J. Hazardous Materials

100. Definitions

110. HAZARDOUS MATERIALS

For hazardous materials, the goal for CEQR is to determine whether the proposed action could lead to increased exposure of people or the environment to hazardous materials and whether the increased exposure would result in significant public health impacts or environmental damage. A hazardous material is any substance that poses a threat to human health or the environment. Substances that can be of concern include, but are not limited to, the following:

- *Heavy metals*. These include lead, cadmium, mercury, arsenic, etc. Used in smelters, foundries and metal works, and components in paint, ink, petroleum products, and coal ash. Heavy metals can be toxic to humans and cause serious physical impairment.

- *Volatile organic compounds (VOCs)*. These include aromatic compounds, such as benzene, toluene, ethylbenzene, and xylene, which are found in petroleum products; and chlorinated compounds, such as trichloroethylene (TCE) and tetrachloroethylene (PCE), which are commonly used as solvents and cleaners. Inhaling vapors can be toxic, and certain concentrations of VOCs can explode or ignite.

- *Semivolatile organic compounds*. These include phenols and other components of creosote and coal tar, as well as polycyclic aromatic hydrocarbons (PAHs). Several PAHs are considered carcinogenic.

- *Methane*. This is generated by decomposing plants and other organic materials. Often found in or near filled areas, methane trapped beneath foundations can lead to explosions.

- *Polychlorinated biphenyls (PCBs)*. Formerly used in electrical equipment, PCBs bioaccumulate in humans and are thought to be carcinogenic and mutagenic.

- *Pesticides*. A substance or mixture of substances used to destroy or mitigate insects, rodents, fungi, weeds or other plant life. Many pesticides are toxic to humans and animals.

- *Polychlorinated dibenzodioxins and dibenzofurans* (commonly referred to as dioxins) have never been commercially manufactured for use. The main sources of these compounds are combustion processes and chemical industries.

- *Hazardous wastes*. These are defined by regulations promulgated under the Federal Resource Conservation and Recovery Act as solid wastes that meet one of the four characteristics of being chemically reactive, ignitable, corrosive, or toxic. The U.S. Environmental Protection Agency has adopted certain waste analysis methods for use in determining whether a material meets any of the four characteristics of hazardous waste. In addition the U.S. Environmental Protection Agency has promulgated three lists of hazardous wastes: 1) a generic list of wastes that are hazardous regardless of the source or industrial category that produces them; 2) a list of hazardous wastes produced from specific industrial sources; and 3) a list of commercial chemicals which are deemed hazardous wastes when/if they are discarded or intended to be discarded instead of used for their intended uses.

120. SITES OF CONCERN

Many sites in urban areas contain soils and/or groundwater that may be contaminated; however, the presence of hazardous materials on a site may not be obvious. Sites that appear to be clean and have no commonly known sources of contamination may have been affected by past uses on the site or in the surrounding area. Many activities, industrial and otherwise, use hazardous materials, and many hazardous waste management practices that are now considered unacceptable were once common. The presence or likely presence of any hazardous substance or petroleum products on a site under conditions that indicate an existing release, past release, or a material threat of release of any hazardous substances or petroleum products is known as a recognized environmental condition as defined by the American Society for Testing and Materials Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E-1527). A recognized environmental condition should be disclosed under CEQR. This term is not considered to include de minimis conditions that do not present a material risk or harm to public health or the environment. Examples of recognized environmental conditions include contaminants spilling or leaking into the soil or groundwater or being dispersed in the air or contained in fugitive dust. Hazardous materials can contaminate a site in several ways:

- They may be present in the soils, groundwater, or buildings and structures on site, as the residue of past or current activities. Manufacturing processes and commercial activities typically utilize them and thus require storage and handling of hazardous materials.

- They may have been imported to a site as fill or grading material over the years. It is not uncommon to find elevated levels of hazardous materials in fill of unknown origin where the past and current activities do not suggest these types of materials were used. This is especially true for properties that are adjacent to waterways where, historically, large amounts of fill material have been used as part of urban development.

- They may migrate to the site from areas off-site in contaminated groundwater flow or through site soils from an up gradient location, for example, or from a leaking underground storage tank nearby.

- They may be incorporated in the buildings and structures on site themselves; examples are lead in paints or asbestos in insulation, tiling, caulking or roofing materials.

A list of facilities, activities or conditions that require further assessment regarding the potential for hazardous materials is found in Appendix 1. Sites that have been potentially impacted from the presence of existing or historical land uses involving hazardous materials should automatically be examined further to evaluate possible exposure pathways and potential impacts on public health or the environment. As described in greater detail in the following sections, evaluation of a site for hazardous materials concerns should include a detailed review of the site history (Phase I in accordance with ASTM E-1527) and a field inspection for a physical sampling of media (i.e., soils, waste, surface waters, groundwater, soil gas, entrapped air, and so on) on the site of concern (Phase II in accordance with ASTM E-1903), and possibly mitigation and remediation. The DEP provides review, recommendations and approval of these activities in order to facilitate projects and maintain protection of human health and the environment.

- In cases where the site is listed in Appendix 1 and sufficient site history is known, the site owner may elect not to complete a Phase I described in Section 320 and proceed directly to conducting a Phase II Environmental Site Assessment (ESA) as described in Section 330. In most cases, however, knowledge of the site history is not sufficient and completion of a Phase I is strongly recommended.

The scope of work for the Phase II must be approved by DEP prior to implementation. Based on DEP's review of the completed Phase II, implementation of a Remedial Action Plan may be required. The scope of work to complete the Remedial Action Plan is also subject to DEP's review. If a remediation plan is necessary to prevent significant public health impacts, DEP will require an agreement that binds property owners to refrain from soil disturbance until a remediation and health and safety plan is agreed to. If construction activity is necessary to complete the Remedial Action Plan, DEP will notify the Department of Buildings (DOB) that all permits except a Temporary Certificate of Occupancy (TCO) may be issued. Upon demonstration that remedial measures have been undertaken, DEP will issue a Notice of Satisfaction (NOS) and work may proceed under a TCO.

130. POSSIBLE EXPOSURE

The presence of hazardous materials on a given site could threaten human health or the environment if exposure to those materials occurs. Potential routes of exposure to elevated levels of hazardous materials can include direct contact between contaminated soil and skin (dermal), breathing of volatilized chemicals or chemicals associated with suspended soil particles (inhalation), swallowing soil (ingestion), or drinking contaminated water (oral). Public health may also be threatened when soil gasses or soil vapors migrate naturally through the subsurface or along preferential pathways (i.e., building foundations, utility conduits, duct work, and so on) and concentrate under barriers of low permeability (i.e., concrete slabs, asphalt, clay liners, and so on) resulting in potentially explosive conditions. Activities that can lead to exposure include the following:

- Introducing a new population to an area containing hazardous materials.

- Excavation, dewatering, grading, or construction activities on a contaminated site.

- Creation of fugitive dust from exposed soils containing hazardous materials.

- Demolition of buildings and structures that include hazardous materials.

- Introduction of new activities or processes that use hazardous materials.

- Building on former landfills or swampland where current or future methane production is occurring or will occur.

The circumstances in which potential exposure could occur, determines the way hazardous material impacts are assessed for CEQR.

200. Determining Whether a Hazardous Materials Assessment is Appropriate

The potential for significant impacts related to hazardous materials can occur when: a) elevated levels of hazardous materials exist on a site; b) an action would increase pathways to their exposure, either human or environmental; or c) an action would introduce new activities or processes using hazardous materials and the risk of human or environmental exposure is increased. If all three of these elements can be definitively ruled out, then there is no need to examine hazardous materials in further detail.

In general, however, it may be difficult to ascertain (a) whether a site contains elevated levels of hazardous materials or, (b) if suspected to contain elevated levels of hazardous materials, the extent of the potential contamination. Therefore, for any sites with the potential to contain hazardous materials, unless the proposed action would not create public health concern, or introduce any new contaminants, an assessment of hazardous materials is appropriate. In addition, a site assessment for hazardous materials would also be appropriate if any future redevelopment of the property is anticipated. On this basis, actions that require hazardous materials assessments include but are not limited to, the following:

- Rezoning of a manufacturing zone to a commercial or residential zone.

- New development in a manufacturing zone.

- Development adjacent to a manufacturing zone or existing manufacturing or commercial facilities (including nonconforming uses) listed in Appendix 1.

- Rezoning from commercial to residential, including mixed-use zones, if the rezoned area would have allowed a use that may have stored, used, disposed of, or generated hazardous materials. C8 districts are examples of such designations.

- Development on a vacant or underutilized site if there is a reason to suspect contamination or illegal dumping.

- Development in an area with fill material of unknown origin. Fill material historically used in New York City has included hydraulic dredge material which may contain petroleum and heavy metal contamination, and ash from the historical burning of garbage in residential and commercial buildings in the City. In addition fill material may produce methane if it is composed of organic wastes and/or if present in former low-lying swamp areas.

- Development on or adjacent to a solid waste landfill site, State or Federal inactive hazardous waste site, power-generating/transmitting facility, or railroad tracks or a railroad right-of-way.

- Development where underground and/or aboveground storage tanks are on or adjacent to the site.

- An action directly affecting a site on which asbestos-containing materials or transformers possibly containing PCBs are present.

- Development adjacent to former municipal incinerators or coal gasification sites.

- Granting of variances or permits allowing residential use in manufacturing zones.

300. Assessment Methods

The hazardous materials assessment begins with a Phase I ESA. The Phase I ESA is conducted in accordance with the requirements established by the current American Society for the Testing of Materials (ASTM) protocol for Phase I ESA's (ASTM E-1527 Section 6) and includes research and field observations to determine whether the site of the proposed action may contain any contamination from past or present activities on the site or as a result of activities on adjacent or nearby properties. If a potential for contamination is found during this assessment, then surface and subsurface investigations are conducted to confirm the presence and extent of the contamination (Phase II ESA).

310. STUDY AREA

The project site is the focus of the study area. The study area for the Phase I ESA (discussed below in Section 320) should also include all other areas that might have affected or may currently affect the project site. Usually in heavily urbanized settings, this includes the adjacent properties and, at a minimum, properties within 400 feet of the project site. Record searches for spills and hazardous waste sites should be performed for a larger area, usually a minimum of a 1,000-foot radius from the project site in a heavily urbanized location. In unusual cases, these searches may include much wider areas or search radii. Record searches for underground storage tanks are performed for the project site, and for any adjacent properties on which there are reason to believe that tanks were or are located. In addition, if the action would involve excavation for utilities, the path of those utilities would also be considered for hazardous materials.

