

Jewish Home Lifecare, Manhattan
125 West 97th Street
NEW YORK, NEW YORK

Remedial Action Plan

New York State Department of Environmental Conservation Spill No. 1306324

AKRF Project Number: 11743

Prepared for:

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Figure 1 – Project Site Location

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Appendix A - Construction Health and Safety Plan

1.0 INTRODUCTION

This Remedial Action Plan (RAP) was prepared for the remediation of New York State Department of Environmental Conservation (NYSDEC) Spill №. 1306324 at the proposed Jewish Home Lifecare Site (the “Site”) located at 125 West 97th Street in Manhattan (New York County), New York. A location map is provided as Figure 1. The approximately 31,800-square foot Site (Tax Block 1852, a portion of Lot 5) is currently a primarily asphalt-paved parking lot.

The spill remediation would be conducted as part of a proposed Site redevelopment, which would entail excavation to approximately 20 feet below grade (potentially down to bedrock) in the spill area and over the majority of the Site. The purpose of this RAP is to present procedures for managing soil and groundwater during the subsurface disturbance associated with construction of a multistory senior residence, in accordance with applicable federal, state, and local requirements, including guidelines for temporary on-site stockpiling and off-site transportation and disposal of soil. The RAP is based on the findings of a *Phase I Environmental Site Assessment* (ESA) prepared by Ethan C. Eldon Associates, Inc. in May 2011 (with an updated regulatory database review conducted by AKRF in January 2014) and *Subsurface (Phase II) Investigation* conducted by AKRF in October 2013 in accordance with a New York State Department of Health (NYSDOH) approved *Sampling Protocol and Health and Safety Plan* (HASP).

All work outlined within this RAP is also subject to the *Construction Phase Environmental Health and Safety Plan* (CHASP) developed for the Site which is provided as Appendix A. The RAP and CHASP will be submitted to NYSDOH and NYSDEC for review and approval.

2.0 SITE BACKGROUND

2.1 Site Characterization

The Site is approximately 90 feet above sea level. Regional topography slopes slightly down toward the west. The Site is underlain by an approximately 10- to 20-foot thick layer of urban fill materials (including sand, gravel, silt, coal, brick, ash, and/or slag), with bedrock beneath. Previous studies indicate that groundwater is first encountered at approximately 11 to 18 feet below grade and would be expected to flow in an approximately westerly direction toward the Hudson River, approximately 0.5 mile away. However, actual groundwater flow may be affected by utilities, basements, subway tunnels, bedrock geology, and other factors. Groundwater in Manhattan is not used as a source of potable water.

The proposed project is the construction of a multistory senior residence (with one cellar level) and surrounding paved and landscaped outdoor areas. Most of the outdoor areas would be underlain by the cellar, which would extend beyond the aboveground footprint as shown on Figure 2. Excavation for the cellar and building foundations is anticipated to extend approximately 20 feet below grade. Bedrock at the location of Spill №. 1306324 was encountered approximately 15 feet below grade. Thus, the proposed construction would require removal of soil down to bedrock at the spill location, removal of soil and potentially bedrock elsewhere within the cellar footprint to approximately 20 feet below grade, and potentially dewatering. The proposed project is undergoing environmental review pursuant to the *State Environmental Quality Review Act* (SEQRA).

2.2 Previous Environmental Investigations

125 West 97th Street, New York, NY – Phase I Environmental Site Assessment, Ethan C. Eldon Associates, Inc., May 2011

The Phase I ESA reviewed a variety of sources including: current and historical land use maps; state and federal environmental regulatory databases; and local records. The Phase I ESA also included reconnaissance of the Site and its surroundings. An updated regulatory database was evaluated by AKRF in January 2014.

The Phase I ESA indicated that the Site once included row houses and tenements, which were demolished by the 1960s. A closed-status (i.e., cleaned-up) petroleum spill with an address matching that of the Site was noted, but it related to a Con Edison manhole located off site within the West 97th Street roadway, and was in any event unlikely to have resulted in subsurface contamination based on the listing details. A spill of No. 6 fuel oil (Spill No. 9702659) was reported at 784 Columbus Avenue, the east-adjacent property, in May 1997. This spill, which reportedly involved subsurface contamination, was given a closed status by the NYSDEC in July 2005. The updated regulatory database review in January 2014 identified the active-status, on-site spill (Spill No. 1306324) discussed below, but no other significant changes from the findings of the May 2011 Phase I ESA. The updated regulatory database review in January 2014 identified the active-status, on-site spill (Spill No. 1306324) discussed below, but no other significant changes from the findings of the May 2011 Phase I ESA.

125 West 97th Street, New York, NY – Geotechnical Evaluation, Gorton & Partners, LLC, April 2011

The geotechnical study indicated that urban fill materials (of unknown origin) were encountered in the top 5 to 10 feet, underlain by apparent native soils (sand, gravel, silt, peat and organic material). Groundwater was first encountered at approximately 11 feet below grade. Bedrock was first encountered at approximately 10 to 30 feet below grade.

Jewish Home Lifecare, 125 West 97th Street, New York, NY – Draft Subsurface (Phase II) Investigation, AKRF, October 2013

The Phase II investigation included the collection of soil and groundwater samples from 8 borings advanced up to 20 feet below grade, and soil samples from 6 on-site tree pits, for laboratory analysis. Urban fill materials (sand, gravel, silt, coal, brick, ash, and/or slag) were encountered throughout the borings. Groundwater was first encountered at approximately 14 to 18 feet below grade. Laboratory analytical data indicated the following:

- In general, AKRF concluded, based on their experience at numerous NYC properties that the detected levels of metals and compounds in soil (and groundwater) samples were consistent with those typically found in the kinds of fill material encountered in the borings, which included brick and other building materials. Several volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and pesticides were detected in exceedance of conservative NYSDEC Subpart 375 Unrestricted Use Soil Cleanup Objectives (USCOs), which assume long-term exposure to unpaved soils. In particular, the VOCs benzene, ethylbenzene, m&p-xylene, and o-xylene were detected in one soil sample (WC-7 Bottom) collected in the southeastern corner of the Site at concentrations ranging from 120 to 9,700 micrograms per kilogram ($\mu\text{g}/\text{kg}$), all of which exceeded USCOs but were below NYSDEC Subpart 375 Restricted Residential Use Soil Cleanup Objectives (RRSCOs). The RRSCOs are a more appropriate (but still highly conservative) comparison as they assume

multifamily residences with some potential for soil contact. RRSCOs, however can only be utilized when the NYSDEC determines that it is not feasible to achieve USCOs. This determination would be via the submission of a Feasibility Study. In reality, long-term exposure to existing soils does not currently occur and would not occur with the anticipated use of the Site in which all existing soil not removed by excavation would be beneath a building, paving or new imported soils used for landscaping and installation of a vapor barrier. Petroleum-related VOCs were found in on-site groundwater samples, but at low concentrations (below TOGS 1.1.1 drinking water standards).

