SUPERFUND RECORD OF DECISION

VENTRON/VELSICOL SITE
WOOD-RIDGE AND CARLSTADT
BERGEN COUNTY
NEW JERSEY

Prepared by: N.J. Department of Environmental Protection
Site Remediation and Waste Management Program
Bureau of Case Management
October 2006

SITE NAME AND LOCATION

Operable Unit 1
Ventron/Velsicol Superfund Site
Wood-Ridge and Carlstadt, New Jersey
EPA No. NJD980529879

STATEMENT AND BASIS OF PURPOSE

This Record of Decision (ROD) documents the selection by the New Jersey Department of Environmental Protection (NJDEP) of the remedial action for the Ventron/Velsicol site (the Site) in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601 et seq. and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. An administrative record for the Site, established pursuant to the NCP, 40 CFR §300.800, contains the documents that are the basis for NJDEP's selection of the remedial action (see Appendix I). The Administrative Record file is located in the following information repositories:

Wood-Ridge Memorial Library
231 Hackensack Street
Wood-Ridge, New Jersey

NJ Department of Environmental Protection
401 East State Street, 5th Floor
Trenton, New Jersey

The United States Environmental Protection Agency (EPA) has been consulted on the planned remedial action in accordance with CERCLA §121(f), 42 U.S.C. §9621(f), and it concurs with the selected remedy (see Appendix II).

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision (ROD) is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances from the Site into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy represents the comprehensive remedial action for Operable Unit 1 at the Site. It addresses ground water and soil contamination. The major components of the selected remedy include:

- A vertical hydraulic barrier system will be installed to serve as a physical barrier to ground water flow and to encapsulate the areas of highest mercury concentrations under the Wolf Warehouse. Soil generated from the installation of the hydraulic barrier (approximately 1,650 cubic yards) will be placed under the cap in the undeveloped area.

- Ground water use restrictions will be placed on the extent of the ground water contamination plume in the form of a Classification Exception Area and a Well Restriction Area to restrict use of contaminated ground water.

- Ground water monitoring will be conducted to determine if hydraulic controls within the barrier are required. If required, hydraulic controls will be implemented. Ground water monitoring will also be conducted to ensure the hydraulic barrier is effective.

- Excavation of all mercury-contaminated soil above 620 mg/kg (approximately 7,150 cubic yards of soil) and off-site disposal of that soil, subsequent to any necessary treatment.

- Excavation of site-related contaminants on the Lin-Mor property to the NJDEP Residential Direct Contact Soil Cleanup Criteria. If the property owners of Lin-Mor agree to the placement of a deed notice, then excavation to the NJDEP Residential Direct Contact Soil Cleanup Criteria will not be required; however, a deed notice will be required.

- Capping areas and/or maintenance of the existing caps (i.e., parking lots and building foundations) with contamination in soil above the NJDEP Non-Residential Direct Contact Soil Cleanup Criteria.

- Excavation of soil within the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and the West Ditch; that soil may be placed under the cap in the undeveloped area. Certified clean fill will be placed in the buffer areas and native vegetation and erosion controls will be installed.

- Contaminated soil will be excavated from West Ditch to promote proper drainage and prevent transport of contamination to downstream areas.

- The drain line within the undeveloped area will be located and removed (if it exists) before installation of the cap.

- Deed notices will be required on all properties with contaminated soil exceeding the NJDEP Residential Direct Contact Soil Cleanup Criteria. If a deed notice(s) cannot be negotiated with a property owner(s), then all soil contamination above NJDEP Residential Direct Contact Soil Cleanup Criteria must be removed on that particular property or properties.

- To ensure the remedy is protective of surface water, monitoring of contaminant flux from ground water to surface water and sediment will occur.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1: Statutory Requirements The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

Part 2: Statutory Preference for Treatment This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Part 3: Five-Year Review Requirements Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

Irene Kropp, Assistant Commissioner
Site Remediation and Waste Management Program
New Jersey Department of Environmental Protection

10/30/06
Date

SITE NAME, LOCATION, AND DESCRIPTION

The Ventron/Velsicol site is located in the boroughs of Wood-Ridge and Carlstadt, Bergen County, New Jersey. The site is irregularly shaped and consists of 38.3 acres; approximately 15.7 of the 38 acres are within the Borough of Wood-Ridge and the remaining 22.6 acres are within the Borough of Carlstadt. The location of the site is depicted in Figure 1. The site is bordered to the east by Berry's Creek, to the west by the Diamond Shamrock/Henkel and Randolph Products properties and Park Place East, to the south by Diamond Shamrock/Henkel Ditch (south) and Nevertouch Creek, and to the north by Ethel Boulevard and a railroad track.

The portion of the site that is identified as OU1 is divided into three areas. The area defined as the "developed" portion is approximately 7 acres in size and is the northernmost portion of the site. Two active warehouses, referred to as the Wolf Warehouse and the U.S. Life Warehouse, are located on this portion. The former mercury processing facility was located on the area of the site that is now occupied by these warehouses.

Approximately 19 acres of land that were filled but not developed lie generally south of the developed portion of the site. This portion of the site is bordered to the north by the railroad track, to the south by Diamond Shamrock/Henkel Ditch (north), and to the east by Berry's Creek. This area is referred to as the "undeveloped" portion of the site.