For the detailed surface and subsurface investigations associated with a Phase II ESA (discussed below in Section 330), the study area is typically limited to the project site itself unless significant migration for a source on the site is discovered. On the site, this assessment is performed for any areas that have the potential for (a) contamination or (b) enhanced exposure pathways, based on the Phase I ESA.

320. PHASE I ENVIRONMENTAL SITE ASSESSMENT

The Phase I ESA is a qualitative evaluation of environmental conditions present at a site based on a review of available information, site observations, and interviews. These assessments do not include sampling or testing of soil, groundwater, or structures (with the frequent exception of asbestos-containing materials). This work is typically performed as part of a Phase II ESA. The Phase I should include the following:

- Records review — including historical land use and regulatory agency file review of study area (see Section 310).
- Site and surrounding area reconnaissance.
- Interviews with owners and occupants.
- Surface and subsurface drainage preliminary evaluation (needed if off-site sources of concern are discovered).
- Evaluation and reporting.

For a generic action that would affect large areas, such site-specific analysis may not be possible. In this case, the approach typically considers what the potential impacts would be for a variety of different types of sites (see Section 400, below).

321. Historical Land Use

Hazardous substances can persist in the soil for long periods of time. Many adsorb (cling) onto soil particles and remain there, or are constituents of commonly used filling materials, such as cinders and ash. Site contamination can also occur from past uses on adjacent properties, such as when underground storage tanks have leaked or when groundwater has been contaminated. Therefore, past activities on a site and the adjacent properties must be considered in an evaluation of the potential for contamination. Several readily available sources of information can be used to research the history of the site, including the following:

- Fire insurance maps.
- Historical maps.
- City directories.
- New York City Department of Building records.
- New York City Fire Department underground storage tank (UST) records.
- Chain-of-Ownership (title deed search).
- Interviews with people knowledgeable about the site.

Aerial photographs are another source of information that can be used during the historical review. While these photographs provide valuable information, the density of buildings in most locations may make it difficult to evaluate possible sources of contamination. Typically the aerial photographic coverage for New York City is excellent and a representative set of photos which covers the years of interest is available. (Refer to the historic resources chapter of this Manual, Chapter 3F, for more information on research sources.) Furthermore, information such as NYC base maps, imagery based on aerial photography, tax blocks and lots, roadways, building footprints, waterways, and mass transportation lines is available from the New York City Department of Information Technology and Telecommunications (DoITT). DoITT can be contacted at 75 Park Place, 6th floor, New York, NY 10007 or http://www.nyc.gov/html/doitt/home.html.

All obvious uses of the property are identified from the present, back to the property's obvious first developed use, or back to 1940, whichever is earlier: (ASTM E 1527). For a majority of project sites in the City, the historical review will extend back to at least 1940 if not much earlier. The historical review should address use, structures, types of businesses, zoning changes, and site coverages. In particular, possible uses of concern should be noted. These include manufacturing uses, automobile-related businesses, landfilling for solid waste disposal, and other commercial establishments that may have used hazardous substances. A comprehensive list is provided in Appendix 1. If an archaeological review is being performed, this work can be coordinated with it.

Much of the historical land use review research can now be rapidly completed by contacting a company that specializes in environmental risk management (Appendix 2). Typically these companies can provide the fire insurance maps, historical maps, city directories, aerial photographs, and title search information based on the site location. Some of this risk management information can be accessed on-line using the site coordinates and hardcopies of the information can be directly downloaded.

322. Regulatory Agency List Review

Concurrent with the historical land use review is a review of the records of the various public agencies—local, State, and Federal—that regulate the storage, handling, emissions, and spill cleanup of hazardous or toxic materials is performed. This research is conducted to evaluate the potential for contamination from on-site and off-site sources, which may have impacted the subject site. As part of this process, incinerators, underground and above-ground storage tanks, active solid waste landfills, permitted hazardous waste management facilities, inactive hazardous waste facilities, suspected hazardous waste sites, and hazardous substance spill locations are noted both on the site and within a prudent radius of the subject property (see study area discussion in 310, above).

The agencies to be contacted during the regulatory review are listed in the Table on the following page and described below.

The U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) and Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list should be reviewed to determine if the property or surrounding properties within the search radius appear on the lists. The NPL contains sites that are targeted for EPA-mandated clean up under the Federal Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA), which authorizes identification and remediation of uncontrolled hazardous waste sites. The CERCLIS list contains potential hazardous waste sites for, which there is not enough information to determine if the site should be included on the NPL.

The Resource Conservation and Recovery Information System (RCRIS) list identifies registered hazardous waste generators, transporters and treatment, storage and disposal facilities as defined by the Federal Resource Conservation and Recovery Act (RCRA), which regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed, or distributed. Inclusion on the RCRA Generators list does not, in and of itself, indicate the facility is a source of contamination. For example, all dry cleaning establishments in New York City are on both the small and large quantity generators list.

The EPA's Emergency Response Notification System (ERNS), a compilation of hazardous substance spills reported to Federal and State authorities, should also be consulted.

At the State level, the New York State Department of Environmental Conservation (NYSDEC) should be contacted to determine: (1) if the site or nearby sites are on the Inactive Hazardous Disposal Site Registry and therefore subject to a State consent order for assessment and possible clean-up; (2) if there have been any landfilling operations on or near the site; and (3) if there are records of leaking underground storage tanks, major oil storage facilities, petroleum bulk storage facilities, chemical bulk storage facilities, or solid waste management facilities. The regional Spill Response Team maintains records of petroleum or other spill incidents reported to the Emergency Response Notification System (ERNS) and should also be contacted during the records search.

Several local regulatory sources should also be contacted. In New York City, the Department of Environmental Protection (DEP) maintains files on hazardous materials emergency incidents as well as a list of sites that have been issued notices of violation and clean-up orders under the Spill Law. Also, under the Community Right-to-Know Law,

USEPA 290 Broadway New York, NY 10007-1866 Freedom of Information Act Officer Http://www.epa.gov/region02/foia	▪ CERCLIS ▪ CORRACTS List ▪ RCRA Generators List ▪ RCRA TSD Facilities List ▪ Leaking underground storage tanks (LUST) ▪ Emergency Response Notification system (ERNS) ▪ NPL ▪ Surface Impoundment Assessment Survey ▪ Industrial Subtitle D (Solid Waste) Facility Survey ▪ National Survey of Solid Waste (Municipal) Landfill Facilities
NYSDEC Records Access Officer 625 Broadway Albany, NY 12233-1016 Division of Environmental Remediation Division of Solid and Hazardous Materials http://www.dec.state.ny.us	▪ Inactive Hazardous Waste Disposal Sites In New York State (listed by county)) ▪ List of Leaking Underground Storage Tanks ▪ List of Major Oil Storage Facilities ▪ Petroleum Bulk Storage Facilities List ▪ List of Chemical Bulk Storage Facilities ▪ List of Solid Waste Management Facilities ▪ List of hazardous waste generators ▪ List of hazardous waste facilities
NYC Fire Department 9 Metro Tech Center Brooklyn, New York 11201	▪ List of Registered Underground Storage Tanks
DEP Office of Environmental Planning and Assessment 59-17 Junction Blvd., 11th Floor Low Rise Corona, New York 11368-5107 DEP Bureau of Environmental Compliance 96-05 Horace Harding Expressway Corona, NY 11368	▪ Emergency Response Incidents ▪ Spill Law Notices of Violation
NYC Department of Buildings 60 Hudson Street New York, NY 10013 212-312-8000* http://www.nyc.gov/html/dob/home.html The department's web site has the necessary contact information for the various borough offices.	• Building Records and Plans • Past Violations of the NYC Building Code • Occupancy Records

DEP is authorized to gather information from facilities that use, store, or manufacture hazardous substances. The New York City Fire Department maintains records on underground storage tank testing and leak history information, and a request for this information is a routine part of any initial assessment.

323. Site and Surrounding Area Reconnaissance

Following completion of the historical review and review of regulatory agency records, a visit to the site and nearby sites within the search radius is typically performed to evaluate the potential for contamination of the subject property from on-site and off-site sources and to confirm literature search information. Items considered during project site reconnaissance can include, but are not limited to, the following:

- Site zoning and use.
- Determination of site boundaries.
- Site coverings, such as asphalt, concrete, exposed soil, or vegetation, and their current condition (note specific conditions, such as soil staining and distressed vegetation).
- Direction of surface water flow from and to the site and location of storm sewers.
- Presence of hazardous materials storage or handling, pollution control devices, above- and below-ground storage tanks, loading docks, and drains or dry wells through which hazardous materials could be disposed.
- Types of operations conducted on-site, along with the processes, materials, and quantity of materials involved in these operations.
- Handling, disposal, and management of wastes, such as drum handling and storage procedures.
- Presence of any of the uses listed in Appendix 1.
- Records concerning generation, storage, transport, and disposal of on-site waste.
- Building components, such as asbestos-containing materials, lead-based paints, and polychlorinated biphenyl (PCB)-containing transformers.
- Pole- or pad-mounted PCB-containing electrical transformers or other electrical equipment on or adjacent to the site.
- Evidence of land-filling practices, such as depressed or mounded areas.
- Evidence of dumping of wastes (stained soils, drum fragments).
- Potential exposure pathways including air, dust, water, or other routes of physical contact to hazardous materials.

The review of neighboring and adjacent sites is usually less detailed. Often, windshield or curbside evaluation will suffice. Particular attention should be paid to those sites that appear on the regulatory agency lists. When identifying neighboring and adjacent sites, the following should be addressed:

- General zoning (residential, commercial, industrial, etc.), existing land use, and any evidence of past land use.
- General operations and environmentally regulated materials.
- Indications of chemical activities.
- Presence of any of the uses listed in Appendix 1.
- General appearance.
- Site coverings, such as asphalt, concrete, exposed soil, vegetation, etc., and their present condition.
- Direction of surface water flow.
- Presence of hazardous material storage or handling, pollution control devices, above- and below-ground storage tanks, drains or dry wells, sump systems, etc.
- Confirmation of regulatory listed sites and observations of the site conditions.

If access to the site is not possible, site conditions can be assumed, based on available information obtained in the historical land use review and regulatory agency list review (Sections 321 and 322, above) and visits to the site boundaries.

In the process of performing the site and surrounding area reconnaissance for the Phase I ESA, immediate notification of DEP is required if:

- Discovery of a petroleum spill or discharge on a tax lot(s) by the Department and/or the applicant must be reported in accordance with applicable Federal, State or local laws.