- Only certain SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracene, and ideno(1,2,3-cd)pyrene) and metals (arsenic, barium, lead, and mercury) exceeded RRSCOs. In particular, lead levels in 3 of the 38 soil samples exceeded 1,000 parts per million (ppm) with a maximum of 3,850 ppm, but the overall average lead level was 290 ppm. The average lead level in the samples from the top 6 inches of tree pits was 304 ppm (maximum 681 ppm). These findings do not indicate a “soil-lead hazard,” defined by the USEPA at 40 *Code of Federal Regulations* (“CFR”) 745.65(c) as, “bare soil on residential real property or on the property of a child-occupied facility that contains total lead equal to or exceeding 400 parts per million in a play area or average of 1,200 parts per million of bare soil in the rest of the yard based on soil samples.”
- The barium level in one sample (132 milligrams per liter [mg/L]) collected beneath the paving, analyzed by the toxicity characteristic leaching procedure (TCLP), exceeded the USEPA Hazardous Waste threshold (100 mg/L). Bricks, paint, tiles, glass, and rubber can contain elevated levels of barium and the detected levels are likely associated with existing urban fill material. Soils exceeding TCLP thresholds require special handling/transport/disposal if they are excavated. No other soil samples exceeded USEPA hazardous waste criteria.

Field screening (including staining, petroleum-like odors and photoionization detector instrument readings) and laboratory data for sample WC-7 Bottom suggested petroleum-contaminated soil was present between approximately 5 and 15 feet below grade in the southeastern corner of the Site. The observed contamination is not likely attributable to off-site Spill №. 9702659, as that spill involved №. 6 fuel oil which typically contains very low levels of VOCs and because the on-site contamination was seemingly encountered at such a shallow depth, above the water table. Spill №. 1306324 was more likely associated with an on-site source, such as a historical (i.e., removed) fuel oil storage tank once present in one of the former Site buildings. Based on these observations and laboratory analytical data, Spill №. 1306324 was reported to NYSDEC on September 16, 2013. The spill is believed to be isolated in this small part of the Site, based on the absence of similar signs of contamination in additional borings conducted nearby.

3.0 CONSTRUCTION MEASURES

Spill №. 1306324 has been reported to NYSDEC in connection with the petroleum-contaminated soil and has an active status. Additionally, soil and fill materials containing elevated concentrations of certain SVOCs, metals and pesticides, as well as a limited area of petroleum-contaminated soil, were identified at the Site and may be encountered during soil disturbance for the proposed project. Based on the scope of the proposed project, dewatering may be required.

No underground storage tanks (USTs) are known to remain beneath the Site. A contingency plan for the removal of any USTs encountered during construction is provided in Section 3.1. A plan is provided in Section 3.2 for spill remediation and appropriate handling, testing, and disposal of the known petroleum-contaminated soil and any other areas of contaminated soil unexpectedly encountered during excavation.

The project design will incorporate measures to minimize potential impacts after construction, as described in Section 4.0. Upon completion of all NYSDOH-approved remedial requirements pertinent to that phase, as outlined in this RAP, a P.E.-certified Remedial Closure Report will be submitted to NYSDOH. The report will include any manifests/bills of lading, etc., associated with off-site disposal of material, photographs of the work in progress, soil analytical testing results for any imported soil used in the Site cap, any laboratory data conducted for characterization or off-site disposal purposes, and documentation of the proper installation of vapor control measures.

3.1 Petroleum Tank Removal

If petroleum storage tanks are encountered, 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 any discovered underground storage tanks will be conducted in accordance with the 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 Technical Guidance for Site Investigation and Remediation (DER-10), May 2010. Laboratory testing of both characterization samples and of samples obtained from the excavation areas will include Method 8021 for VOCs and Method 8270 for SVOCs.

Any tanks encountered at the Site will be registered with NYSDEC and the New York City Fire Department, if necessary. Tank removal activities and any associated petroleum-contaminated soil removal must be documented in a Tank/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.

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 7 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 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. Remove and dispose of all concrete tank support structures or vaults as encountered.
8. Spill reporting to the NYSDEC Spill Hotline (800-457-7362) will be conducted, as necessary.
9. After tank removal, examine for evidence of petroleum releases in accordance with NYSDEC, Division of Spills Management SPOTS Memo №. 14 "Site Assessments at Bulk Storage Facilities." If there is evidence of a petroleum release, follow procedures for Soil Contamination Plan in addition to the procedures below.
10. Suspect materials will be field-screened with a 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 3.2.1 and 3.2.2. Material will be excavated until field screening with a PID yields concentrations of less than 20 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 guidance document DER-10 (Section 5.4 (b)5 through (b)7).
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).

3.2 Soil Disposal

Soil 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. The Phase II included sampling to characterize soil for disposal in accordance with typical receiving facility requirements; additional sampling may be required by the specific receiving facility(ies) selected.

Active-status Spill №. 1306324 will be remediated in coordination with and to the satisfaction of the NYSDEC. The following procedures will be implemented during disturbance of known petroleum-contaminated soil or in case sludges, soil or sediment known to be contaminated or showing evidence of potential contamination, such as discoloration, staining, or odors are encountered during excavation activities:

1. For new contamination that does not appear to be related to Spill №. 1306324, additional spill reporting to the NYSDEC Spill Hotline (800-457-7362) will be conducted, as necessary.
2. If additional waste characterization sampling is required beyond that conducted during the Phase II, the suspect soil will be sampled for laboratory analysis. Soil sample(s) will be analyzed at a minimum for parameters required by the intended disposal facility.
3. If the suspect soil is contaminated based on sampling results, it will be excavated and removed in accordance with the stockpiling and/or direct-loading procedures presented below. Soils 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 run 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 will then be disposed of in accordance with all applicable federal, state and local regulations.
5. The excavation will continue vertically until no evidence of contamination is noted in the base of the excavation or until bedrock or groundwater (whichever is shallower) is encountered. The excavation will continue horizontally until no evidence of contamination is noted in the sidewalls of the excavation. 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 be determined based on NYSDEC guidance. If post-excavation samples exceed action levels, then additional excavation will be performed, as warranted.
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.

When applicable, hazardous waste manifest forms and/or non-hazardous waste records will be completed as required by the appropriate regulatory agencies for verifying the material and quantity of each load in units of volume and weight.

3.2.1 Stockpiling Procedures

Any material intended for off-site disposal may be stockpiled temporarily or loaded directly onto trucks for off-site disposal, if pre-approved by the receiving facility. No petroleum-contaminated soil excavated from the Site will be re-used on-site.

Soil with known contamination or exhibiting evidence of contamination will be stockpiled on polyethylene sheeting. If the soil is expected to remain on-site overnight or longer, the stockpile will be covered with similar polyethylene sheeting and be 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, run-off and erosion, using water, plastic covers, silt fences, and/or hay bales, as necessary.