The area referred to as the "off-site" portion consists of the following properties: the Blum Property, the Prince Packing property, the EJB property, the Lin-Mor property, Ethel Boulevard, and the railroad property. The Borough of Wood-Ridge owns Ethel Boulevard and Norfolk Southern owns the railroad property.

The remaining 12 acres of the site, south of the undeveloped area, are generally marsh, except for a fringe of fill along the western border. This portion of the site is not a part of OU1. This portion will be handled with Operable Unit 2, which is also referred to as the Berry's Creek Study Area. The Berry's Creek Study Area consists of the marsh, Berry's Creek, and other wetland areas adjacent to Berry's Creek. A remedial investigation of the Berry's Creek Study Area will begin in 2007.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site History

Prior to 1927, most of the site was marshland. From 1927 to 1974, various parties constructed and operated a mercury processing plant on the developed portion of the site. In 1929 F.W. Berk and Company, Inc. (Berk) began operating a processing plant and manufacturing mercury products near the current location of the Wolf Warehouse. Berk continued to operate the plant until 1960, when the corporation dissolved and the plant and property were sold to the Wood Ridge Chemical Corporation (WRCC), a wholly owned subsidiary of the Velsicol Chemical Corporation (Velsicol). The main operations of the mercury processing plant included the manufacture of red oxide of mercury, yellow oxide of mercury, phenyl mercuric acetate, and other organic and inorganic mercury compounds. The plant also reclaimed mercury from both

in-house and customer waste products (amalgams, batteries, thermometers, impure mercury, etc.).

Velsicol continued to operate the plant until 1968, when the Ventron Corporation (Ventron), a predecessor to Morton, purchased WRCC and the approximately 7- acre parcel on which the plant was located from Velsicol. Velsicol retained ownership of the rest of the site property until transferring ownership to NWI Land Management, Inc., in 1986. Ventron operated the plant until it was closed in 1974. In 1974, the parcel of land where the plant was located was sold to Robert and Rita Wolf (Wolf). Wolf demolished the plant in 1974, and in 1975, subdivided the land and transferred title of the westernmost parcel to U.S. Life Insurance Company. Two warehouses were constructed, one on each parcel.

The warehouse on the western portion of the site (U.S. Life [Jerbil] Warehouse) was built first, after removal of the upper layer of contaminated soil to the eastern portion of the site. Construction of the Wolf Warehouse on the eastern portion of the site was apparently meant to contain mercury-contaminated soils under the foundation and/or the asphalt pavement surrounding the building. However, no post construction documentation of this containment structure is available.

The approximately 19-acre portion of the site between the developed area and Berry's Creek (i.e., the undeveloped area) was used as a dumping area for various materials including demolition material and domestic solid waste subsequent to 1960.

At present, three parties own property on the site. Jerbil Incorporated owns the U.S. Life Warehouse property (approximately 4.2 acres), Jonathan and Roni Blonde own the Wolf Warehouse property (approximately 2.3 acres), and the LePetomane III, Inc. Custodial Trust owns the undeveloped (approximately 19 acres) and marsh (approximately 12 acres) areas. The LePetomane III, Inc. Custodial Trust is the successor to NWI Land Management, Inc. following the discharge in bankruptcy of NWI's parent, Fruit of the Loom, Inc.

Enforcement History and Previous Investigations/Actions

NJDEP has overseen various investigations of soil, ground water, surface water, sediment and air quality beginning in the 1970's. EPA placed the site on the National Priorities List (NPL) in 1984. In that same year, the Superior Court of New Jersey issued the "Stipulation and Supplementary Order Approving Cooperative Agreement for Remedial Investigation and Feasibility Study and Amending Procedural Order Involving Remedy" in which Ventron and Velsicol agreed to investigate the site. In 1990, NJDEP performed a removal action for soil in residential areas of Wood-Ridge and Moonachie near the site. The removal actions were conducted at ten properties in Wood-Ridge and one property in Moonachie. The work included excavation of mercury-contaminated soil, placement of clean back-fill, revegetation, and general restoration of the properties to their original condition.

The Stipulation was amended in 1996 by the Resolution of the Berry's Creek /Wood-Ridge Site Action Committee. This resolution specified that Velsicol and Morton would conduct a Remedial Investigation and Feasibility Study pursuant to an NJDEP-approved Scope of Work.

Beginning in 1996, Morton International, Inc., in consultation with NJDEP and EPA, began further investigation of the site. The resulting documents were:

- Operable Unit 1 Remedial Investigation Report (Exponent, June 2004)
- Ecological Risk Assessment (Exponent, April 2001)
- Human Health Risk Assessment (Exponent, July 2005)
- Feasibility Study (CH2MHill, April 2006)

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The documents referenced above have been placed in the repository. The Proposed Plan, along with notice of the availability of the RI/FS, was released to the public on August 3, 2006. The documents and the plan were made available to the public in both the Administrative Record (Appendix I) and at information repositories maintained at the Wood-Ridge Memorial Library and at NJDEP's Trenton office.

The notice of availability was published in the Bergen Record on August 3, 2006. A public comment period was held from August 3, 2006 through September 2, 2006. A public meeting was held in Wood-Ridge, New Jersey on August 9, 2006. At this meeting, representatives from NJDEP, CH2MHill, and Exponent presented results of the remedial investigation and feasibility study and the preferred alternative. The public was provided the opportunity to ask questions and make comments.