- Discovery or evidence of "reportable quantities" of hazardous materials or hazardous wastes by the Department and/or the applicant on a tax lot(s) that pose a potential or actual threat to public health or the environment under Federal, State, or local guidelines must be reported in accordance with applicable Federal, State or local laws.

324. Interviews with Owners and Occupants

Often the site owner or occupants can provide information regarding current and past uses at the site. Interviews with the owners and occupants should be limited to persons with relevant knowledge such as a building supervisor or maintenance director. Typically the interviews are conducted in person during the site reconnaissance but may also be conducted over the telephone or in writing. Typically the questions posed during an interview should be designed to determine if hazardous materials are currently used at the site or may have been used in the past. The person being interviewed should be asked about the following general topics:

- Past ESA reports or environmental audits.
- Environmental permits.
- Registrations for underground storage tanks.
- Material safety data sheets for products used at the site.
- Hydrogeologic or subsurface investigation reports.
- Past or current on-site violations of environmental laws.

The information collected during the interviews will often be confirmed by the records review. Information which cannot be confirmed by the records review or other sources should be viewed with some degree of uncertainty. However, all of the information collected during the interviews should be considered in the conclusions of the ESA.

325. Surface Topography and Groundwater Migration Evaluation

Surface topography and groundwater migration evaluation is important if off-site sources of concern are discovered as part of the work described in Sections 322 and 323, above. This evaluation provides an indication of the direction contaminants, if present, may be transported. The topography will dictate surface flow in an area of concern. The surface drainage patterns in New York City are largely determined by the substantial amount of paved areas and the location of storm drains. Depending on the topography of the site and surrounding area, runoff from spills on adjacent or nearby sites may reach the subject site.

Groundwater flow is a function of the local geology. Most of the City is blanketed by glacial deposits consisting of sands, gravels, clays, and till. Many waterfront and low areas have been filled over time, notably at south shore locations and the southern tip of Manhattan. In some cases this fill material can form preferential pathways for the movement of contaminants especially when utility conduits have been filled with permeable material. The natural and man-made cover is typically underlain by unconsolidated Cretaceous formations with varying groundwater flow properties. These formations, in turn, rest on bedrock consisting of crystalline rock. The general topography varies with location, and this affects the speed and direction of groundwater flow. In addition, tidal influence may alter groundwater flow direction and gradients in waterfront areas.

Topographic maps produced by the United States Geological Survey (USGS) can be used to predict direction of surface and groundwater flow. Typically, a 7.5-minute scale map is used (see Section 730, below). Three sources of New York City groundwater information are "Groundwater in Bronx, New York and Richmond Counties with Summary Data on Kings and Queens Counties, New York City, New York," U.S. Geological Survey in Cooperation with the Water Power and Control Commission, Bulletin GW-32, 1953; "Reconnaissance of the Ground-Water Resources of Kings and Queens Counties, New York," U.S. Geological Survey Open File Report 81-1186; and "Subsurface Geology and Paleogeography of Queens County, Long Island, New York," U.S. Geological Survey, Water-Supply Paper 2001-A, 1978. Charts and maps indicating the direction of groundwater flow for many areas are not readily available, and consultation with a hydrogeologist familiar with the New York City area is recommended. Precise conclusions regarding the direction of groundwater flow can only be drawn by installation of and data collected from at least three wells, and even then the migration of contamination may differ from the general direction of groundwater flow (i.e., dense non-aqueous phase liquid contamination may move by gravity in a direction of bedrock fissures while groundwater flows in a different direction, or contamination may migrate along preferential pathways such as along subsurface conduits in a direction different from overall groundwater flow).

The surface topography and groundwater flow evaluation should conclude whether the potential exists for hazardous materials from off-site sources to migrate onto the project site. Conditions favorable for hazardous materials migration onto the project site include, but are not limited to, the following:

- The site is downgradient in terms of groundwater flow from a suspected contaminated site.

- The site's surface is topographically downgradient from a suspected contaminated site.

- Utility conduits may act as preferential pathways for contaminant migration from a suspected contaminated site.

326. Assessment Conclusions and Reporting

Based on the results of the Phase I report (i.e., historical land use review, regulatory review, interviews, site inspections, and surface topography and groundwater flow evaluation) or a recognition that existing or historical site uses have included those listed in Appendix 1, the applicant or lead agency should assess the potential for contamination on the project site. In general, hazardous materials may be a concern for the action if any of the following have occurred:

- Past or present uses on the site or in the surrounding area used or use hazardous materials.

- The site or surrounding area includes locations listed in regulatory agencies' records.

- If past or present surrounding uses are a concern, the site is downgradient in terms of groundwater flow, topographically downgradient from those suspected sites, or if the installation of utility lines may create the potential for hazardous materials migration.

- If records indicate the site has been filled and the nature and extent of the fill is unknown.

The conclusions of this assessment can fall into four categories: (Note that DEP must be contacted when potential significant adverse impacts are identified).

1. The assessment determines little or no likelihood of contamination, and, therefore, no significant impacts resulting from hazardous materials. If due diligence has been taken in making this determination, a conclusion can be drawn that no potential for adverse impacts exist and no further investigation is required.

2. Contamination may exist, and there is a potential for significant impacts. However, enough is known at this point that potential worst-case impacts can be disclosed and mitigation developed without additional work during the CEQR review. (Note that additional work may be required to satisfy other regulatory agencies). An example of this situation is a gasoline station, where the potential impacts resulting from contaminants that may have leaked or spilled are known and mitigation is straightforward. A surface and subsurface assessment or its equivalent may be required to properly frame and implement mitigation. Neither this assessment nor the mitigation need be undertaken until construction is scheduled to begin. In this example, as noted above, additional work may be required by the NYSDEC, which has regulatory authority over petroleum spills in the State. In the case of the gasoline station, remediation would typically include proper removal of the tanks and removal of contaminated soils for disposal at a landfill or beneficial reuse facility rated to accept such soils. This type of contamination, because its properties are well known and mitigation well established, would not require issuance of a Positive Declaration. Depending on impacts in other technical areas, the appropriate surface and subsurface assessment and remediation could in this case become part of the project, or could be required as a condition in a Conditional Negative Declaration. (More information about Positive Declarations, Conditional Negative Declarations, and Negative Declarations is provided in Chapter 1 of this Manual; for more information on Conditional Negative Declarations related to petroleum products, see Section 500, below.)

3. Contamination may exist, but not enough is known at this point to disclose the reasonable significant potential impacts that could occur. More work is necessary. At this point, it is strongly recommended that DEP be contacted. Additional work (surface and subsurface investigations, described in Section 330, below) can be performed to determine the nature and extent of any contamination, or a Positive Declaration can be issued and such work performed as part of the EIS. This is discussed in more detail in Section 420, below.

4. Contamination is known to exist. More work is required to determine its nature

and extent so that significant impacts can be fully disclosed and mitigation developed as appropriate. It is strongly recommended that DEP be contacted. Additional work (surface and subsurface investigations, described in Section 330, below) can be performed to determine the nature and extent of any contamination, or a Positive Declaration can be issued and such work performed as part of the EIS. This is discussed in more detail in Section 420, below.

The initial Phase I ESA is documented for the record, describing the scope of work, activities, findings, and conclusions. The report would typically include the following kinds of information:

- Site and adjacent site history.
- Surface and subsurface drainage patterns.
- Site reconnaissance findings.
- Regulatory agency list review findings.
- Potential impact from adjacent sites, such as landfills, NPL sites, surface impoundments, leaking USTs, USTs of unknown status, etc.
- On-site concerns, such as leaking USTs, USTs of unknown status, dumping of hazardous materials, PCBs, etc.
- Previous sampling and analytical data.
- Recommendations for additional actions, if any.

No Phase I ESA can wholly eliminate uncertainty regarding the potential for hazardous materials or a recognized environmental condition in connection with a property. The preliminary assessment does not provide any guarantee that hazardous materials or environmental conditions will not be found during the proposed or any future actions at the property. Therefore, the reviewer must make certain that all due diligence measures have been undertaken before concluding that no potential adverse impact could occur (Category 1). As the level of effort to characterize a site increases to include subsurface investigations and sampling as part of a detailed Phase II ESA, this uncertainty can be reduced.

330. PHASE II ENVIRONMENTAL SITE ASSESSMENT

Once an initial Phase I ESA has determined that a site may have hazardous materials (conclusions 3 and 4 in Section 326, above), the next step is a more detailed physical and chemical investigation of the site to ascertain whether hazardous materials are actually present, and to characterize the type and potential extent of contamination from those materials. The NYCDEP Office of Environmental Planning and Assessment (OEPA) should be consulted with to develop and approve a Phase II ESA. The detailed Phase II ESA may include one or more physical investigations discussed in more detail below. A standard guide for Phase II ESA's has been developed by ASTM (ASTM E 1903-97) that can be used as a framework to develop the required scope of work for the assessment activities.

Appendix 3 presents several illustrative examples of the level of effort required to characterize a site adequately during a Phase II ESA. Even sites which are intended for industrial use that will result in capping the site with impermeable materials should be adequately characterized in the remediation plan to: 1) document contaminant levels; 2) insure that all potential exposure pathways to on-site and off-site receptors have been addressed; and 3) ensure public and worker health and safety during construction.

In some cases, depending on the potential contaminants and the surface and subsurface drainage patterns on the site, it may also be necessary to conduct a physical investigation of the soils or groundwater on an adjacent property, so as to develop appropriate mitigation measures.

A work plan for physical investigation is developed based on review of the initial assessment data; it may involve some or all of the assessment techniques. The plan (also called a sampling protocol) contains three major elements: (1) a survey and analytical plan, addressing the types of surveys to be undertaken, the rationale for the approach, the various sampling locations, and the investigative, sampling, and laboratory analysis methods to be used; (2) a health and safety plan for personnel undertaking the work; and (3) a quality assurance and quality control plan for the acquisition, handling, and analysis of samples taken. The lead agency should prepare the work plan in advance of initiating field activities and coordinate with DEP's Office of Environmental Planning and Assessment (OEPA) for a review of its completeness before implementation.

In the process of performing the Phase II Environmental Site Assessment described in the following sections, immediate notification of NYSDEC may be required if:

- Discovery of a petroleum spill or discharge on a tax lot(s) by the Department and/or the applicant must be reported in accordance with applicable Federal, State or local laws.

- Discovery or evidence of "reportable quantities" of hazardous materials or hazardous wastes by the Department and/or the applicant on a tax lot(s) that pose a potential or actual threat to public health or the environment under Federal, State, or local guidelines must be reported in accordance with applicable Federal, State or local laws.

