacts. The NYSDEC and NYSDOH will be notified should the implementation of this contingency Expanded Community Air Monitoring and Odor/Vapor Control Plan be required. Procedures intended to detect and respond to conditions which may affect on-site personnel are specified in the IRMHASP for this Site.

2.0 DUST, ODOR, AND VAPOR SUPPRESSION

2.1 Dust Suppression Measures

Dust suppression measures will be implemented during excavation activities associated with potential underground storage tank removals in accordance with the guidelines in NYSDEC Technical and Administrative Guidance Memorandum #4031, Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites. The following dust suppression measures will be implemented:

- Applying water on haul roads.
- Wetting equipment and excavation faces.
- Spraying water on buckets during excavation and dumping.
- Hauling materials in properly tarped or covered containers.
- Restricting vehicle speeds on the Site to ten mph.
- Covering excavated areas and material after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

2.2 Odor and Vapor Control Measures

Emissions of odors and vapors will be controlled by minimizing, to the extent possible, the exposure of contaminated soil to the atmosphere. Specific measures that shall be implemented are:

- Minimizing the size of excavations. Contaminated soil will be excavated by sections to minimize the size of the excavation that is open at any time.
- Promptly backfilling excavations. Adequate volumes of on-site or off-site fill material will be available if it is not possible to backfill with excavated material.
- Promptly removing contaminated soil. Pre-approval will be obtained from disposal facilities to minimize delay in moving soil off-site. Stockpiling of contaminated soil will be avoided to the extent practicable.

- Covering exposed excavated soil surfaces with encapsulant foam if odor is detected. A biodegradable, non-hazardous, non-flammable foam, such as Rusmar A-600, Allied AFT-400, or equivalent with an appropriate applicator unit will be present on-site during the excavation work. The foam will be used to cover stockpiles and exposed soil surfaces if necessary. In addition, odor neutralizing agents (such as Ecosorb 606 by Lenntech Water) will be applied directly to the soil, or in the air, if odors persist. No long-term invasive activities are planned as part of the Remedial Investigation (RI); therefore, long-term encapsulants and tarps would not be needed.
- Hauling soil only in covered trucks. When a disposal facility has been arranged, a trucking route will be selected that will minimize truck travel through residential areas.

3.0 EXPANDED PERIMETER MONITORING

Expanded perimeter air monitoring will be performed for volatile organic compounds (VOCs) and particulate matter. Since excavations as part of the Remedial Investigation (RI) will be localized, monitoring locations will be at the upwind and downwind boundaries of the exclusion zone.

3.1 Perimeter Monitoring – Volatile Organic Compounds

3.1.1 Monitoring Procedure

Perimeter monitoring for volatile organic compounds (VOCs) will be conducted using an organic vapor meter (OVM) equipped with a photoionization detector (PID). The OVM will be capable of calculating 15-minute running average concentrations and is equipped with an audible alarm to indicate the exceedance of an action level. Monitoring for VOCs at the upwind station will be conducted at the start of each workday and every time the wind direction changes, to establish background conditions. Monitoring for VOCs at the downwind station will be conducted on a continuous basis during excavation and loading operations. Background readings and any readings that trigger response actions will be recorded in the Project log book, which will be available on-site for NYSDEC/NYSDOH review, and the results of air monitoring activities and odor/vapor control measures will be provided in daily reports submitted to the NYSDEC and NYSDOH. The perimeter monitoring locations chosen will be recorded on a Site map submitted with the daily reports.

3.1.2 Response Actions

If the ambient (breathing zone) air concentration of volatile organic compounds (VOCs) at the Site perimeter exceeds five parts per million (ppm) over a 15-minute time weighted running average, but does not exceed 25 ppm, then invasive work activities will be temporarily halted. If VOC levels readily return to below five ppm, then work may resume with continued monitoring. If VOC levels do not readily return to below five ppm, then work will be halted and NYSDEC and NYSDOH will be notified immediately. The source of the VOC emissions will be identified and corrective actions taken to reduce emissions. Work will not resume until VOC levels are below five ppm.

If the ambient (breathing zone) air concentration of VOCs at the Site perimeter exceeds 25 parts per million (ppm) over a 15-minute time weighted running average, or ambient air concentrations do not readily fall below 5 ppm after two consecutive 15-minute time-weighted running averages, then work will be halted and NYSDEC and NYSDOH will be notified immediately. Confirmatory air samples will be collected at the upwind and downwind Site perimeters for laboratory analysis. Samples will be collected over a half-hour period in six-liter SUMMA canisters using flow controllers set at a rate of 0.2 liters per minute. The air samples will be analyzed for VOCs including tentatively identified

will be analyzed for VOCs including tentatively identified compounds (TICs) by EPA Method TO-15. The source of the emissions will be identified and corrective actions taken to reduce emissions. Work will not resume until the start-up is approved by NYSDEC and NYSDOH.

5.0 ODOR AND VAPOR CONTROL PLAN REVISIONS

If the odor and vapor control measures described in this contingency plan are still not adequate to prevent repeated exceedances of perimeter monitoring action levels, or to prevent off-site impacts as detected by the neighborhood odor and vapor monitoring program, then the invasive activities that resulted in the exceedances will be suspended, and NYSDEC and NYSDOH will be notified. A revised plan for dust, vapor, or odor control with alternative work practices and control measures will be submitted to NYSDEC and NYSDOH. The suspended activities will not be resumed until the revised dust, vapor, or odor control plan is approved by NYSDEC and NYSDOH, and the alternative work practices and control measures are implemented.