Based on the comment received at the August 9, 2006 meeting, the local community and public officials generally supported the agencies' preferred alternative presented in the Proposed Plan. A detailed response to the comment received is contained in the Responsiveness Summary. No written comments were provided.

SCOPE AND ROLE OF ACTION

The scope and role of this action addresses Operable Unit 1 of the site, which consists of the upland soil and ground water. This will be the final remedy for Operable Unit 1.

A remedial investigation of Operable Unit 2, which is also referred to as the Berry's Creek Study Area will begin in 2007. The Berry's Creek Study Area consists of Berry's Creek and wetland areas adjacent to Berry's Creek.

SUMMARY OF SITE CHARACTERISTICS

Site Hydrology

Surface water features in the vicinity of the site are illustrated on Figure 1. Surface water drainage at the site is generally to the southeast, where Berry's Creek borders the site. Berry's Creek flows generally south from the site in a 5.25-mile course through tidal marshes before joining the Hackensack River. Much of the stream course is curving. The stream flow in the last 1.25 miles of this creek has been diverted to a straight, man-made channel known as Berry's Creek Canal.

Three ditches drain the southern (marsh) part of the site (See Figure 1). The Diamond Shamrock/Henkel Ditch (north), which marks the boundary between the undeveloped portion of the site and the marsh portion, flows in a southeasterly direction into Berry's Creek. The Diamond Shamrock/Henkel Ditch (south) is coincident with the site's southwestern property boundary and converges with Nevertouch Creek, which then forms the southern site boundary to its confluence with Berry's Creek. A drainage ditch is roughly halfway between the two ditches. The Diamond Shamrock/Henkel Ditch (south) is an open drainage channel that feeds Nevertouch Creek and Berry's Creek.

The marsh portion of the site reportedly floods to a depth of up to 2 feet during high tide. As the flood tide drains this area, the bulk of the water flows through a channel along the eastern edge of the marsh to Nevertouch Creek, before converging with Berry's Creek. The flow of water is diverted back to the Berry's Creek channel during low tide. There are no well-defined drainage patterns for the undeveloped area. The developed area is paved, and drainage generally is directed toward the drainage ditch between the warehouses. Drainage from this area flows along the western property boundary (in the West Ditch) toward the Diamond Shamrock/Henkel Ditch (north).

Site Geology/Hydrogeology

The geology at the site consists of the following, listed by increasing depth:

- Surficial fill in the undeveloped area, consisting of gravel, sand, silt and clay, with shale fragments as well as glass, brick, cinders, porcelain, wire, leather, cloth, coal, wood, shingles, rubber, plastic, metal, and other debris. Surficial fill in the developed area consists of predominantly silt and clay, with limited sand and gravel. The fill ranges in thickness from approximately 5-8 feet in the developed area of the site to approximately 3-14 feet in the undeveloped area of the site. Fill is not known to be present in the marsh area.

- Meadow mat, consisting of fibrous organic peat and silt, which, where present, ranges from 0.5 to 4 feet thick. The meadow mat is thinnest beneath the undeveloped area where artificial filling has occurred, which may indicate the meadow mat in this area has been compressed by the overlying fill.

- A 5 to 10 foot thick layer of fine to medium-grained sand.
- A varved, gray to red-brown silt that is 62 to 146 feet thick.
- A red-brown silty sand unit that is at least 20 feet thick.
- Bedrock, consisting of reddish-brown shale, siltstone and sandstone that is approximately 9000 feet thick.

The layers of fine to medium-grained sand and red-brown silty sand likely exhibit similar physical or hydraulic properties and appear to be indistinguishable from a hydrogeologic perspective. Therefore, they are considered undifferentiated.

Major features of the site-wide ground water flow patterns include:

- A generally radial flow pattern (outward from the center) is apparent in the undeveloped area, with the highest ground water levels in monitoring wells MW-2 and MW-3. This is most likely caused by higher infiltration of water in the undeveloped area than in the areas to the north and west of the undeveloped area.
- Along with the radial flow patterns, there is likely to be a small downward vertical component of flow generally in the center of the undeveloped area, which then transitions to a small upward vertical flow component near the perimeter of the undeveloped area.
- As part of the overall flow patterns, ground water in the eastern and southern portions of the undeveloped area flows toward Berry's Creek and the Diamond Shamrock/Henkel Ditch (north). Ground water in the western portion of the site flows towards the West Ditch and Berry's Creek.

Ground Water Impacts

A total of fifteen monitoring wells were installed in the developed and undeveloped portion of the site. During the remedial investigation, wells were sampled in 1997, 1999, 2000 and 2002, and the following contaminants were detected in ground water at levels exceeding the New Jersey Ground Water Remediation Standards: arsenic (up to 41.5 ppb), iron (up to 31,700 ppb), manganese (up to 4,180 ppb), mercury (up to 22.9 ppb), and benzene (up to 14 ppb). Concentrations of one metal, selenium, exceeded New Jersey Surface Water Quality Standards, but not the Ground Water Remediation Standards.

It was determined that there are three site-related contaminants of concern in ground water, namely arsenic, mercury and benzene. While iron and manganese have been detected in all site monitoring wells at concentrations exceeding the New Jersey Ground Water Remediation Standards during every sampling event, the concentrations both in upgradient and downgradient wells have not varied significantly over time. Therefore, it is believed that iron and manganese

concentrations site ground water reflect background geochemical conditions and are not site related.