331. Survey and Analytical Plan

The survey and analytical plan describes the site investigation appropriate to find and identify the type and extent of contamination that may be present. In general, it is advisable to begin with first stage surveys which might use geophysical, soil-gas surveys or limited soil probing and surface sampling (soils or wipes), where appropriate, to help locate concentrations of contaminants and focus soil or groundwater sampling in those areas. If this approach were taken, the work plan would indicate two stages, with the detailed soil or groundwater sampling programs to be defined in the second stage. The results of these initial surveys may also eliminate the need for more extensive sampling.

The survey and analytical plan should clearly note that prior to any type of intrusive investigation or sampling, subsurface utilities must be marked out to avoid possible injury to workers and the potential danger of damaging the utility.

The survey and analytical plan should also clearly document the procedures regarding decontamination of sampling equipment. Drilling and subsurface sampling equipment should be decontaminated between sampling locations. The plan should also address the proposed number of wells or borings; well or boring depths; well specifications; split-spoon sampling intervals; organic vapor screening and soil description methods; potential aquifer permeability testing or determination; well development techniques; handling and disposal of borehole cuttings and well development water; and methods of determining the groundwater elevation.

The analytical plan should be tailored to the proposed project. Sampling should typically be performed at a minimum to the depth of the project excavation.

The elements of the survey and analytical plan are generally as follows.

331.1. First Stage Surveys

Geophysical Survey. A geophysical survey may be undertaken to help locate buried metallic objects or material, to characterize the subsurface conditions and geology, and possibly to determine the presence or extent of a groundwater contaminant plume. Typical geophysical tools and techniques may include magnetometers (to test for buried metal, such as tanks or drums), ground-penetrating radar, ground conductivity surveys, and seismic refraction/reflection surveys. Limits on geophysical techniques can include overall cost and the presence of interference structures, such as overhead electric wires or excessive subsurface metal (i.e., reinforced concrete) that can produce anomalous readings and difficulty in interpretation of data. The goal of the geophysical survey is to guide subsequent fieldwork by aiding in the determination of optimum sampling locations at the site. Occasionally, the results of the geophysical survey will suffice, and additional testing will not be required. An example would be where presence of an existing UST is the only issue. If the geophysical survey indicates that a UST is not on the site (and there is no documentation to the contrary), no additional work would be necessary.

Soil-Gas Survey. A soil-gas survey tests the unsaturated zone (area above the water table) of the subsurface environment for the presence of volatile organic compounds (VOCs). Typical volatile compounds include constituents in gasoline and industrial solvents, such as toluene, trichloroethylene and tetrachloroethylene. These VOCs may persist from surface spills or leaking underground storage tanks, or may be diffusing upward into the unsaturated zone from deeper contaminated media including groundwater. In addition, soil gas sampling may be required in landfilled and/or swampy areas to determine whether methane gas is present. Typical techniques include the placement of a vapor sampling probe (usually a hollow steel rod with a slotted intake point) into the subsurface, purging the sampling system, and testing the effluent soil gas with field analytical equipment. This analytical equipment can include flame ionization detectors (FID's), photo-ionization detectors (PID's), portable gas chromatographs (GC's), and combustible gas meters (CGI's).

Occasionally, a soil-gas survey will suffice for this analysis, particularly if it yields negative results, and no additional work will be necessary.

Most often, however, soil-gas analysis is a good screening technique but requires the subsurface geologic formation to be permeable enough to allow the transmission and detection of subsurface volatile organic vapors. Additionally, soil-gas surveying techniques work best for volatile compounds, but have limited use for heavier petroleum products or other less volatile compounds, such as fuel oils, whose volatile constituents have been distilled off during the refining process.

Shallow Soil Probes. A large number of shallow soil samples can be collected in a relatively short time using a truck-mounted direct-push hydraulic hammer system. This type of soil probing is routinely done during first stage surveys to collect a number of preliminary soil samples to assist in the characterization of the site. This type of probe sampling results in minimal disturbance to the site and does not have the access limitations of a typical full sized drilling rig. Upon retrieval, the soil samples should be scanned using a PID or other suitable field screening equipment. The field screening results should be noted on a test boring log, along with information regarding sample interval, soil description, moisture content, color, and evidence of contamination (odor, sheen). As appropriate, a limited number of soil samples can be selected for further analysis at an approved base laboratory. In certain cases, completion of the shallow soil probe investigation may be sufficient to characterize site concerns. An example would be if an existing gasoline UST is the only concern at the site and a limited soil probe investigation was conducted near the UST. If the field screening and analytical results indicated that petroleum products have not impacted the soils adjacent to the tank, no additional work would be necessary. Although this type of soil probe sampling relies heavily on dedicated sampling equipment, this equipment should be decontaminated between sampling locations to avoid cross contamination. Limitations of this type of soil probe sampling include limitations on depth, limited sample volume, and failure to provide standard blow counts.

Subsurface Excavations. Test pits and trenching with mechanical equipment allow for inspection and sampling of the subsurface materials. Exposing the subsurface to inspection often reveals heterogeneity or other features that may have been missed by sampling at discrete, isolated sampling points. In certain situations where the area of concern is defined and relatively small in extent, excavation equipment can be used quickly to assess subsurface soils with a limited number of test pits. This is especially useful in determining composition of fill material or debris piles.

Surface Soil and Waste Sampling. Sampling of surface soils or exposed wastes or other surfaces for contaminants is often conducted during first stage surveys. A large number of such samples can be quickly collected with very little disturbance to activities at the site. For example, if PCB transformers were noted in the initial assessment, a wipe sample and surface soil sample in those locations would be taken to determine if the transformers had leaked. Areas where suspected wastes are exposed at the surface should also be sampled. Again depending on the media sampled (liquid, solid, semi-solid, or mixed), the samples can be quickly collected with simple sampling tools such as dedicated spoons or trowels. Special consideration and care should be exercised in conducting this type of sampling since any contaminants exposed at the surface provide a potential exposure pathway for persons occupying or working at the site.

331.2. Detailed Surveys

Soil and Groundwater Probe Investigations. During more detailed surveys and subsurface investigations at contaminated sites, the direct-push probe unit is used to collect both soil and groundwater samples from discrete depths. In addition to the ability to collect discrete soil and groundwater samples, this type of probe unit typically results in minimal disturbance to the site and does not have the access limitations of a typical full sized drilling rig. During the completion of the soil or groundwater probes field screening is also conducted to provide additional information and assist in the selection of samples for further analysis. As appropriate, a number of soil and groundwater samples can be selected for further analysis at an approved New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory.

Soil Boring and Monitoring Well Plan. The soil boring and monitoring well installation program is usually implemented at the areas of concern identified in the initial assessment with guidance from any first stage sampling efforts. Soil and groundwater sample collection points are concentrated in those areas of the site most likely to be contaminated. The soil boring and well installation program is usually accomplished by mobilizing an environmental drilling rig at the site. Soil samples are generally obtained with a split-spoon sampler. For both groundwater and subsurface soil, sampling depends on rig access to the site and the presence of overhead utilities and right-of-way issues. Soil samples may be obtained by hand auguring if rig access is not available; however, this requires the subsurface to be penetrable by the hand auger and can only extend to limited depths.

Although split spoon is the commonly used sampling tool on a conventional drilling rig, other tools may be used if they obtain appropriate results, including hydropunch groundwater sampling, temporary well points, and screened augers. For example, the hydropunch groundwater-sampling tool can be used to obtain groundwater samples during a test-boring program. The hydropunch tool can be used generally anywhere a split-spoon sampler can be used including depths much greater than practical with a groundwater probe. The hydropunch allows the acquisition of a groundwater sample without the installation of a permanent monitoring well. The hydropunch requires relatively permeable geologic formations and will not allow for the determination of the groundwater flow direction, as will permanent monitoring wells.

Testing Buildings and Structures. It is possible for building structures to be contaminated with hazardous materials. These materials could have been introduced in construction materials or discharged as a result of poor operational practices on the part of an industrial occupant. Appropriate sampling techniques depend on the material of concern and the location of the contamination in or on the building. Wipe samples, bulk samples, air samples, coring samples, or field measurements may be appropriate in different situations.

Common building materials include asbestos-containing thermal systems, surfacing and miscellaneous materials, and lead (and other metals) in painted surfaces. Under local law 76 (see Section 711.3, below), bulk samples of suspect asbestos-containing materials must be collected by a professional certified by DEP or the New York City Department of Health. Material containing more than 1- percent asbestos is considered asbestos containing. If lead-based paint is suspected, an initial field assessment can be performed using a portable X-ray fluorescence (XRF) detector. If the initial field measurements indicate positive or inconclusive results, it is recommended that representative confirmatory sampling and laboratory analysis be performed. Lead dust may also be considered in some structures and on some paved surfaces in building yards or surrounding streets. Visible signs of staining, pooling, or discharge of waste material inside structures should be sampled based on the suspected material. For example, suspected PCB-containing surface stains are assessed by performing wipe samples, which are then analyzed in the laboratory (see below).

331.3. Constituents for Analysis and Analytic Methods

Common types of hazardous materials found in soil and groundwater on sites in the City are petroleum hydrocarbons, VOCs, polycyclic aromatic hydrocarbons (PAHs), and lead and other heavy metals. However, it is likely that additional compounds could be on-site and if there is no evidence to suggest that they are not, a broader testing of samples for possible contaminants is recommended (i.e., pesticides, herbicides and PCBs). The samples should be analyzed by a laboratory accredited by the New York State Department of Health's Environmental Laboratory Approval Program (ELAP).

The laboratory analyses of environmental samples should be conducted according to the holding time and Quality Assurance/Quality Control (QA/QC) requirements of NYSDEC Analytical Services Protocol (ASP) using the latest update since June 2000, (Appendix 4). Reports should provide the reduced deliverables as specified for ASP Category A deliverables, unless Category B data deliverables are requested by DEP.

Analytical methods for solid matrices are published in US EPA SW-846: Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 3rd edition, (Appendix 4). The wastewater and drinking water analytical methods are provided by the US EPA Office of Water: EPA Methods and Guidelines for Analysis of Water. (Appendix 4). Environmental samples at a minimum should be analyzed for the Superfund Target Compound List (TCL) organic compounds and Target Analyte List (TAL) inorganic analytes or for modified list(s) of constituents as appropriate for the project objective. The analytical laboratory should achieve and provide quantitation and reporting levels of the generated data that are low enough to meet the ASP requirements as well as to satisfy all the Applicable or Relevant and Appropriate Requirements (ARARs) established for the project.