Soil will be segregated and stockpiled based on its known or anticipated type and/or level of contamination (based on analytical data, 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:

- Soil intended for reuse on site;
- Hazardous waste;
- Nonpetroleum contaminated nonhazardous soil for off-site disposal;
- Petroleum-contaminated soil for off-site disposal; and
- Soil 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 nonhazardous wastes.

3.2.2 Alternatives to Stockpiling

Alternative procedures to stockpiling could include, but are not limited to, agreement(s) from the intended disposal or treatment facilities to accept boring data and/or analytical data previously obtained so that materials may be directly loaded into trucks for shipment to the disposal facility.

3.3 Waste Management and Transportation

The proposed project will require soil excavation (e.g., for Spill №. 1306324 remediation and other excavation required for the construction of new building foundations and cellar).

- Any material showing evidence of contamination (such as odors, staining and/or elevated PID readings) will be properly disposed off site in accordance with applicable regulatory requirements and disposal facility requirements.
- Material including construction and demolition debris (C&D) showing no evidence of contamination may be properly disposed off site, or alternatively may be reused on site provided it is: (1) below a structure; (2) beneath a roadbed or other paved area; or (3) in unpaved areas, beneath the “soil cap.”

Transportation of all 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 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 truck beds with compatible material (such as polyethylene) or by decontaminating them prior to any use other than hauling contaminated materials.

All vehicles leaving the Site will be inspected to ensure that contaminated soil adhering to the wheels or under carriage 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 truck access routes will be evaluated 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.

3.4 Dust Control

To prevent the potential migration of dust, the following measures will be implemented during all earth-disturbing operations:

- Water will be available (and used as necessary) for sprinkling/wetting to suppress dust, especially in dry weather. If visible dust is observed during soil disturbance, dust suppression measures (e.g., sprinkling disturbed area with water) will be initiated.
- All haul trucks will have tarp covers.
- Vehicles will be inspected prior to their leaving the Site and cleaned as necessary to prevent tracking out of or dispersion of dust.

All work that involves soil disturbance or otherwise generates dust will be performed utilizing methods to minimize dust generation to the extent practicable. Particulate air monitoring requirements will be conducted as discussed in Section 3.6 of this Plan.

3.5 Endpoint Soil Sampling

Based on Phase II data, contamination associated with Spill №. 1306324 appears to be limited to soil in a small portion of the Site (the vicinity of boring SB-7 on Figure 2). The spill is proposed to be remediated by excavation as part of Site redevelopment. No VOCs were detected in Phase II groundwater samples at concentrations above TOGS 1.1.1 drinking water standards/guidelines. Excavation at the spill location is proposed to extend to bedrock, and laterally well beyond SB-7 to the north and west. To the south and east of SB-7, excavation for Site redevelopment is proposed to extend up to 25 feet laterally.

During excavation, soil will be field screened visually and using a PID to delineate the limits of contamination. If the bottom of the excavation terminates above bedrock, endpoint soil samples will be collected from the bottom of the excavation for laboratory analysis for VOCs and SVOCs. If evidence of contamination is noted at the excavation sidewalls once the excavation is extended laterally to the design boundary, endpoint samples will be collected in accordance with NYSDEC guidance (CP-51 and DER-10) from the most contaminated interval along the affected sidewall(s). The frequency of endpoint sampling will be determined per NYSDEC DER-10 Section 5.4 (b)5 thru (b)7) and based on the area of the excavation exhibiting field evidence of contamination (e.g., odors, staining or elevated PID readings).

If endpoint soil sampling indicates the presence of contamination beyond the design extent of excavation, the excavation will be extended (if feasible as per CP-51 Soil Cleanup Guidance) to remove the contamination to the satisfaction of NYSDEC.

3.6 Air Monitoring

An air monitoring program will be implemented during all soil disturbance activities to prevent or minimize exposure of the field personnel and the public to potential environmental hazards. Results of this air monitoring will be used to determine appropriate response actions. The air

monitoring will be consistent with or more stringent than the procedures in *Appendix IA - NYSDOH Generic Community Air Monitoring Plan (GCAMP)* of the NYSDEC Division of Environmental Remediation, May 2010 *DER-10 Technical Guidance for Site Investigation and Remediation*.

- Air monitoring for total particulates 10 micrometers or less (PM-10) will be performed during all soil disturbance activities using a Dust Trak® dust monitor or equivalent to measure real-time concentrations of PM-10.
- A PID will be used to perform air monitoring for VOCs during all soil disturbance activities. The PID would be calibrated with isobutylene in accordance with the manufacturer's recommendations.

Measurements for PM₁₀ and VOCs would be made prior to commencement of the work and during the work in areas where soil would be disturbed. The action levels in Tables 1 and 2 below are based on 15-minute averages of the monitoring data. The measurements would initially be made downwind of and as close as practicable to the workers and work area at breathing height. This is more conservative than the GCAMP, which would suggest measuring further from the work area, at the downwind perimeter. The Site Safety Officer (SSO) will set up the equipment and confirm that it is working properly. His/her qualified designee may then oversee the air measurements. Upwind/background levels will also be measured prior to starting work and regularly thereafter, especially when wind directions change. The final measurement for the day will be performed after the end of work. The initial action levels and required responses are listed in Table 1. If any vapor complaints are received from the public during the development the NYSDOH and the NYSDEC will be notified immediately.

If the downwind PM₁₀ particulate level at the downwind perimeter of the work area is 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) greater than the background level averaged over a 15-minute period or if airborne dust is observed leaving the work area, additional dust suppression techniques will be employed. Work will continue with these dust suppression techniques provided that downwind PM₁₀ particulate levels do not exceed 150 $\mu\text{g}/\text{m}^3$ above the background level and provided that no visible dust is migrating from the work area. If, after implementation of dust suppression techniques, PM₁₀ particulate levels at the downwind perimeter of the work area are greater than 150 $\mu\text{g}/\text{m}^3$ above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM₁₀ particulate concentration to within 150 $\mu\text{g}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

In addition to the community air monitoring, less stringent Occupational Safety and Health Administration (OSHA) requirements apply to Site workers. The applicable levels and required responses are shown in Table 2. However, it is noted that in almost all situations the Table 1 action levels (even when measured at the downwind perimeter rather than within the work zone) will control responses.

Table 1.
Community Air Monitoring Action Levels and Required Responses by Instrument,
Action Level and Response Action.

Instrument	Action Level	Response Action
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Table 1.
Community Air Monitoring Action Levels and Required Responses by Instrument, Action Level and Response Action.