Soil Impacts

Based on the investigations, it has been determined that soil at the site within the OU1 boundary, both in the developed area and the undeveloped area, has been impacted with various contaminants at concentrations exceeding the New Jersey Residential Direct Contact Soil Cleanup Criteria (RDCSCC) and the Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC). The fifteen contaminants exceeding the RDCSCC in soil (both surface and subsurface) within OU1 are: mercury (up to 34,700 mg/kg), arsenic (up to 120 mg/kg), copper (up to 2,190 mg/kg), beryllium (up to 2.1 mg/kg), benzo(a)anthracene (up to 62 mg/kg), benzo(a)pyrene (up to 52 mg/kg), benzo(b)fluoranthene (up to 64 mg/kg), benzo(k)fluoranthene (up to 4.7 mg/kg), bis(2-ethylhexyl)phthalate (up to 380 mg/kg), chrysene (up to 12 mg/kg), dibenz(a,h)anthracene (up to 1.3 mg/kg), indeno(1,2,3-cd)pyrene (up to 2.6 mg/kg), lead (up to 4,320 mg/kg), thallium (up to 21.9 mg/kg) and zinc (up to 43,200 mg/kg). By comparing concentrations of some contaminants found in on-site soils to levels found in fill material, it was determined that benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, beryllium, and zinc were related to fill and would not be considered contaminants of concern related to the site. However, remedies for this historic fill material were considered during the evaluation of soil alternatives.

Surface Water and Sediment Impacts

Surface water and sediment were sampled in the on-site basin and the West Ditch. Mercury exceeded the NJDEP Surface Water Quality Standards in the on-site basin and the West Ditch. Lead also exceeded the NJDEP Surface Water Quality Standards in the West Ditch. The mercury, cadmium, chromium, copper, lead, nickel, silver, and zinc concentrations in sediments exceeded the screening criteria in both the on-site basin and West Ditch. Arsenic concentrations in one location of the on-site basin exceeded screening criterion.

Air Sampling

Air sampling was conducted at the site to determine the concentration of gaseous and particulate mercury in ambient air at the site. Four locations were monitored in the developed area of the site (one inside the U.S. Life Warehouse, one inside the Wolf Warehouse, and two outside locations adjacent to the warehouses) and one location was monitored in the undeveloped area. The results of the sampling showed the highest level of mercury was in the Wolf Warehouse at 30.39 ng/m^3. The NJDEP indoor air criterion for mercury is 300 ng/m^3.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Site uses: The area is zoned commercial/industrial and future use of the property is expected to remain consistent with the current zoning and land use. Warehouses exist on the developed

portion of the property, and there are preliminary plans to construct another warehouse on the undeveloped portion.

Ground Water Uses: Ground water underlying the site is considered Class II-A, a source of potable water. A recent survey indicated there are numerous wells within a half mile of the site. However, only three are identified in NJDEP well records as being used for possible drinking water purposes. Since the ground water plume related to this site is contained within the site boundaries, this site has not impacted off-site wells.

SUMMARY OF SITE RISKS

A Baseline Human Health Risk Assessment (BHHRA) was conducted to provide a quantitative assessment of the health risks to human receptors under current and future land-use scenarios if no remedial action were taken at the site.

Human Health Risk Assessment

As part of the RI/FS, a BHHRA was completed to estimate the potential current and future effects of site contaminants on human health. The BHHRA estimates the human health risk which could result from the contamination at the site if no remedial action was taken and without any institutional controls in place.

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification* – identifies the contaminants of potential concern (COPCs) at the sites based on several factors such as toxicity, frequency of occurrence and concentration. *Exposure Assessment* – estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water by which humans are potentially exposed). *Toxicity Assessment* – determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization* – summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The reasonable maximum exposure, which is the greatest exposure reasonably anticipated to occur, was evaluated.

The area where the site is located is currently zoned commercial/industrial and future use of the property is expected to remain consistent with this zoning and land use. Warehouses exist on the developed portion at the northern section of the property. The undeveloped portion is likely to be accessed only by trespassers under current site conditions, while future use scenarios for the southern portion of the site anticipate this area to be developed as commercial/industrial use. Ground water underlying the site is considered Class II-A, a source of potable water. No current exposures to contaminated ground water are known; the BHHRA evaluated the reasonable anticipated future use as a drinking water source.

Hazard Identification

A BHHRA was conducted to evaluate the potential risks and hazards to human health associated with OU1 of the Ventron/Velsicol Superfund site in its current state. Although the risk assessment evaluated all contaminants identified in the ground water and soils, the conclusions of the risk assessment indicate that the significant risks and hazards are associated with mercury at the site, while lead is of concern in some discrete areas. A summary of the concentrations of the contaminants of concern for the site is provided in Table 1.

Exposure Assessment

The BHHRA addressed the potential risks to human health by identifying several potential exposure pathways through which the public may be exposed to contaminant releases at the site under current and future land use and ground water use conditions. Although the onsite ground water is not currently used for drinking, it is designated by the State as a potable water supply, meaning it could be available for drinking in the future. The site is zoned for commercial/industrial use, and it is anticipated that future use will be consistent with current use. Since the site consists of areas with operating warehouses in the northern portion of the property as well as undeveloped areas to the south, the exposure assessment evaluated potential risks from exposure to both areas. In the BHHRA, contaminants in soil, sediment, ground water and air at the site were quantitatively evaluated for potential health threats to current and future onsite receptors.