For buildings and structures, paint samples are analyzed for the presence of lead, utilizing the EPA Method 7420 (Flame Atomic Absorption) or 7421

(Graphite Furnace Atomic Absorption), as appropriate. Wipe samples for PCB-containing surface stains are analyzed using EPA Method 8081. Asbestos samples must be sent to a lab accredited by the New York State Department of Health's Environmental Laboratory Approval Program (ELAP) and the National Voluntary Laboratory Accreditation Program (NVLAP), and analyzed by polarized light microscopy (PLM) for its asbestos type and percentage. If the site history or inspection indicates that other hazardous materials might be present, analyses for these materials should also be conducted.

332. Health and Safety Plan

Surface and subsurface assessments are conducted in accordance with a site-specific Health and Safety Plan, established to protect the health and safety of all on-site personnel. The plan is prepared in accordance with the applicable U.S. Occupational Health and Safety Administration (OSHA) standards under 29CFR Part 1910.120. The intent of the plan is to provide the necessary information to minimize the potential for injury or exposure to site contaminants while investigating the site. The Health and Safety Plan must describe each of the potential hazards at the site and describe the methods to mitigate these hazards. Special attention must be given to the methods to monitor for potential exposure and the various levels of protection required for the tasks to be completed at the site. The Health and Safety Plan should also describe any community monitoring that may be needed.

333. Quality Assurance and Quality Control

Before beginning fieldwork, a laboratory analytical program and proper field and laboratory quality assurance/quality control (QA/QC) procedures must be developed. This program establishes general sampling and QA/QC requirements for all sampling and laboratory analysis activities. Also referred to as a Quality Assurance Project Plan (QAPP), its main goal is to assure sample integrity from the field to the laboratory and that the proper laboratory analytical procedures and protocols are followed. The program should include sampling QA/QC protocols for all compounds sampled. It should describe sampling techniques and methods to assure sampling integrity; field instrumentation calibration and maintenance procedures; decontamination procedures for all equipment; chain-of-custody procedures; sample preservation requirements; laboratory analytical procedures; laboratory equipment calibration and maintenance procedures; the experience and capabilities of personnel; and any other factors associated with obtaining, delivering, and analyzing hazardous waste samples. The USEPA provides guidance in developing quality assurance project plans, and references for these guidance documents are also found in Appendix 4.

340. CONCLUSIONS AND DOCUMENTATION

The results of the Phase II ESA are interpreted to determine the potential for the presence of hazardous materials. The level and extent of contamination can be measured and interpreted from the site investigations and laboratory analysis. As part of the assessment, the soil and groundwater sampling data are quantitatively compared to existing guidelines and standards (these are described below in Section 710).

The final step of Phase II ESA is to document the methodologies; findings and recommendations, including description of the site and surrounding area; field activities; compilation and tabulation of analytical data; description of the site hydrogeology; interpretation of the analytical and site assessment data; and comparison to appropriate standards, criteria or guidance values. The contents and format of the Phase II report should conform as closely as possible to the guidelines in ASTM E 1903 Appendix X1. Often the Phase II report will become an appendix of the EIS if one is conducted.

400. Determining Impact Significance

410. POTENTIAL FOR SIGNIFICANT IMPACTS

The potential for significant adverse impacts from hazardous materials depends on the type of materials and their location on the site and the proposed use(s) of the site. In general, given adequate knowledge of the site and its environs, the following two questions can be used to determine whether a significant adverse impact would occur:

- Is there the potential for human exposure to contaminants? This includes present and future on-site occupants, off-site occupants, and construction workers.

- Is there the potential for environmental exposure to the contaminants? This includes contaminants entering on-site or surrounding natural resources or exacerbating existing environmental contamination.

If the answer to both of these questions is "no," it is unlikely that a potential for significant impact exists. If the answer to either is "yes," then significant adverse impact might occur. Based on those two general questions, examples of significant adverse impacts from hazardous materials include the following:

- Future occupants of the site may be exposed to on-site hazardous materials. For example, children at a residential site may ingest contaminated soils or lead-laden particles from a building's interior, or be exposed to contaminated groundwater.

- Future site occupants may be exposed to materials from off-site. For example, materials leaking from an underground gasoline storage tank on the adjacent property could migrate in the subsurface either as a separate product, in the dissolved phase in groundwater, or as vapor into a building on the site.

- Workers may be exposed during site preparation, excavation, and construction. For example, sites that were formerly used as solid waste landfills can contain high levels of methane, which can lead to explosions during excavation; compounds adsorbed to soils may become airborne as dust and ingested through the nose and mouth. Dewatering activities could expose workers to contaminated ground-water.

- Occupants of adjacent properties may be exposed. For example, contaminated soil or dust could be transported to adjacent sites during excavation or construction. Further, construction activities could cause on-site contaminants to migrate off-site, depending on the soils and surface and subsurface drainage patterns. Soil gas may migrate to adjacent properties and may migrate into adjoining buildings, creating a potential health hazard (i.e., gasoline constituents or chlorinated solvents), or concentrate beneath impermeable barriers and rise to potentially explosive levels (i.e., methane).

- Operations related to the proposed action can result in a significant adverse impact to occupants of the site or surrounding property, although it is generally assumed that safe procedures in accordance with all applicable rules and regulations of City, State and federal agencies will be practiced. An example is a manufacturing facility that does not properly dispose of its waste materials.

When hazardous materials are present, whether or not a significant impact would occur depends on the action or use proposed for the site, because this is what determines whether the potential for exposure could occur. If, for example, contaminated subsurface soil were to be excavated for the construction of a new building, this would constitute a potential significant adverse impact. The construction workers who would excavate the soil would be exposed to the contaminated soil. On the other hand, if the same contaminated subsurface soil was to remain in place, undisturbed, and an existing building was to be rehabilitated above it, provided there was no potential for soil/gas contamination within the structure, then there would likely be no significant adverse impact from these specific activities. No humans would be exposed to the contaminated soils. As another example, if soil 50 feet below the surface of a site is contaminated with lead in concentrations greater than suggested guidelines, but no excavation is planned, then no significant impact would result. If the same concentrations were located in the top foot of soil, however, people could be exposed to the contamination even if no excavation was planned there, and a significant impact would result. One must also keep in mind the proposed projects are often modified before and after construction. It is possible that further excavation on a site may lead to potential health impacts to residents or construction workers, and that significant impacts may be possible in the future and remediation may be required. Following are examples of significant adverse impacts, which might occur from hazardous materials above applicable guidelines.

- *Residential or commercial uses or zoning*. A significant adverse impact would occur, in general, with lower contaminant concentrations when a site is in residential and commercial areas than in manufacturing loca-tions. This is particularly true because residential and commercial areas often have open, unpaved areas that can make contaminated areas, such as surficial soils, more accessible and, in the case of residential uses, site occupants would be exposed for longer periods of time.

- *Excavation*. When soil is to be excavated, con-struction workers and nearby residents may be exposed to contaminated materials. Therefore, a significant adverse impact would likely occur. In addition, many excavations require dewatering which may encounter contaminated groundwater.

- *Site Coverage*. When contaminated sites are not covered or capped by structures, pavement, or clean fill, exposure to hazardous materials present on the ground or in surficial soils may create a significant impact. However, capping of hazardous materials does not necessarily eliminate potential exposure and a significant adverse impact as described below.

- *Soil Gas*. When contaminated soil gas migrates into buildings located on the property or adjacent properties or when soil gas collects under impervious surfaces and rises to potentially explosive concentrations. In these instances a significant adverse impact would occur.

In addition to the threat of existing hazardous materials, significant impacts can also occur because of future hazardous materials related to the proposed action. For any actions that will introduce hazardous materials to a site or that will involve management of hazardous materials, the methods of handling and disposing of those materials in accordance with all applicable regulations should be considered so that significant adverse impacts would not occur.

Conditions of contamination that are not considered significant include the following:

- When groundwater on the site exceeds groundwater quality standards, no significant impact would occur unless there is a definable route of exposure through drinking water or volatilization into buildings or structures, or if the action will exacerbate existing groundwater contamination, facilitate migration of contaminants in groundwater, or involve dewatering.

- In certain circumstances—particularly for asbestos and lead—implementation of specific regulatory requirements would prevent significant impacts. For example, if the action requires demolition or renovation of a building containing asbestos, New York City law requires removal and disposal of the asbestos by certified professionals prior to exposure of construction workers, future occupants, etc., following prescribed procedures. This requirement applies whether or not an action is also subject to CEQR. The applicant must comply with the relevant New York City, New York State, and Federal regulations pertaining to asbestos-containing materials. Because asbestos is controlled by local law, its presence must be disclosed in CEQR, but it is assumed that there would be no significant impact if all regulations are followed. This is because the regulations typically require clean-up before exposure and because the regulations are comprehensive and specify remediation measures. Compliance with these regulations would ensure that no significant impact would occur. The above guidance is included for the information of lead agencies and applicants.

  If asbestos is an issue, but the action would not result in the disturbance of the in-place asbestos, such as in the reuse of an existing building, the CEQR analysis would consider the condition of the asbestos (i.e., whether it is friable) and assess the potential for significant impact due to any increased exposure.

Decisions about significant adverse impacts must be made on a site-specific, action-specific basis, considering all available information. The lead agency should consult with DEP's Office of Environmental Planning and Assessment in determining and assessing significant adverse impacts. However, if any significant impacts are identified, the lead agency must coordinate with DEP. In addition, other agencies (i.e., NYSDEC, USEPA, Coast Guard, and so on) may also require notification depending on the adverse impact identified. For generic or programmatic actions, site-specific conclusions may not be possible. In this case, more general conclusions about the type of impacts that could be expected for different types of sites may be appropriate.

420. ASSESSMENT ISSUES FOR THE EAS AND EIS

Because the investigations of hazardous materials may be time consuming and costly, and access to a site may be restricted, CEQR practice regarding hazardous materials information requirements for the EAS or EIS has evolved as set forth here. Typically, a Phase I EAS is done for the EAS. The timing of additional assessment work depends on the ability to describe the potential for significant impacts. If the concerns for a site are numerous, complex, or uncertain so that a reasonable worst-case scenario cannot be developed, then a Phase II ESA would be required before a Determination of Significance can be made for an EAS, or the DEIS is completed. (More information about Determinations of Significance, Positive Declarations, Conditional Negative Declarations, and Negative Declarations is provided in Chapter 1 of this Manual.)