Instrument	Action Level	Response Action
Particulate Monitoring *	Less than 100 µg/m ³ at downwind edge of work zone	Continue monitoring
	Between 100 µg/m ³ and 150 µg/m ³ at downwind edge of work zone	Apply additional dust suppression measures.
	Above 150 µg/m ³ at downwind edge of work zone	Stop work. Apply additional dust suppression measures. Resume work when less than 150 µg/m ³ .
Volatile Organic Compound Monitoring **	Up to 5 ppm at downwind edge of work zone	Continue monitoring
	More than 5 ppm at downwind edge of work zone	Stop work. Only resume work when less than 5 ppm.

Notes: *: 15-minute time-weighted average; **: instantaneous reading; parts per million (ppm); micrograms per cubic meter (µg/m³)

Table 2. OSHA Air Monitoring Action Levels and Required Responses by Instrument, Action Level and Response Action.

Instrument	Action Level	Response Action
Particulate Monitoring *	Less than 5 mg/m ³	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 5 mg/m ³ and 50 mg/m ³	Level C. (Requires Full Face or half face respirator, Hooded chemical resistant two piece Tyvek suit 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) Apply dust suppression measures. If less than 2.5 mg/m ³ in work area, resume work using Level D. Otherwise, upgrade Level C.
	Above 50 mg/m ³	Stop work. Apply additional dust suppression measures. Resume work when less than 50 mg/m ³ and maintain Level C.
Volatile Organic Compound Monitoring **	Less than 10 ppm	Level D or D-Modified
	Between 10 and 20 ppm	Level C
	More than 20 ppm	Stop work. Resume work when source of vapors is abated and readings are less than 20 ppm above background

Table 2. OSHA Air Monitoring Action Levels and Required Responses by Instrument, Action Level and Response Action.

Instrument	Action Level	Response Action
Notes: *: 15-minute time-weighted average; **: instantaneous reading; ppm: parts per million; mg/m ³ : milligrams per cubic meter (mg/m ³)		

Adequacy of Dust Monitoring for Lead NAAQS

The National Ambient Air Quality Standard (NAAQS) for lead, which provides “*public health protection, including protecting the health of ‘sensitive’ populations such as asthmatics, children, and the elderly,*” as well as “*public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings*” is 0.15 µg/m³ of lead (calculated as a rolling 3-month average).¹ As discussed in Section 2.2, the Phase II findings indicated that the average lead concentration in Site soils was 290 ppm. The respirable dust monitoring to ensure total dust levels at the edge of the work area stay below 150 µg/m³ means that 15-minute average airborne lead levels would on average stay below 0.0435 µg/m³ (since with a total dust level of 150 µg/m³ only a 290/1,000,000 fraction of this total would be lead, and (290 / 1,000,000) x 150 µg/m³ equals 0.0435 µg/m³). This average lead level of 0.0435 µg/m³ would be less than one-third of the (3-month average) 0.15 µg/m³ lead NAAQS.

Thus, with an upper limit of 150 µg/m³ for total PM₁₀ particulates, although the actual level of airborne lead would vary over the duration of excavation even when areas of the Site with relatively higher levels of lead were being excavated, airborne lead levels would rarely (if ever) be expected to exceed 0.15 µg/m³, even on a short-term basis, and would be significantly lower when averaged over the 3-month period associated with the NAAQS.

3.7 Groundwater Management Plan

Based on the scope of the proposed project, some dewatering may be necessary during construction. Any dewatering will be conducted in accordance with a New York City Department of Environmental Protection (NYCDEP) Bureau of Wastewater Treatment (BWT) Wastewater Quality Control Permit. Groundwater testing, and possibly pretreatment (dependent upon the testing results), will be necessary to comply with these requirements.

4.0 PROJECT DESIGN MEASURES**4.1 Site Cap and Importation of Fill**

A majority of the Site will be capped with new building foundations or paved areas/roadways. The remainder (landscaped outdoor areas) will be covered with a “soil cap.” The cap will consist of a minimum of 2 feet (as measured from top of final grade) of imported clean fill that meets Part 375 Section 1.8(g)(2)(ii) Restricted Residential Use Soil Cleanup Objectives (RRSCOs) in

¹ The federal standard for lead has not yet been officially adopted by New York State. Hence, there is no New York State Ambient Air Quality Standard for lead.

areas not underlain by the cellar (see Figure 2). In landscaped areas underlain by the cellar, the top two feet of soil would similarly consist of imported clean fill. The general environmental RAP being prepared as part of the State Environmental Quality Review Act (SEQRA) process for the proposed Jewish Home Lifecare facility, which will be required to be implemented during the facility construction, will require testing soil/fill to be used in the soil cap at the source facility for Target Compound List (TCL) VOCs, SVOCs, pesticides, PCBs, and Target Analyte List (TAL) metals (initially at a frequency of one composite sample per 250 cubic yards, but with lower frequency for certain sources if approved by NYSDOH). That RAP will also require that the soil cap meet 6 NYCRR RRSCOs.

In addition to the criteria above, reuse procedures in Section 3.3 of this RAP shall also be followed.

4.2 Vapor Barrier

The general environmental RAP will require the installation of a vapor barrier beneath the new building foundations to reduce the potential for vapor intrusion. The vapor barrier will consist of Grace Preprufe 160R/300R or equivalent, which will be applied to the underside of the foundation slab and outside of below-grade foundation walls. The membranes will also serve as part of the waterproofing system. Any penetrations through the foundations will be sealed in accordance with the manufacturer's specifications. Documentation of the compatibility of the vapor barrier with petroleum will also be submitted to NYSDOH and NYSDEC.

5.0 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 Environmental Laboratory Approval Program (ELAP) for the methods that require analysis.

5.1 Sample Collection

Samples will be collected in accordance with the following procedures:

- Record sample observations (evidence of contamination, PID readings, soil classification) in field log book.
- 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 analysis, if applicable. One composite sample will be collected for all other analyses.
- Seal and label the sample jars as described in Section 5.6 below and place in a chilled cooler.

5.2 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 must be properly decontaminated after use.

5.3 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 “SP-1-1” and the first sample collected from the second stockpile will be labeled “SP-2-1.”

For groundwater samples, the alpha prefix will be “GW” and the number following the prefix will correspond to the sample number. For example, the first groundwater sample collected for sample analysis will be labeled “GW-1” and the second sample will be “GW-2.”

5.4 Sample Labeling and Shipping

All sample containers will be labeled with the following information:

- Site identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- 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 result in an 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 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 chain-of-custody (COC) seal to ensure that the coolers remain sealed during delivery.