The BHHRA focused on a variety of possible receptors, including current and future onsite workers and construction workers in the developed areas and current and future trespassers/visitors, future onsite workers, and future construction workers in the undeveloped areas. In addition, the identification of a hot spot of mercury in the developed area and a hot spot of mercury and lead in the undeveloped area required that the BHHRA evaluate exposure to these discrete locations by taking into account that the exposure would likely be significantly less than exposure to the rest of the site. A complete discussion can be found in the Baseline Human Health Risk Assessment Report. The ground water was evaluated as a potable water supply under future use scenario only.

Toxicity Assessment

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic (systemic) effects due to exposure to site chemicals are considered separately. Consistent with EPA guidance, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual contaminants of concern were summed to indicate the potential risks associated with mixtures.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intake and safe levels of intake (reference doses and inhalation reference doses). Reference doses (RfDs) and inhalation reference doses (RfDis) have been

developed by EPA for indicating the potential for adverse health effects. RfDs and RfDis, which are expressed in units of milligrams per kilogram per day (mg/kg-day), are estimates of daily exposure levels for humans thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical vapor inhaled) are compared with the RfD or RfDi to derive the hazard quotient for the contaminant in the particular medium. The HI is derived by adding the hazard quotients for all compounds within a particular medium that impact a particular receptor population.

An HI greater than 1 indicates that the potential exists for noncarcinogenic health effects to occur because of Site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The toxicity values, including reference doses and inhalation reference doses for the contaminants of potential concern at the Site, are presented in Table2.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) and inhalation cancer slope factors (SFis) have been developed for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs and SFis, which are expressed in units of $(mg/kg-day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF or SFi. Use of this approach makes the underestimation of the risk highly unlikely. The SF and SFi values used in this risk assessment are presented in Table 3.

Risk Characterization

The quantitative hazard and risk calculations were based on reasonable maximum exposure scenarios. These estimates were developed by taking into account various conservative assumptions about the likelihood of a person being exposed to contaminated media at the site. Risk characterization involves integrating the exposure and toxicity assessments into quantitative expressions of carcinogenic risks and noncarcinogenic health effects. Specifically, chronic daily intakes were compared with concentrations known or suspected to present carcinogenic risks or noncarcinogenic health hazards.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks of between 10^{-4} to 10^{-6} to be acceptable. This range indicates that an individual has no more than approximately a one in ten thousand to one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at a site. The New Jersey Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-1, et. seq., has set the acceptable cancer risk for human carcinogens at 1 x 10^{-6} (one-in-one-million). The noncarcinogenic HIs are presented in Table 4. Excess lifetime cancer risks estimated at the site are presented in Table 5.

Lead was not quantitatively evaluated for the potential receptors at the Ventron/Velsicol site due to lack of toxicity values for this compound. It is, nonetheless, a chemical of concern for the site due to its widespread presence in the surface soil in the developed portion of the site, with a mean concentration of 2,110 ppm, and in the surface soil in the undeveloped area, with a mean

concentration of 2,096 ppm. Both of these values exceed EPA health-based screening levels of 400 ppm for children and 800 ppm for adults. Therefore, exposure to site soils by these receptors may result in adverse health effects.

At the Ventron/Velsicol site, the quantitative excess lifetime cancer risk and noncarcinogenic HIs are as follows:

Developed Area

Future Long-term Workers: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of contaminants from surface soil; and inhalation of VOCs in indoor air from vapor intrusion from subsurface contamination. The calculated HI is 5.2, with exposure to mercury in the surface soil contributing most significantly to the hazard. The incremental lifetime cancer risk is within the acceptable risk range.

Future Construction Workers: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from subsurface soil. The calculated HI is 7.8, with exposure to mercury in the soil contributing most significantly to the hazard. The incremental lifetime cancer risk is within the acceptable risk range.

Undeveloped Area

Current/Future Adult Trespassers/Visitors: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from surface soil and sediments. The calculated HI is 3.8, with exposure to mercury in the soil contributing most significantly to the hazard. The incremental lifetime cancer risk is within the acceptable risk range.

When the mercury hot spot in the undeveloped area is included in the assessment, the calculated HI is 17, and exposure to the mercury hot spot drives the risk.

Current/Future Adolescent/Pre-Adolescent Trespassers/Visitors: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from surface soil. The calculated HI is 5.3, with exposure to mercury in the soil contributing most significantly to the hazard. The incremental lifetime cancer risk is within the acceptable risk range.

When the mercury hot spot in the undeveloped area is included in the assessment, the calculated HI is 25, and exposure to the mercury hot spot drives the risk.

Future Long-term Workers: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of contaminants from surface soil; and inhalation of VOCs in indoor air from vapor intrusion from subsurface contamination. The calculated HI is 9.6, with exposure to naphthalene in indoor air from the subsurface soil contributing most significantly to the hazard. The incremental lifetime cancer risk is within the acceptable risk range.

When the mercury hot spot in the undeveloped area is included in the assessment, the calculated HI is 23, and exposure to the mercury hot spot, along with the naphthalene in the subsurface soil,

drives the risk.

Future Construction Workers: Risks and hazards were evaluated for incidental ingestion of, dermal contact with, and inhalation of particulates released from subsurface soil. The calculated HI is 2.8, with exposure to mercury in the soil contributing most significantly to the hazard. The incremental lifetime cancer risk is within the acceptable risk range.