If the theoretical hazardous material issues and potential impacts can be described without a Phase II, and a Positive Declaration is issued, then the DEIS can be completed without testing results. Work plan approval, however, for physical investigations should be obtained from DEP before DEIS completion. The protocol would then be appended to the DEIS and reference made to it in the text. Ideally, testing to describe site-specific conditions would be undertaken between the draft and final EIS and the results would be presented in the completed FEIS. If the area subject to the environmental review is so vast, development would occur over an extended period of time, or property access is limited, Phase II investigations may be impossible. Disclosure of potential hazardous materials issues may be made in the DEIS and FEIS and institutional controls, which are discussed in Section 550 and 560 below, may be options.

If the only hazardous materials impact of the proposed project site is due to petroleum product contamination from underground storage tanks on or adjacent to it, a Conditional Negative Declaration may be appropriate (as long as the action is not Type I and the lead agency is not the applicant; see Chapter 1 for more information on Conditional Negative Declarations and Section 500, below, for more information on use of a Conditional Negative Declaration related to petroleum products) and the testing to determine the extent of contamination could be undertaken before site grading, excavation, building construction, or any movement of soils at the site. Specifically for example, for rezoning actions involving sites not controlled by the applicant, a zoning designation of "E" can be incorporated into the proposed project as described in more detail in Section 5. The “E” designation is a mitigation technique which ensures that no significant adverse impact would result from a proposed action because of the steps which would be undertaken prior to the development of a rezoned site.

Where timely access to the site is impossible, the analysis relies on information obtained from Phase I records and visits to the site boundaries. The assessment would make conservative assumptions on the type and extent of hazardous materials potentially present and the impacts that could result from these contaminants. In this case, it is necessary to develop and work with a scenario that could be overly conservative, but lacking other information, there is no choice. The protocol for additional sampling work is developed by the applicant/lead agency and approved by DEP for incorporation into the Environmental Review The mechanism for ensuring testing and other analytical methods, and thereby ensuring remediation, is assured through incorporation into a Restrictive Declaration or other institutional control. In this way, further investigations are completed and appropriate remediation determined before any site disturbance can begin.

500. Developing Mitigation

Mitigation is the implementation of actions designed to eliminate, reduce to acceptable levels, or control sources of significant impact. Mitigation measures are determined based in part on the detailed Phase II ESA report. The conclusions of the report should summarize the investigation and provide a list of contaminants of concern for the site. The conclusions should also describe potential exposure pathways (assuming the proposed action is carried forward) and determine whether the potential for significant exposure or mitigation exists. The report can also describe a proposed remediation plan, if necessary.

DEP allows a “risk-based” approach in determining the proper course of mitigation at a subject site. The risk-based approach evaluates the current and proposed future land use of the site along with the proposed action (i.e., construction, excavation, etc) against the known contaminants of concern and potential exposure pathways in determining what remedial course of action, if any, is appropriate for a site. Implementation of a remedial action follows careful development of an appropriate remedial plan. The remedial plan should be assessed as to possible adverse impacts on human health or the environment upon its implementation. Clearly, a sound knowledge of the site contaminants-of-concern and actual and potential exposure pathways is critical. As described in more detail below, both short-term (during implementation of the remedial plan) and long-term (after the remedy is complete) risks should be assessed. Questions that the DEP considers when evaluating a proposed remedial approach are:

- Which of the available remedial technologies will accomplish the remedial goals for the site?
- What are the short-term risks?
- What are the long-term risks?

- What are the risk-based benefits of their remedial plan?
- Will implementation create potential new or additional risks to the surrounding public?
- Will implementation result in hazardous materials to be left on site such that a Deed Restriction, discussed in Section 560, is required?

In evaluating the short-term risks associated with a remedial technology, both adjacent community (if any) and on-site worker risk are assessed. Examples of remedial technologies that may pose a short-term risk to an adjacent community may include emissions from on-site air stripper, or fugitive emissions of contaminated dust as a result of construction activities (i.e., excavation, loading, transportation, and disposal). In addition, on-site worker health and safety issues should be considered in choosing a remedial technology.

Evaluation of long-term risk associated with a remedial plan focuses on evaluating the residual risk and evaluating the effectiveness of the remedy over time. Residual risk may occur if hazardous materials are left on-site or if the remedial alternative will not achieve State standards or criteria (i.e., groundwater contamination above applicable standards discussed in Section 714). Evaluation of the effectiveness of the remedial activity is a measure of how protective the remedy will be of human health and the environment over time.

As an example, an applicant proposes to construct a paved parking lot on a vacant earthen lot with known gasoline contaminated groundwater. In this example the current and proposed land uses are known (vacant land and a paved parking lot). The contaminants of concern, gasoline constituents, are also known. An environmental assessment of the site indicates that there are no potential off-site receptors and the only potential on-site exposure pathway is inhalation of contaminants that have volatilized from the groundwater and migrated through subsurface soils to the atmosphere. In this simplified case, construction of the paved parking lot provides an essentially impermeable cover over the barren land, eliminating the potential for subsurface contaminants to volatilize to the atmosphere and, therefore, eliminating the remaining exposure pathway for occupants of the proposed use. For this scenario, it is likely that no additional remedial measures would be necessary for the proposed project. However, given the same scenario with a different planned site use or if it is considered likely that future uses would include excavation below the impermeable surface (e.g., a parking lot) additional mitigation may be required. For example, assuming the same scenario but in this case the applicant proposes to construct a building that will include a basement. Construction of a building with a basement on the same site would potentially increase the exposure potential as volatilized contamination from groundwater could migrate into the basement. In addition, there may be issues of on-site worker health and safety due to the presence of subsurface contaminated soils and groundwater. Potential off-site issues may also come into play as contaminated soils and groundwater (if dewatering is necessary) may require off-site disposal. The mitigation measure in this scenario may be the installation of a vapor barrier beneath the building to eliminate the exposure pathway. As illustrated by these two simplified scenarios, the DEP focuses on the mitigation of risk in evaluating proposed remedial measures at sites. Additional examples of typical mitigation measures include the following:

- Removal and off-site disposal of contaminated surface and/or subsurface soils/materials that would be encountered during proposed construction.

- Installation of a subsurface vapor recovery system to collect and treat contaminated vapors that may have otherwise migrated into on-site building or collected at potentially explosive levels beneath on-site structures.

- Paving/capping of soils on site to eliminate potential exposure from contaminated soils.

DEP has developed standard testing protocols and procedures to remediate potential significant impacts related to the underground storage of petroleum products. Therefore, if the lead agency determines that the only substances of concern are related to petroleum products, and the action is not Type I or a rezoning, the following statement has been determined to be appropriate for a Conditional Negative Declaration:

> A soil and groundwater sampling protocol will be submitted to the OEPA for review and approval. In addition, remedial actions determined to be necessary based on the testing results will be submitted for approval by DEP/OEPA. No site grading, excavation, or building construction will begin prior to DEP/OEPA written approval of the sampling protocol and remediation program.

Site mitigation techniques generally fall into one of the following categories: (1) containment; (2) removal; or (3) treatment. Each type, with selected examples, is described briefly in this section. It should be noted that implementation of any mitigation measures does not absolve the site owner from additional mitigation in the future should conditions warrant (i.e., site use changes). In addition, NYSDEC or other agencies may require additional investigation or mitigation measures.

510. CONTAINMENT TECHNIQUES

Containment is the process of covering or enclosing contaminated materials to minimize direct contact with receptors. For subsurface contamination, capping of the affected area is often used to control the infiltration of surface water or rainwater, therefore minimizing contaminant migration. Caps are often employed when contaminated materials are left in place. Capping is commonly performed together with measures for groundwater extraction or contaminant control, surface water control, and gas collection or control. Various cap designs and capping materials are available. The selection of the cap design and materials depends on the nature of the waste to be covered, and the intended use of the capped area. The major disadvantages of capping include an uncertain design life and the need for long-term maintenance. Caps need periodic inspection and maintenance since they are vulnerable to cracking and to chemical deterioration.

Soil and hard caps are examples of this technique. Soil caps are used when the sole purpose of the cap is to separate the wastes from the surface environment. Hard caps are made of asphaltic or portland cement concrete.

Lateral migration of contaminants can be contained by such techniques as construction of subsurface barriers, such as slurry walls; or soil grouting, in which liquid material is injected into the soil where it solidifies to form a barrier.

520. REMOVAL TECHNOLOGIES

Contaminated surface and subsurface materials can be removed from a site. The type of equipment and construction techniques selected depend on the physical characteristics of the materials being excavated, the volume of material to be excavated, the depth of the excavation, and the haul distances involved. Health and safety procedures and monitoring plans are typically developed to ensure the protection of the workers, the public, and the environment.

Once removed, the contaminated materials must be properly disposed of, usually in landfills approved for the purpose. The transport and disposal of solid and hazardous wastes and materials are regulated by the USEPA, NYSDEC and the U.S. Department of Transportation In some cases, it is possible to treat hazardous materials and return them to the site (see below), to use them elsewhere (e.g., as fill), or to dispose of them at a non-hazardous waste landfill.

Excavation of soil and fill debris is applicable to the removal of dry to moist earth, gravel, or other non-rock materials above the water table. Removal technologies are not just limited to soils. These technologies are also applicable to groundwater, gases, bulk liquid and sludge, and vessels containing hazardous materials.

Groundwater extraction, often referred to as pump-and-treat technology, is designed to halt the lateral and vertical migration of contaminated groundwater while extracting contaminated groundwater for treatment and/or disposal. Under appropriate hydrogeologic conditions, groundwater collection technique and extraction wells are a standard component of remediation of contamination in the subsurface.

Sometimes subsurface contamination produces gas. Active gas collection technique should be one of monitoring and control technologies that identify the problem and attempt to control the releases, be it from subsurface lateral migration or from surface emissions. Most often the source of the gas will be a landfilled area or an extensive area of fill or C&D waste. As these wastes degrade they are known to create significant levels of gas under the proper conditions.

Bulk liquids and sludges are sometimes found in pits, ponds, lagoons, sumps, trenches, or tanks. The liquids often must be removed to prevent the contamination of soil and groundwater adjacent to the area.

When abandoned storage drums are found at a site, actions may be warranted to remove the drums to prevent release of waste materials. Drum removal activities may include locating, staging, overpacking, opening of the drums; and sampling, testing, and consolidating the contents from the drums.

530. TREATMENT TECHNOLOGIES

Treatment technologies involve treating the contaminated materials to reduce the concentration of the contaminants of concern. This can be performed both in-situ and ex-situ, on-site, or ex-situ, at a remote location.