5.5 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 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, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

5.6 Documentation

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

- Sample identification number
- Sample location
- Field Observations
- Sample Type
- Analyses
- Date/Time of collection
- Collector's name
- Sample procedures and equipment utilized
- Date sent to laboratory/name of laboratory
- Copies of Site drawings indicating stockpile numbers and locations

6.0 CLOSURE REPORT AND DOCUMENTATION

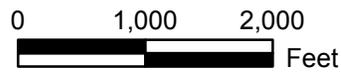
Upon completion of all spill remediation activities, as outlined in this RAP, a Spill Closure Report will be submitted to NYSDEC and NYSDOH. This report will demonstrate that the remedial activities have been properly implemented, including soil excavation and off-site disposal and any other remedial activities required by NYSDEC. Installation of the vapor barrier and Site cap (i.e., concrete foundation slabs and a soil cap for landscaped areas) would occur at a subsequent stage of Site development as specified in Section 4.0 of this RAP. At a minimum, the Spill Closure Report will include photographs of the excavation, analytical data for any endpoint soil samples, all transportation manifests, and soil disposal/recycling certificates. Once the spill is given a closed status by NYSDEC, documentation of this closure along with any other pertinent site information (e.g., vapor barrier installation documentation, soil disposal manifests) that was not a part of the Spill Closure Report will be submitted to NYSDOH.

FIGURES

© 2013 AKRF, Inc. Environmental Consultants O:\Projects\11743 - JEWISH HOME LIFE\Hazmat\11743 Fig 1 loc map.mxd



SOURCE
 USGS 7.5 Minute Topographic Map
 Central Park Quad 1995



**Jewish Home Lifecare - 125 West
 97th Street
 New York, New York**



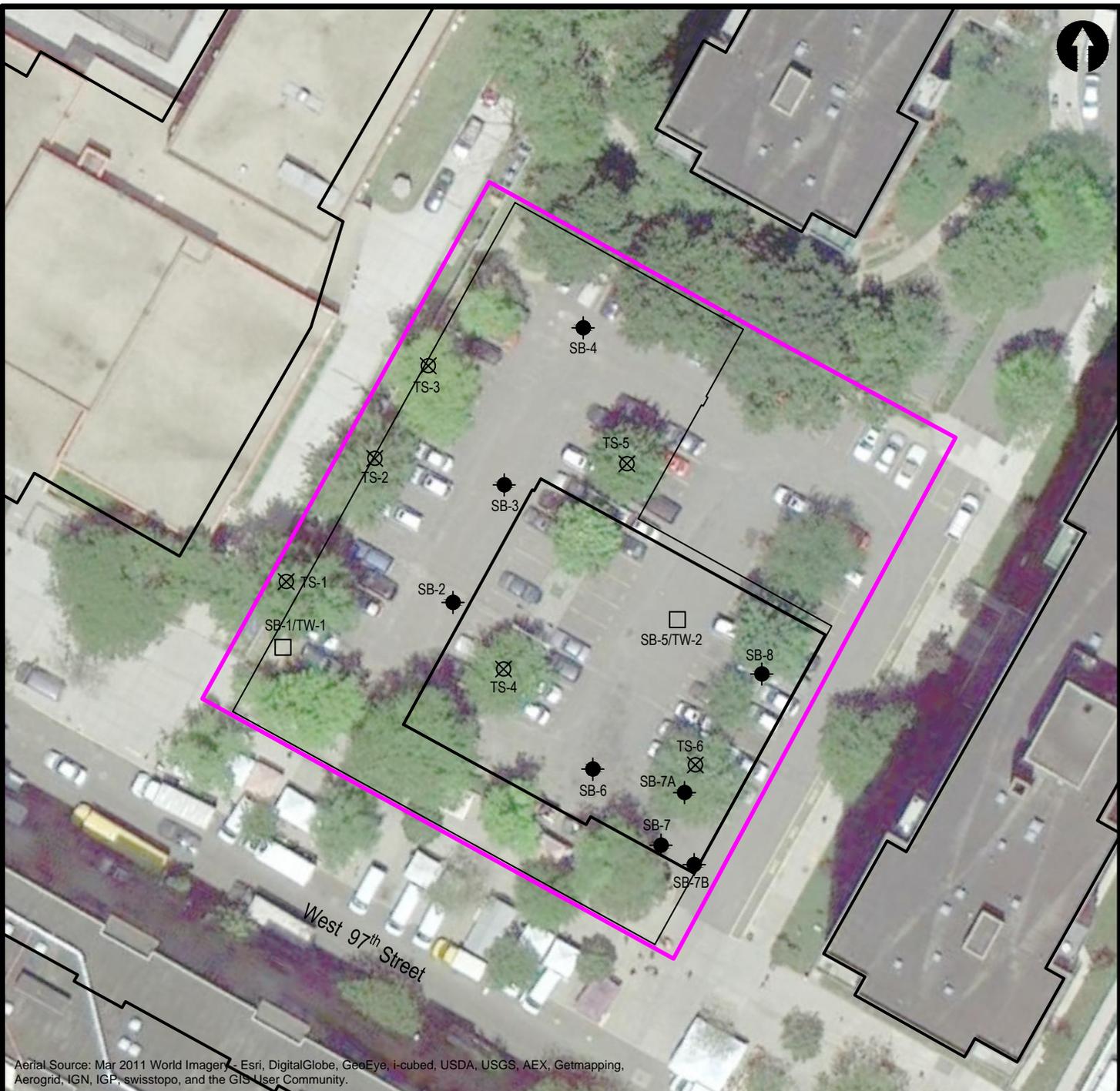
DATE
1/31/2014

PROJECT No.
11743

SITE LOCATION

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

FIGURE
1



Aerial Source: Mar 2011 World Imagery - Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.



LEGEND:

- PROPOSED BUILDING FOOTPRINT
- PROJECT SITE BOUNDARY
- SB-2 SOIL BORING SAMPLE*
- TS-1 TREE PIT SURFACE SAMPLE*
- SB-1/TW-1 SOIL BORING / GROUNDWATER SAMPLE*
- PROPOSED CELLAR FOOTPRINT
- SB-2
- TS-1
- SB-1/TW-1
- SB-2
- TS-2
- TS-3
- TS-4
- TS-5
- TS-6
- SB-3
- SB-4
- SB-5/TW-2
- SB-6
- SB-7A
- SB-7
- SB-7B
- SB-8

*Subsurface (Phase II) Investigation, AKRF, October 2013

Jewish Home Lifecare - 125 West 97th Street
New York, New York

SITE PLAN



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

DATE
8.22.2013

PROJECT No.
11743

SCALE
as shown

FIGURE
2

APPENDIX A
CONSTRUCTION HEALTH AND SAFETY PLAN

Jewish Home Lifecare, Manhattan

125 West 97th Street

NEW YORK, NEW YORK

Construction Health and Safety Plan

New York State Department of Environmental Conservation Spill No. 1306324

AKRF Project Number: 11743

Prepared for:

Jewish Home Lifecare, Manhattan
120 West 106th Street
New York, New York 10025

Prepared by:



AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, New York 10016
212-696-0670

MAY 2014

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FIGURES

Figure 1 - Hospital Location Map

APPENDICES

Appendix A - Potential Health Effects from On-site Contaminants
Appendix B - Report Forms
Appendix C - Emergency Hand Signals

1.0 PURPOSE

This Construction Health and Safety Plan (CHASP) was prepared for remediation of NYSDEC Spill No. 1306324 at the Jewish Home Lifecare Site (the “Site”) located at 125 West 97th Street in Manhattan. The approximately 31,800-square foot Site (Tax Block 1852, a portion of Lot 5) is currently a primarily asphalt-paved parking lot. A location map is provided as Figure 1.