Ground water

Future Adult and Child Residents: Risks and hazards were evaluated for ingestion of ground water, dermal contact with ground water, and inhalation of VOCs while showering with ground water. The estimated cancer risks are 4×10^{-4} (adult) and 2×10^{-4} (child); benzene and arsenic in the ground water are the most significant contributors to the cancer risk. The calculated HIs are 23 (adult) and 75(child), with mercury, benzene, and naphthalene as the most significant contributors to the hazard.

Summary

For these receptors, exposure to contaminants results in either an excess lifetime cancer risk that exceeds EPA's target risk range of 10^{-4} to 10^{-6} or an HI above the acceptable level of 1, or both, indicating that there is significant potential risk to populations from direct exposure to soil. Additionally, the average concentration of lead in soil exceeds the health-based screening value for both the adult and the child, indicating the potential for adverse health effects.

Discussion of Uncertainties in Risk Assessment

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Fate and transport modeling is also associated with a certain level of uncertainty. Factors such as the concentrations in the primary medium, rates of transport, ease of transport, and environmental fate all contribute to the inherent uncertainty in fate and transport modeling.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the

chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, and from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the site, and is highly unlikely to underestimate actual risks related to the site.

More specific information concerning public health and environmental risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the risk assessment report.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in the ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

Ecological Risk Assessment (ERA)

A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: *Problem Formulation* - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. *Exposure Assessment* - a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. *Ecological Effects Assessment* - literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. *Risk Characterization* - measurement or estimation of both current and future adverse effects.

The comparison of contaminant concentrations in ground water, surface water, sediment and on-site surface soils against NJDEP-accepted screening values represents the preliminary screening level problem formulation. This comparison showed contaminants exist in ground water, surface water, sediment and on-site surface soils above the screening values.

The primary contaminant of concern is mercury; however, chromium, lead, and zinc are also contaminants of concern. Potential risks to benthic macroinvertebrates are likely. Moreover, aquatic dependent wildlife (e.g., piscivorous birds) may be affected through biomagnification of mercury.

The Screening Level Ecological Risk Assessment indicated that the various media at the site posed potential ecological risk. Rather than proceed to a Baseline Ecological Risk Assessment, it was decided that potential ecological risks would be addressed as part of the remedy. The response action selected in the ROD will minimize ecological risk by limiting the exposure of ecological receptors to site contaminants. The removal of soil within a 55' buffer of the waterbodies, and capping the non-developed and developed portions of the site will prevent exposures within the upland portion of the site. In addition, monitoring will be conducted to

ensure that the remedy is protective and that contamination is not being transported via groundwater to surface water or sediment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), NJDEP's Ground Water Remediation Standards (GWRS), and the Federal Maximum Contaminant Levels (MCLs).

The following remedial action objectives for contaminated ground water and soil address the risks to human health and the environment at the Ventron/Velsicol site.

Remedial Action Objectives for Ground Water

The remedial action objectives for ground water are to:

- Prevent/minimize the potential downgradient and off-site migration of contaminated ground water to the marsh area and Berry's Creek;

- Reduce human and ecological receptor's potential exposure to contaminants in ground water to within acceptable risk levels.

There are currently no complete exposure pathways to contaminated ground water beneath the Ventron/Velsicol site because there are no known contaminated wells in use. All residents in the area of the Ventron/Velsicol site are currently on city-supplied water. If contaminated ground water were to be used as a drinking water source in the future, significant health risks would exist. All ground water alternatives, except for the no action alternative, include development of a Classification Exception Area and a Well Restriction Area.

NJDEP has identified remediation goals for the ground water at the Ventron/Velsicol site as the drinking water standards or the New Jersey Ground Water Remediation Standards. The most conservative of the two standards would be used as the remediation goal. Table 6 lists the contaminants of concern found in the ground water at the site, and their respective Cleanup Goals. The remediation goals listed in this table are chemical-specific ARARs for the Site.

Remedial Action Objectives for Soil

The remedial action objectives for soil are to:

- Prevent/minimize potential migration of contaminants in surface soil via windblown dust and surface runoff to the marsh area and Berry's Creek;

- Prevent/minimize potential migration of contaminants to ground water, which may discharge to surface water and sediment;

- Prevent/minimize potential migration of contaminants in on-site sediments via surface runoff to the marsh area and Berry's Creek;

- Reduce human and ecological receptor's potential exposure to contaminants in surface soil to within acceptable risk levels;

- Reduce exposure to contaminants in soil in the undeveloped area to allow for reasonable anticipated future land use.

The remediation goals for soil are the New Jersey Soil Cleanup Criteria. A summary of these criteria can be found in Table 7. The remediation goals listed on this table are chemical-specific ARARs for the Site.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621 (b)(1) mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances, pollutants and contaminants at a Site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d) (4), 42 U.S.C. §9621 (d)(4).

Based on the information contained in the RI and FS Reports, the Human Health Risk Assessment, and the Ecological Risk Assessment, the Proposed Plan evaluated, in detail, six remedial alternatives for ground water at the Site and seven remedial alternatives for soil at the Site.

Ground Water Remedial Alternatives

Common Elements

Except for Alternative G1, all the alternatives require water use restrictions, development of a Classification Exception Area (CEA) and a Well Restriction Area (WRA), and establishment of a long-term ground water monitoring program to ensure the protectiveness of the remedy.