Incineration is a well-proven method of treating solid, semi-solid, and liquid wastes containing organic compounds. Incineration involves burning the waste at a very high temperature to ensure that the compound is totally broken down to raw materials. Typically incineration is very expensive and is not a cost-effective on-site remedial action unless large quantities of material require treatment. Often this remedial action will also include removal of the material and shipping it off-site for treatment.

Thermal Treatment Technologies include a number of methods which use heat to separate the contaminants thermally from the media it is found in. These technologies do not destroy the contaminants, so typically these technologies include off-site disposal of a concentrated amount of the original contaminant.

Soil Vapor Extraction (SVE) is a well-proven method of treating unsaturated soils contaminated with VOCs. Soil vapor extraction consists of a network of wells with perforated well screens spanning the contaminated portion of the unsaturated zone to remove VOCs.

Air Sparging/SVE includes passing air through a column of VOC contaminated groundwater and then collecting the contaminant enriched vapors with a SVE system above the water table. The system includes a series of air injection points below the water table and another series of vapor extraction points above the watertable. Assuming favorable site conditions, this type of system serves to clean up both the groundwater and soils at a VOC-contaminated location.

Air stripping is a well-proven technology in the removal of volatile organics from water. This technology includes aerating the contaminated water to purge any volatiles. Vessels containing activated carbon are used to remove any remaining toxic substances from the water or vapor. Activated carbon adsorption is widely used in the treatment of hazardous waste streams, especially for the removal of mixed organics from waters.

Soil flushing is the application of a liquid flushing agent to soils to physically and/or chemically remove contaminants. This new and innovative process is most applicable for a low- to medium-concentration contamination that is distributed over a wide area.

In situ biodegradation is the process of enhancing microbial action to remediate subsurface contaminants that are adsorbed to soil particles or dissolved in the aqueous phase by adding oxygen, hydrogen, carbon or other nutrients to the system.

Monitored Natural Attenuation (MNA) is a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants. This remedial strategy involves gaining regulatory acceptance of the approach followed by continued monitoring to assess progress. This type of remedial strategy has been gaining acceptance for sites where there is no potential for human or environmental exposure to the contaminants. An example would be a site with low levels of volatile organics in the groundwater and where the groundwater is not used for drinking purposes.

Precipitation is a process by which the chemical equilibrium of a waste water stream is altered to reduce the solubility of heavy metals.

Solidification refers to hazardous waste treatment processes that are designed to improve handling and physical characteristics of the waste, minimize free liquids, and decrease the leachability of pollutants. Stabilization techniques involve processes that limit solubility or that detoxify the waste contaminants even though the physical characteristics of the waste may or may not be changed or improved. The most common application of solidification techniques is for control of leachability from waste containing metals. Solidification can be done both in-situ and above grade.

540. MITIGATION TECHNIQUES FOR CONTAMINATION IN BUILDINGS OR STRUCTURES

Mitigation measures depend on the contaminant of concern and the location of the contamination in or on the building or structure. Generally, hazardous materials contaminating building components can be contained or removed. Lead-containing materials can be removed, enclosed, encapsulated, or managed in-place. (As noted in Section 400, asbestos regulations typically require clean-up before potential exposure). The method of handling asbestos, specified in the regulations, is similar to that described above. Lead and asbestos are the two most common contaminants, but other possible hazardous conditions may be present. The mitigation for specific problems should be resolved in coordination with DEP on a case-by-case basis.

550. REZONINGS AND THE "E" DESIGNATION

The "E" designation is used in connection with the environment review pursuant to CEQR of any Zoning Map Amendment, subject to review and approval pursuant to Section 197-c and 197-d of the NYC Charter, where one or more tax lots on the area subject to the Zoning Map Amendment and not under the control or ownership of the person seeking such Zoning Map Amendment, have been identified by the Lead Agency as likely to be developed as a consequence of this action and the environmental assessment identifies significant impacts from contamination on such sites. Measures to mitigate such impacts are identified. In such cases, DEP may recommend to the Department of City Planning or lead agency that a particular site be given an "E" designation on the zoning map pursuant to 11-15 of the New York City Zoning Resolution. For "E" designated sites no change of use or development requiring a New York City Department of Buildings permit may be issued without approval from DEP. An "E" designated site entails a mandatory procedure that incorporates DEP's review at each step to ensure protection of human health and the environment from known or suspected hazardous materials associated with the site.

Designation as an "E" site discloses the potential contamination and ensures that mitigation will be provided before construction on those sites. Chapter 24 of Title 15 of the Rules of the City of New York contains rules establishing practices and standards for determining when and how an "E" designation, as delineated in Section 11-15 of the New York City Zoning Resolution, is imposed and/or removed on any tax lot subject to a proposed zoning map amendment. The new rules are designed to codify the procedures that have evolved since the initial adoption of Section 11-15 in the 1990s. The new rules are included as Appendix 5.

560. RESTRICTIVE DECLARATIONS, INCLUDING DEED RESTRICTIONS

In certain circumstances, protection of human health and the environment from hazardous materials can be addressed through issuance of a site-specific Restrictive Declaration or Institutional Control. The Restrictive Declaration requires that the property owner enter into a sampling and/or remediation agreement to be approved by DEP as a prerequisite to soil disturbance and it obligates the property owner to: (1) Obtain a written approval from DEP before the New York City Department of Buildings can issue any permits for excavation, construction and so on, and (2) obtain from DEP a Notice of Satisfaction to be submitted to the New York City Department of Buildings stating that the remediation plan has been implemented before a Temporary Certificate of Occupancy or Certificate of Occupancy can be issued. In simple terms, the Restrictive Declaration is a tool to ensure potential significant impacts from hazardous materials that are not a current threat to human health and the environment are mitigated or remediated. The Restrictive Declaration, since it is recorded with the land, ensures that the site use remains unchanged and no alteration to the site (i.e., construction that could increase exposure to the hazardous materials) can be performed without implementation of the remedial plan to the satisfaction of DEP. In addition, the agreement may apply to all future owners or lessees or any party of interest. Since Restrictive Declarations are developed on a site-specific basis, DEP should be contacted for more information on their potential use at a site.

600. Developing Alternatives

The alternatives may include the mitigation methods described above and/or specific changes to the proposed project that minimize possible exposure. If increased exposure to hazardous materials may be associated with the excavation of a site for the construction of a building, an alternative may be slab construction not requiring extensive excavation. If there is a concern for exposure of children to surface soils at a residential development, an alternative may be to pave the area or select another use for the site. Alternative sites may also be considered.

700. Regulations and Coordination

710. REGULATIONS AND STANDARDS

Regulations regarding hazardous materials address their identification, registration, classification, discharge, handling and storage, generation, treatment, transportation, and disposal. They also provide a means to identify and fund the clean-up of hazardous sites and hazardous releases. Regulations are promulgated by the City, State, or Federal government. An overview of key applicable regulations is presented here. (The primary reference for this section was Parkin, W.P., et.al., 1992, *The Complete Guide to Environmental Liability and Enforcement in New York*, sponsored by the National District Attorney's Association.)

711. Federal Government

711.1. Resource Conservation Recovery Act (RCRA) and Hazardous and Solid Waste Amendments (HSWA)

RCRA, adopted in 1976 and amended in 1984, creates the basic framework for the Federal regulation of hazardous wastes. It provides controls for the generation, transportation, treatment, storage, and disposal of hazardous waste through a comprehensive "cradle to grave" system of hazardous waste management techniques and requirements. EPA administers RCRA and delegates administration of major components to New York State. RCRA defines hazardous waste either as a listed hazardous waste or a waste exhibiting any of the characteristics of a hazardous waste (40 CFR Part 261). The four characteristics of hazardous waste are: (1) ignitability; (2) corrosivity; (3) reactivity; and (4) toxicity as measured by the Toxicity Characteristic Leaching Procedure (TCLP). The 1984 Hazards and Solid Waste Amendments (HSWA) added Federal regulation of underground storage tanks.

711.2. Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and Superfund Amendments and Reauthorization (SARA)

Congress enacted CERCLA (also known as Superfund) and its amendments (40 CFR Part 300) to fund the clean-up of hazardous substance waste sites. CERCLA, which was amended by SARA, has created a national policy and procedures for containing and remediating released hazardous waste substances and for identifying and remediating sites contaminated with hazardous substances. CERCLA's province excludes crude oil, petroleum products, and natural gas products.

Title III of SARA, the Federal Emergency Planning and Community Right to Know Act, was promulgated to allow public access to information about local use of hazardous chemicals and to require each generator of such materials to develop chemical emergency planning procedures (40 CFR Part 300). A list of Extremely Hazardous Substances (EHS) and their respective reportable quantities was created.

711.3. Transportation of Hazardous Materials

The U.S. Department of Transportation addresses the listing and transportation requirements for hazardous materials under 49 CFR Part 171 through 177, and USEPA regulates hazardous waste transport under 40 CFR Part 262 and 263.

711.4. Toxic Substance Control Act (TSCA)

TSCA empowers EPA to regulate specific toxic substances. Federal regulation of polychlorinated biphenyls (PCBs) and asbestos-containing materials falls under TSCA.

712. New York State

712.1. Environmental Conservation Law

NYSDEC has developed the regulatory framework for hazardous waste management in New York in response to the State's Environmental Conservation Law. The criteria for determining a hazardous waste closely parallel those of RCRA and are set forth in Volume 6 of the Codes, Rules and Regulations of the State of New York (NYCRR) Part 371.

The State has also created its own Superfund-like program to help finance the State's share of clean-up costs under the Federal program or to finance clean-ups at State sites that are not under the Federal program. New York State's Superfund program, the Inactive Hazardous Waste Sites Law, was passed in 1979. This program is described in 6 NYCRR Part 375, which was amended in May 1992. The law provides for the identification, listing, and remediation of inactive hazardous waste sites in

New York. Under the law, NYSDEC has provided for a comprehensive listing of inactive hazardous waste sites.

712.2. Petroleum and Hazardous Substances Storage Laws

The storage of petroleum and hazardous substances in New York State is regulated through a series of laws enacted to ensure proper storage and to address petroleum and hazardous substance spills and leaks. In 1984, Federal underground storage tank requirements were adopted as required by Subtitle I of RCRA. The New York State petroleum and hazardous substance storage laws are more comprehensive than the Federal laws and include the Oil Spill Prevention, Control and Compensation Act of 1977; the Petroleum Bulk Storage Act of 1986; and the Hazardous Substance Bulk Storage Act of 1986.

The Hazardous Substances Bulk Storage Act of 1986 specifically addresses the storage of non-petroleum hazardous substances. Owners of tanks storing listed hazardous substances are required to register all tanks storing listed hazardous substances with a capacity greater than 185 gallons.