The purpose of this CHASP is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during construction at the Site. The CHASP is intended to minimize health and safety risks resulting from the known or potential presence of subsurface hazardous materials.

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

2.0 APPLICABILITY

Work subject to this CHASP would include all activities that disturb the existing soil, bedrock or groundwater on-site. The contractors and their subcontractors involved in the construction project will provide a copy of this CHASP to their employees whose work involves any potential exposure to on-site soil, and will complete all work in accordance with this CHASP.

3.0 SITE DESCRIPTION

3.1 General Information

The Site is approximately 90 feet above sea level. Regional topography slopes slightly down toward the west. The Site is underlain by an approximately 10- to 20-foot thick layer of urban fill materials (including sand, gravel, silt, coal, brick, ash, and/or slag), with bedrock beneath. Previous studies indicate that groundwater is first encountered at approximately 11 to 18 feet below grade and would be expected to flow in an approximately westerly direction toward the Hudson River, approximately 0.5 mile away. However, actual groundwater flow may be affected by utilities, basements, subway tunnels, bedrock geology, and other factors. Groundwater in Manhattan is not used as a source of potable water.

3.2 Hazard Potential

The hazard potential at the Site was evaluated based on findings of a *Phase I Environmental Site Assessment* (ESA) (Ethan C. Eldon Associates, Inc., May 2011) and a *Draft Subsurface (Phase II) Investigation* (AKRF, October 2013).

The Phase I ESA indicated that the Site once included row houses and tenements, which were demolished by the 1960s. A spill of No. 6 fuel oil (Spill No. 9702659) was reported at 784 Columbus Avenue, the east-adjacent property, in May 1997. This spill, which reportedly involved subsurface contamination, was given a closed status by the New York State Department of Environmental Conservation (NYSDEC) in July 2005.

The Phase II included the collection of soil and groundwater samples from 8 borings, and soil samples from 6 tree pits. The Phase II and a previous geotechnical investigation indicated that the Site is underlain by an approximately 10- to 20-foot thick layer of urban fill materials (including sand, gravel, silt, coal, brick, ash, and/or slag), with bedrock beneath. The fill materials beneath the Site are associated with elevated concentrations of certain metals, semi-volatile organic compounds (SVOCs) and pesticides. In particular, lead levels in 3 of the 38 soil samples

exceeded 1,000 parts per million (ppm) with a maximum of 3,850 ppm, but the overall average lead level was 290 ppm. The average lead level in the samples from the top 6 inches of tree pits was 304 ppm (maximum 681 ppm). These findings did not indicate a “soil-lead hazard,” defined by the USEPA at 40 *Code of Federal Regulations* (“CFR”) 745.65(c) as, “bare soil on residential real property or on the property of a child-occupied facility that contains total lead equal to or exceeding 400 parts per million in a play area or average of 1,200 parts per million of bare soil in the rest of the yard based on soil samples.”

The barium level in one soil sample collected beneath the paving, analyzed by the Toxicity Characteristic Leaching Procedure (TCLP), exceeded the USEPA Hazardous Waste threshold. Bricks, paint, tiles, glass, and rubber can contain elevated levels of barium and the detected levels are likely associated with existing urban fill material. Soils exceeding TCLP thresholds require special handling/transport/disposal if they are excavated. No other soil samples exceeded USEPA hazardous waste criteria.

The volatile organic compounds (VOCs) benzene, ethylbenzene, m&p-xylene, and o-xylene were detected at somewhat elevated concentrations in one soil sample (WC-7 Bottom) collected in the southeastern corner of the Site. Evidence of contamination (including staining, petroleum-like odors and photoionization detector instrument readings) was observed in boring WC-7 approximately 5 to 15 feet below grade, and appeared to be isolated in a small area of the Site based on observations in nearby borings. Petroleum-related VOCs were found in on-site groundwater samples, but at low concentrations (below NYSDEC drinking water standards). Although the soil VOC concentrations did not exceed NYSDEC Subpart 375 Restricted Residential Use Soil Cleanup Objectives (RRSCOs), based on the combination of field observations and laboratory data, Spill №. 1306324 was reported to NYSDEC on September 16, 2013. The spill is likely attributable to a historical (i.e., removed) fuel tank in one of the former on-site buildings.

3.3 Hazard Evaluation

The most likely routes of exposure are breathing of volatile and semi-volatile compounds or particulate-laden air released during soil disturbing activities, dermal contact, and accidental ingestion. Appendix A includes specific health effects from chemicals present or potentially present on-site. Although some of the chemicals of concern listed in the sections below were not detected during the subsurface investigation, they are included here as a precaution. The remaining sections of this CHASP 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.

This CHASP addresses potential environmental hazards from the presence of hazardous materials. It is not intended to address the normal hazards of construction work, which are separately covered by OSHA regulations and/or local and state construction codes and regulations.

3.3.1 Hazards of Concern

Check all that apply		
<input checked="" type="checkbox"/> Organic Chemicals	<input checked="" type="checkbox"/> Inorganic Chemicals	<input type="checkbox"/> Radiological
<input type="checkbox"/> Biological	<input type="checkbox"/> Explosive/Flammable	<input type="checkbox"/> Oxygen Deficient Atm.
<input checked="" type="checkbox"/> Heat Stress	<input checked="" type="checkbox"/> Cold Stress	<input type="checkbox"/> Other
Comments: No personnel are permitted to enter permit confined spaces		

3.3.2 Physical Characteristics

Check all that apply		
<input checked="" type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Solid	<input type="checkbox"/> Sludge
<input checked="" type="checkbox"/> Vapors	<input type="checkbox"/> Unknown	<input type="checkbox"/> Other
Comments:		

3.3.3 Hazardous Materials

Check all that apply					
Chemicals	Solids	Sludges	Solvents	Oils	Other
<input type="checkbox"/> Acids	<input type="checkbox"/> Ash	<input type="checkbox"/> Paints	<input type="checkbox"/> Halogens	<input type="checkbox"/> Transformer	<input type="checkbox"/> Lab
<input type="checkbox"/> Caustics	<input type="checkbox"/> Asbestos	<input type="checkbox"/> Metals	<input type="checkbox"/> Petroleum	<input type="checkbox"/> Other DF	<input type="checkbox"/> Pharm.
<input type="checkbox"/> Pesticides	<input type="checkbox"/> Tailings	<input type="checkbox"/> POTW	<input type="checkbox"/> Other	<input type="checkbox"/> Motor or Hydraulic Oil	<input type="checkbox"/> Hospital
<input type="checkbox"/> Petroleum	<input checked="" type="checkbox"/> Other: Fill Material	<input type="checkbox"/> Other – Tars & Other NAPL		<input type="checkbox"/> Gasoline	<input type="checkbox"/> Rad.
<input type="checkbox"/> Inks				<input checked="" type="checkbox"/> Fuel Oil	<input type="checkbox"/> MGP
<input type="checkbox"/> PCBs					<input type="checkbox"/> Mold
<input checked="" type="checkbox"/> Metals					<input type="checkbox"/> Cyanide
<input checked="" type="checkbox"/> Other: VOCs, SVOCs					