Ground Water Alternative 1 (G1) No Further Action

Estimated Capital Costs:	$	0
Annual O&M Costs:	$	0
Total Present Worth Cost:	$	0

Estimated Construction Time Frame: 0 months

Regulations governing the Superfund program generally require that the "no action" alternative be evaluated to establish a baseline for comparison with other, active alternatives. Under this alternative, no further action would be taken at the site to prevent exposure to ground water contamination. The ground water contamination would not be treated or contained. Ground water contaminant concentrations would not meet the remediation goals within a reasonable time frame.

Ground Water Alternative 2 (G2) *Monitored Natural Attenuation and Institutional Controls*

Estimated Capital Costs:	$ 25,000
Annual O&M Costs	
Years 0-2:	$ 95,000
Years 2-50:	$ 24,000
Total Present Worth Cost:	$ 480,000
Estimated Construction Time Frame:	0 months

The objective of Alternative G2 is to rely on natural attenuation to reduce concentrations within the ground water plume to below the Ground Water Remediation Standards, while placing use restrictions on the area of ground water exceeding the Ground Water Remediation Standards. The use restrictions will consist of a Classification Exception Area (CEA) and a well restriction area (WRA) that will restrict the use of ground water within the designated area.

Ground water monitoring will also be required as a part of this alternative to verify that natural attenuation is occurring and that the concentrations of contaminants at perimeter wells continue to be below the Ground Water Remediation Standards.

Ground Water Alternative 3 (G3) Hydraulic Controls via Pumping

Total Capital Costs:	$1,020,000
Annual O&M Costs	
Years 0-2:	$ 251,200
Years 3-50:	$ 179,800
Total Present Worth Cost:	$3,630,000
Estimated Construction Time Frame:	6 months

In this alternative, ground water will be intercepted before entering Berry's Creek using a series of extraction wells and the extracted ground water will be discharged to the Publicly Owned Treatment Works (POTW). The system will pump at a relatively low flow rate, and will be used primarily as a protective measure for downgradient ground water quality rather than active contaminant removal. The ground water will not require significant treatment, if any, prior to discharge to the POTW, however if necessary, the levels of mercury, benzene, and arsenic in the ground water will be treated via filtration. The treatment will consist of two granulated activated carbon (GAC) units as well as a series of green sand filters to remove solids.

Ground Water Alternative 4 (G4) Ground Water Pump and Treat

Total Capital Costs:	$ 2,300,000
Annual O&M Costs:	$ 740;000
Total Present Worth Cost:	$10,910,000
Estimated Construction Time Frame:	8 months

The objective of this alternative is to aggressively remediate the ground water by active removal of the contaminated ground water for ex-situ treatment and ultimate discharge. This alternative consists of a series of wells, both within the developed and undeveloped areas, which will extract contaminated ground water. After the ground water is extracted, it will be treated via filtration and ion exchange before being discharged to the POTW.

Ground water will be monitored upgradient, within, and downgradient of the plume during operation of the treatment system to verify the effectiveness of the system.

Ground Water Alternative 5 (G5) Vertical Hydraulic Barrier

Total Capital Costs:	$1,360,000
Annual O&M Costs	
Years 0-2:	$ 95,000
Years 2-50:	$ 24,000
Total Present Worth Cost:	$1,820,000
Estimated Construction Time Frame:	1.5 months

The objective of this alternative is containment through the installation of a vertical hydraulic barrier around the mercury-contaminated soils located beneath the Wolf Warehouse. The vertical hydraulic barrier will serve as a physical barrier to ground water flow. The wall will be keyed 2 feet into the confining layer underlying the site at a depth of approximately 20 feet. The approximate length of the vertical hydraulic barrier is 1,300 feet, however the exact location and size will be determined during design. The asphalt parking area and the flooring of the Wolf Warehouse will limit the amount of infiltration into the area encompassed by the vertical hydraulic barrier, effectively serving as a cap of the area. It is anticipated that water levels within the vertical hydraulic barrier will stagnate, therefore it is expected that no hydraulic controls will be needed. However if it is determined that hydraulic controls are needed, those controls will be implemented. An example of a hydraulic control is pumping wells within the vertical hydraulic barrier.

Ground Water Alternative 6 (G6) Vertical Hydraulic Barrier Around Site Perimeter

Total Capital Cost:	$ 4,230,000
Annual O&M Cost	
Years 0-2:	$ 237,000
Years 3-50:	$ 166,000
Total Present Worth Cost:	$ 6,650,000
Estimated Construction Time Frame:	9 months

This alternative consists of surrounding the entire site (developed and undeveloped areas) with a low permeability hydraulic barrier to protect Berry's Creek and contain ground water contamination within the site limits. It is assumed that the barrier will be keyed 2 feet into the confining layer at a depth of approximately 20 feet and the approximate length of the barrier will be 5,400 feet.

Hydraulic controls will be necessary inside the barrier to remove infiltration and minimize mounding of ground water. The hydraulic controls will be implemented as described in Alternative G3, with the exact number of extraction wells to be determined during design. The ground water extracted will be discharged to the POTW but may have to be treated prior to discharge as described in Alternative G3. The volume of water will be less than that of Alternative G3 since the hydraulic barrier will limit horizontal migration of ground water into the footprint of the barrier.