713. New York City

713.1. Hazardous Substances Emergency Response Law (Spill Law)

New York City has enacted Local Law 42/1987, the New York City Hazardous Substances Emergency Response Law, also known as the Spill Law. Under this law, the City has declared its policy to respond to emergencies caused by releases or threatened releases of hazardous substances into the environment that may have an adverse effect on the public health, safety, and welfare and to prevent injury to human, plant, and animal life and property. DEP administers this law, which allows the department to order clean-up of hazardous substance spills.

713.2. Community Right-to-Know Law

The New York City Community Right-to-Know Local Law 26/1988 authorizes DEP to gather chemical information from facilities that use, store, or manufacture hazardous substances and to use this information for emergency planning and response purposes. The intent of this law is to protect the health and safety of the community and the environment against accidental release of hazardous materials. In addition, the law gives New York City residents the right to know the identities, quantities, characteristics, and locations of hazardous substances used, stored, and manufactured in their communities.

713.3. Asbestos Legislation

Asbestos-containing materials are regulated at the City, State, and Federal levels of government. DEP, pursuant to Local Laws 76/1985 and 80/1987, specifies requirements for building surveys, laboratory analyses, professional certifications, and asbestos abatement procedures. Local Laws 70/1985 and 21/1987, administered by the New York City Department of Sanitation, govern the transport, storage, and disposal of asbestos waste in the City. The City's regulations are comprehensive and go beyond those of the State and Federal governments. The New York State Industrial Code 56, administered by the New York State Department of Labor, and the EPA-administered National Emissions Standards for Hazardous Air Pollutants (NESHAP) also regulate asbestos activities.

713.4. Industrial Pretreatment Program

This program establishes standards for certain pollutants discharged to the sewer system, requiring pretreatment for effluent that would otherwise not meet the standards.

714. Applicable Standards

New York State has promulgated standards and guidance values for ground and surface waters and suggested soil clean-up guidelines.

714.1. Surface and Groundwater

The NYSDEC Division of Water has published Water Quality Regulations for Surface Waters and Groundwaters under 6 NYCRR Parts 700-705, effective 1972 and last amended August 1999. Under these regulations NYSDEC provides a water classification system for surface and groundwaters (Part 701). General conditions that apply to all water classifications are that the discharge of sewage, industrial waste, or other wastes shall not cause impairment of the best usages of the receiving waters as specified by the water classification at the location of the discharge and at other locations that may be affected by such discharge.

The Water Quality Regulations establish eight fresh surface water classifications, five saline surface water classifications, and three groundwater classifications, and for each, provide a definition of their best usage. Ambient Water Quality Standards and guidance values are categorized according to this water classification system. The standards are derived to provide for the protection of human health, potable water supply, aquatic life, and consumers of aquatic life.

In addition to the Water Quality Regulations under 6 NYCRR Part 700-705, NYSDEC Division of Water has issued Technical and Operational Guidance Series 1.1.1 to provide a compilation of ambient water quality guidance values and groundwater effluent limitations for use where there are no standards or regulatory effluent limitations. This document also provides a summary of the water quality standards and limitations under 6 NYCRR Part 700-705.

Standards and guidance values for protection of the best usage as a source of potable water supply protect human health and drinking water sources and are referred to as health (water source) values. For the majority of specified substances, these values generally equal the maximum contaminant level (MCL) for that substance. If no specific MCL exists, the standard or guidance is 5 micrograms per liter (µg/L) or a less stringent value as determined by the Commissioner of the New York State Department of Health. For those substances that do not have an applicable health (water source) standard, and for which the NYSDEC has determined that a threat to human health may exist if discharged into the waters of the State, a guidance value is derived by applying the procedures utilized by the State or a "general organic guidance" value of 50 µg/L for an individual organic substance may be utilized (Part 702.15), whichever is more stringent.

The three classification categories of groundwater established based on their best usage include Class GA fresh groundwaters, Class GSA saline groundwaters, and Class GSB saline groundwaters. The best usage of Class GA groundwaters is as a source of potable water supply. Thus, the Class GA standards generally correspond to the MCL. The best usages of Class GSA saline groundwaters is as a source of potable mineral waters, for conversion to fresh potable waters, or as a raw material for the manufacture of sodium chloride or its derivatives or similar products. The best usage of Class GSB saline waters is as a receiving water for the disposal of wastes. The Class GSB is not assigned to any groundwater of the State, unless the commissioner of NYSDEC finds that adjacent and tributary groundwaters and the best usages thereof will not be impaired by such classification. The groundwaters of the five boroughs are classified as Class GA groundwaters except where the criteria for saline groundwater is met (Part 703.5).

Groundwater analytical data generated from a site are typically compared with NYSDEC standards and guidance values that apply to a site's groundwater classification. This comparison aids in the evaluation of the extent of impairment of the groundwater being analyzed. Unless volatilization at the ground water interface would result or a drinking water supply is affected, no significant impact may be considered to result from the groundwater contamination.

714.2. Soil

Human exposure to soil contaminants can occur through inhalation, ingestion, or skin contact, as well as indirectly through contaminants leaching or percolating to groundwater, if it is used as a source of drinking water. There are generally no promulgated Federal, New York State, or New York City clean-up standards for contaminants in soil. There are, however, guidance values that have been proposed by various government agencies including NYSDEC. These guidelines are typically derived from models employing numerous conservative assumptions developed to set clean-up levels at soil-contaminated sites.

In New York NYSDEC has developed soil cleanup criteria specifically for inactive hazardous waste sites. NYSDEC's primary goal for inactive hazardous waste sites is restoration to pre-disposal conditions to the extent feasible and authorized by law. The Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels (TAGM 4046, January 1994 with updates) sets up soil cleanup objectives which are designed to eliminate all significant threats to human health or the environment where pre-disposal conditions are not feasible. The goal of these criteria is to eliminate significant risks to human health and the environment. The soil cleanup criteria are typically determined from the risk of exposure in children aged one to six who are the most likely to ingest soil. The behavior of specific contaminants in the environment is also considered when determining criteria (i.e., the ability of soils to sorb organic chemicals), with more stringent criteria being imposed for the protection of ground and drinking water quality.

The soil cleanup criteria listed in TAGM 4046 are should be used to assess levels of environmental contamination in New York. TAGM 4046 is an evolving document and users should verify the use of the most recent update, which can be found on the NYSDEC web page provided in Appendix 4. The DEP also recommends the use of the TAGM 4046 guidance values when determining potential impacts on public health and the environment.

714.3. Hazardous Waste Characteristics

6 NYCRR Part 371 requires that before transport and disposal of contaminated soil from a site, the generator must determine if it is subject to regulation as a hazardous waste. A solid waste, such as contaminated soil, is considered a hazardous waste if it exhibits one or more of the characteristics identified in 6 NYCRR Part 371.3 or if it is a listed acutely hazardous or toxic waste.

720. APPLICABLE COORDINATION

As noted above, several Federal, State, and City regulations govern hazardous materials. The agencies that administer these regulations at a Federal and State level, such as EPA and NYSDEC, typically are not active in the CEQR process. However, if a significant amount of hazardous waste exists on the site, which is a significant threat to public health and the environment, the appropriate regulatory agencies must be notified by either DEP or the lead agency. For instance, if a petroleum spill of more than 5 gallons is found during a site investigation being performed for a CEQR, NYSDEC must be notified pursuant to Article 17, Section 1743 of the New York State Environmental Conservation Law and Article 12, Section 175 of the New York State Navigation Law. The appropriate Federal and New York City government agencies must also be notified. DEP can provide complete notification requirements. Other than regulatory notification requirements, however, Federal and State agencies typically do not have a review and/or approval role in the CEQR process.

At the City level, coordination with DEP's Office of Environmental Planning and Assessment is required where the proposed site is likely to show potential for the presence of hazardous materials (such as a site in or near manufacturing uses or with a history that reveals a potential hazardous materials issue). DEP will provide consistent technical guidance and review throughout the research, investigation, and remediation phases of a hazardous wastes assessment.

730. LOCATION OF INFORMATION

Throughout this section of the CEQR Manual, references to publications, regulations, regulatory agencies, and other sources of information are made. Generally, publications and guidelines can be purchased or obtained free-of-charge from the referenced agencies. Listed below are regulatory agencies and current addresses, along with publications and/or regulations that may be obtained.

- RCRA/Superfund Hotline
Publications and technical information.

- Government Printing Office
26 Federal Plaza
New York, NY 10278
EPA regulations and guidelines.
Fee charged for publications.

- New York State DEC
Regional Office, Region 2
Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
Division of Air Resources
Division of Solid and Hazardous Materials
Division of Fish, Wildlife, and Marine Resources
Division of Water
Division of Environmental Remediation
Division of Lands and Forests

- DEP-Office of Environmental Planning and Assessment
59-17 Junction Boulevard, 11th Floor
Elmhurst, NY 11373

- DEP-Bureau of Environmental Compliance
59-17 Junction Boulevard, 1st Floor
Elmhurst, NY 11373
Copies of "Spill Law" and Right-to-Know Laws available free of charge.

- United States Geological Survey
P.O. Box 1669
Albany, NY 12201
Topographic maps. Also available at local map stores, such as the Hagstrom Map Company.

- New York Public Library
455 Fifth Avenue
New York, NY 10016
Fire insurance maps and city directories.

- New York City Department
of Buildings (Manhattan)
60 Hudson Street
New York, NY 10013
Building renovation records and certificates of occupancy for past and present uses available for review.

- New York City Department
of Buildings (Brooklyn)
Municipal Building
Brooklyn, NY 11201
Building renovation records and certificates of occupancy for past and present uses available for review.

- New York City Department
of Buildings (Bronx)
1932 Arthur Avenue
Bronx, NY 10457
Building renovation records and certificates of occupancy for past and present uses available for review.

- New York City Department
of Buildings (Queens)
126-06 Queens Boulevard
Kew Gardens, NY 11415
Building renovation records and certificates of occupancy for past and present uses available for review.

- New York City Department
of Buildings (Staten Island)
Borough Hall
Staten Island, NY 10301
Building renovation records and certificates of occupancy for past and present uses available for review.

- New York City Fire Department
Bureau of Fire Prevention
250 Livingston Street
Brooklyn, NY 11201
Records on fuel tanks, storage of flammable materials.

- National Cartographic
Information Center
U.S. Department of the Interior,
Geologic Survey
507 National Center
Reston, VA 27092
Aerial photographs and information on commercial surveying firms.