3.3.4 Chemicals of Concern

Chemicals	REL/PEL/STEL	Health Hazards
Barium	REL = 0.5 mg/m ³ PEL = 0.5 mg/m ³	(ingestion) Irritation of digestive system, muscle weakness, difficulty breathing, blood pressure changes
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
DDT/DDE (pesticides)	REL = 0.5 mg/m ³ PEL = 1 mg/m ³ [skin]	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; potential carcinogen.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Fuel Oil	REL = 350 mg/m ³ PEL = 400 ppm	Nausea, irritation – eyes, hypertension, headache, light-headedness, loss of appetite, poor coordination; long-term exposure – kidney damage, blood clotting problems; potential carcinogen.
Lead	REL = 0.05 mg/m ³ PEL = 0.05 mg/m ³	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension.
Mercury	REL = 0.1 mg/m ³ PEL = 0.05 mg/m ³	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.
Naphthalene	REL = 10 ppm PEL = 10 ppm	Irritation eyes; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage.
Polycyclic Aromatic Hydrocarbons (PAHs)	PEL = 5 mg/m ³	Harmful effects to skin, bodily fluids, and ability to fight disease, reproductive problems; potential carcinogen.
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia (skin tingling or numbness); dermatitis; liver, kidney damage.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, poor coordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Comments: REL = National Institute for Occupational Safety and Health (“NIOSH”) Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit ppm = parts per million mg/m ³ = milligrams per cubic meter		

4.0 HEALTH AND SAFETY OFFICER

The contractor or engineer will designate one of its personnel as the Site Safety Officer (SSO). The SSO will be a competent person responsible for the implementation of this plan. The SSO will have completed a 40-hour training course (updated by an annual refresher) that meets OSHA requirements of 29 Code of Federal Regulations (CFR) Part 1910, Occupational Safety and Health Standards. The SSO has stop-work authorization, which he/she will execute on his/her determination of an imminent safety hazard,

emergency situation, or other potentially dangerous situation. If the SSO must be absent from the Site, he/she will designate a suitably qualified replacement that is familiar with the CHASP.

5.0 TRAINING

All those who enter the work area where the contamination is present while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All construction personnel upon entering the Site must attend a brief training meeting, its purpose being to:

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

Each member of the construction crew will be instructed in these objectives before he/she goes onto the Site. Construction personnel will be responsible for identifying potential hazards in the work zone. The SSO or other suitably trained individual will be responsible for conducting the training program. Others who enter the Site must be accompanied by a suitably-trained construction worker.

6.0 GENERAL WORK PRACTICES

To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance in contaminated areas.

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the Site. These areas will be designated by the 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 stress.

7.0 PERSONAL PROTECTIVE EQUIPMENT & AIR MONITORING

7.1 Personal Protective Equipment

The personal protection equipment required for various kinds of site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, “General Description and Discussion of the Levels of Protection and Protective Gear.”

During the implementation of air monitoring, site personnel will wear, at a minimum, Level D personal protective equipment. The protection will be based on the air monitoring described in Section 7.2.

8.0 DECONTAMINATION PROCEDURES

8.1 Personnel Decontamination

Personnel decontamination (decon), if deemed necessary by the SSO, will take place in a designated decontamination area. This area will be delineated during each stage of work. Personnel decontamination will consist of the following steps:

- Soap and potable water wash and potable water rinse of gloves;
- Coverall removal (if applicable);
- Glove removal;
- Disposable clothing removal; and
- Field wash of hands and face.

8.2 Sampling Equipment Decontamination

Any nondisposable sampling equipment for confirmatory sampling or other equipment that is in contact with contaminated materials will be decontaminated in accordance with the following procedure:

- Double wash with solution of Simple Green[®] and clean tap water;
- Double rinse with clean tap water;
- Rinse with clean distilled water; and
- Allow equipment to air dry.

8.3 Heavy Equipment Decontamination

If heavy equipment comes in contact with contaminated materials, it will be decontaminated prior to being relocated to a clean area or leaving the Site. A designated decontamination pad will be constructed, where soil, dust, or oil will be washed off the exterior, undercarriage, and wheels or tracks of the equipment. Wash water will be collected for treatment and/or disposal.

9.0 EMERGENCY RESPONSE

9.1 Emergency Procedures

In the event that an emergency develops at the Site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site; and
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.
- A spill of oil or other hazardous materials.

General emergency procedures and specific procedures for personal injury and chemical exposure are described below. In the event of an accident or emergency, an Incident Report form should be filled out and placed in the project file. An example Incident Report form is provided in Appendix B. Information on emergency hand signals is provided in Appendix C.

9.1.1 Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should communicate to the SSO (via voice and hand signals) of the chemical exposure. The SSO should contact the appropriate emergency response agency.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the chemical should be neutralized or removed if it is safe to do so.
- If the chemical has contacted the skin, the skin should be washed with copious amounts of water.
- In case of eye contact, an emergency eye wash should be used. Eyes should be washed for at least 15 minutes.
- All chemical exposure incidents must be reported in writing to the Project Manager. The SSO is responsible for completing the Incident Report Form.

9.1.2 Personal Injury

In case of personal injury at the Site, the following procedures should be followed:

- Another team member (buddy) should signal the SSO that an injury has occurred.
- A field team member trained in first aid can administer treatment to an injured worker.
- If deemed necessary, the victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.
- The SSO is responsible for making certain that an Incident Report Form is completed. This form is to be submitted to the AKRF Health and Safety Officer. Follow-up action should be taken to correct the situation that caused the accident.
- Any incident (near miss, property damage, first aid, medical treatment, etc.) must be reported.

A first-aid kit, eye-wash, and blood-borne pathogens kit will be kept on-site during the field activities.

9.1.3 Evacuation Procedures

- The SSO will initiate evacuation procedures by signaling to leave the Site or containment structure;
- All personnel in the work area should evacuate the area and meet in the common designated area;
- All personnel suspected to be in or near the contract work area should be accounted for and the whereabouts or missing persons determined immediately; and
- The SSO will then give further instruction.

9.1.4 Procedures Implemented in the Event of a Major Fire, Explosion, or Emergency

- Notify the paramedics and/or fire department, as necessary;
- Signal the evacuation procedure previously outlined and implement the entire procedure;
- Isolate the area;
- Stay upwind of any fire;
- Keep the area surrounding the problem source clear after the incident occurs;
- Complete accident report for and distribute to appropriate personnel.

9.1.5 Spill Response

All personnel must take every precaution to minimize the potential for spills during site operations. Any spill will be reported immediately to the SSO. The SSO will then determine and report any required spills to the NYCDEP and/or NYSDEC Hotlines. Spill control apparatus (sorbent materials) will be located on-site. All materials used for the clean up of spills will be containerized and labeled separately from other wastes. The SSO, in consultation with the Project Manager, will determine if additional spill response measures are required.

9.2 Hospital Directions

Mount Sinai St. Luke's is at 1111 Amsterdam Avenue in Manhattan, as shown on Figure 1.

Hospital Information and Directions

Hospital Name:	Mount Sinai St. Luke's
Phone Number:	(212) 523-4000
Address/Location:	1111 Amsterdam Avenue – New York, New York (The Emergency Department is located on West 113 th Street between Amsterdam Avenue and Morningside Drive)
Directions:	1. Go WEST on West 97th Street 2. Turn RIGHT onto Amsterdam Avenue 3. Turn RIGHT onto West 113th Street The Emergency Department entrance will be on the LEFT.

9.3 CHASP Contact Information

AKRF Project Manager – Marcus Simons	(646) 388-9527
Site Safety Officer (SSO) – Asya Bychkov	(646) 388-9533
Jewish Home Lifecare Representative – Bruce Nathanson	TBD
Ambulance, Fire and Police Departments	911
Local Poison Control	(212) 764-7667 pm/weekend (212) 340-4494
NYSDEC Spill Response Team	(800) 457-7362
NYCDEP Hotline	(718) DEP-HELP

10.0 APPROVAL & ACKNOWLEDGMENTS OF CHASP

APPROVAL

Signed: _____ Date: _____
Project Manager

Signed: _____ Date: _____
Health and Safety Officer

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

AFFIDAVIT

I, _____ (name), of _____ (company name), have read the Construction Health and Safety Plan (CHASP) for the Jewish Home Lifecare Site in Manhattan, New York. I agree to conduct all on-site work in accordance with the requirements set forth in this CHASP and understand that failure to comply with this CHASP could lead to my removal from the Site.

Signed: _____	Company: _____	Date: _____
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Signed: _____	Company: _____	Date: _____

FIGURES

© 2013 AKRF, Inc. Environmental Consultants O:\Projects\11743 - JEWISH HOME LIFE\Hazmat\11743 HASP Hospital Map.mxd



Legend

-  Project Site
-  Route to Hospital
-  Hospital Location



St. Luke's Roosevelt Center
1111 Amsterdam Avenue
New York, New York

**Jewish Home Lifecare - 125 West
97th Street
New York, New York**



DATE
1/28/2014

PROJECT No.
11743

HOSPITAL LOCATION MAP

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

FIGURE
1

APPENDIX A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances 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: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

What happens to barium when it enters the environment?

- Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
- The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
- Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.

Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).

Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

- Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
- Living in areas with unusually high natural levels of barium in the drinking water.
- Working in a job that involves barium production or use.
- Living or working near waste sites where barium has been disposed of.

How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 µg/g creatinine (measured in urine).

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m³) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m³ of total dust and 5 mg/m³ for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m³ for soluble barium compounds. The NIOSH has set RELs of 10 mg/m³ (total dust) for barium sulfate and 5 mg/m³ (respirable fraction).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public 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 and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. 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.



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 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

(Pronounced bĕn'zĕn')

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.

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

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 mg/L). 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.



This fact sheet answers the most frequently asked health questions (FAQs) about DDT, DDE, and DDD. 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 is 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.

HIGHLIGHTS: Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 441 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD when they enter the environment?

- DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.
- DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.
- DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.
- They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2-15 years, depending on the type of soil.

- Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.
- DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

How might I be exposed to DDT, DDE, and DDD?

- Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.
- Eating contaminated imported foods from countries that still allow the use of DDT to control pests.
- Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.
- Infants fed on breast milk from mothers who have been exposed.
- Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

How can DDT, DDE, and DDD affect my health?

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months. A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to

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breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in breast milk had an increased chance of having premature babies. In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer. The Department of Health and Human Services (DHHS) determined that DDT may reasonably be anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.

There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.

Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans.

A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

How can families reduce the risk of exposure to DDT, DDE, and DDD?

- Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
- Cooking will reduce the amount of DDT in fish.
- Washing fruit and vegetables will remove most DDT from their surface.
- Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m³) in the workplace for an 8-hour shift, 40-hour workweek.

The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (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 F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. 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.



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.

HIGHLIGHTS: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

(Pronounced ěth' əl bĕn' zĕn')

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 classified 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 F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. 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.



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.

SUMMARY: Fuel oils are liquid mixtures produced from petroleum, and their use mostly involves burning them as fuels. Drinking or breathing fuel oils may cause nausea or nervous system effects. However, exposure under normal use conditions is not likely to be harmful. Fuel oils have been found in at least 26 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are fuel oils?

(Pronounced fyoo'el 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

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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/m³) 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.

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.



This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is 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.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

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 paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

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.

How might I be exposed to lead?

- Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.

- Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.

- Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.

- Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

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(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

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. 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. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

- Avoid exposure to sources of lead.
- Do not allow children to chew on mouth surfaces that may have been painted with lead-based paint.
- If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- 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
- If your home contains lead-based paint or you live in an area contaminated with lead, 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 determine 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 recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter ($\mu\text{g}/\text{dL}$). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 $\mu\text{g}/\text{dL}$ to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public 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 and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. 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.



This fact sheet answers the most frequently asked health questions (FAQs) about mercury. 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.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mŭr/kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.

- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

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vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from

rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

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

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m³) and 0.05 mg/m³ of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. 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 F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. 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.



This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. 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 is important you understand this information because these substances 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: Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?

- Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.
- Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.
- Naphthalene can become weakly attached to soil or pass through soil into underground water.
- In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.
- Naphthalene does not accumulate in the flesh of animals or fish that you might eat.

1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

- Breathing low levels in outdoor air.
- Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.
- Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.
- Drinking water from contaminated wells.
- Touching fabrics that are treated with moth repellents containing naphthalene.
- Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene 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. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia 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 high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene

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causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer.

However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Human Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using

fireplaces or heating appliances in their homes.

If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any 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 (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 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 impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (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 F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. 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.



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.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ī-sī'klīk ār'ə-măt'īk 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; smoke-houses; 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.

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- ❑ 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/m³). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m³ 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/m³ 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 F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. 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.



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.

HIGHLIGHTS: Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

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 petroleum products as well as from leaking 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 levels can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

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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).

References

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 F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. 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.



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.

SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

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

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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
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: _____

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 C
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 BREATHE!



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