Soil Remedial Alternatives

Soil Alternative 1 (S1) No Further Action

Under this alternative, there would be no additional remedial actions conducted at the site to control or remove the contaminants in the soil.

Total Capital Cost:	$ 0
Annual O&M Cost:	$ 0
Total Present Worth Cost:	$ 0
Estimated Construction Timeframe:	0 months

Soil Alternative 2 (S2) Capping and Institutional Controls and Limited Excavation to RDCSCC

Total Capital Cost:	$5,610,000
Annual O&M Cost:	$ 35,000
Total Present Worth Cost:	$6,090,000
Estimated Construction Timeframe:	6 months

This alternative consists of the following: excavation of the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and West Ditch; excavation of the buried drain line in the undeveloped area (if it exists); excavation and capping of the West Ditch; excavation of site-related contaminants on the Lin-Mor Property to the Residential Direct Contact Soil Cleanup Criteria (RDCSCC); air monitoring for mercury in the Wolf Warehouse; capping all areas with soil contaminant levels that exceed the Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) (either maintenance of existing caps or placement of new caps); and placement of deed notices on those properties with soil contaminant levels that exceed the RDCSCC.

Soil within a 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and the West Ditch will be excavated and certified clean fill will be placed in the excavation. This will address soil contamination in the area without installing a cap, which will

allow for a transitional vegetated habitat between the upland cap and aquatic environment. The cap in the undeveloped fill area will cover a 5-foot portion of the buffer to reduce the potential for exposure of contaminants to animals that may burrow under the edge of the cap. The excavated material may be placed under the cap in the undeveloped area, unless mercury concentrations exceed 620 mg/kg, in which case the soil will be treated, if necessary, and disposed of off-site.

According to historical information, a buried drain line was located on the site, running from the developed area to Berry's Creek. During the investigation, the drain line could not be located, however further attempts will be made to locate the drain line, and if it is found, it will be removed.

Since the owners of the Lin-Mor property did not consent to placing a deed notice on their property, the areas of the Lin-Mor property that have been impacted with site-related contaminants will be excavated as necessary to meet the RDCSCC. The excavated material may be placed in the undeveloped fill area to be capped.

Institutional controls in the form of deed notices will be placed on all properties with contaminant levels in soil that exceed the RDCSCC, specifically the Blum, Prince Packing, Wolf Warehouse, U.S. Life Warehouse, EJB, Borough of Wood-Ridge (Ethel Boulevard), Norfolk Southern (railroad property), and the undeveloped fill area properties. The deed notices will include a summary of the contamination that remains on the property, a description of engineering controls (i.e., caps) on each property, the locations of the engineering controls, and the monitoring and maintenance requirements. Biennial certifications will be submitted while the engineering and institutional controls remain in place including inspections to verify the integrity of the engineering controls and to verify the engineering controls are still protective of human health and the environment.

Indoor air samples for mercury will be collected in the Wolf Warehouse during the summer and winter seasons for the first year, and then biennially thereafter. If NJDEP and/or EPA determine that additional monitoring or remedial actions are required to address indoor air issues, those actions will be implemented.

Capping is required on all areas that exceed the NRDCSCC. The existing caps in portions of the site will remain in place and will be upgraded, as necessary, to promote proper drainage. The existing caps include: building foundations of the U.S. Life Warehouse and the Wolf Warehouse; asphalt caps used for parking and/or streets adjacent to the buildings; the existing street of Ethel Boulevard; and the existing gravel sub-base of the Norfolk Southern railroad property. Upgrades to the asphalt caps will include resurfacing to repair any existing cracks or breaches in the surface.

A single layer cap will be placed over the undeveloped fill area, over the small property between Ethel Boulevard and the railroad (EJB property) and any other area that has soil with contaminant levels exceeding the NRDCSCC and currently is not capped.

Soil Alternative 3 (S3) Excavation of Soil with Mercury Levels over 620 mg/kg in Undeveloped Area, Capping and Institutional Controls, and Limited Excavation to RDCSCC

Total Capital Cost:	$7,930,000
Annual O&M Cost:	$ 35,000
Total Present Worth Cost:	$8,413,000
Estimated Construction Timeframe:	7 months

This alternative consists of the following: excavation of the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and West Ditch; excavation of the buried drain line in the undeveloped area (if it exists); excavation and capping of the West Ditch; excavation of site-related contaminants on the Lin-Mor Property to the RDCSCC; air monitoring for mercury in the Wolf Warehouse; capping all areas with soil contaminant levels that exceed the NRDCSCC (either maintenance of existing caps or placement of new caps); and placement of deed notices on those properties with soil contaminant levels that exceed the RDCSCC. These components of the remedy are described in S2, above. In addition, prior to capping the undeveloped area, soil with concentrations of mercury over 620 mg/kg will be excavated. The areas exceeding 620 mg/kg for mercury were chosen as the target areas since these concentrations are an order of magnitude over 62 mg/kg, a level that EPA considers associated with a hazard index of 1. EPA considers a level 10 times higher (i.e., 620 mg/kg) as a basic guide to define a principal threat waste.

Soil generated during the excavation in the undeveloped fill area with mercury exceeding 620 mg/kg will be treated, if necessary, to meet the Resource Conservation and Recovery Act Land Disposal Requirements, prior to disposal at an offsite landfill. Off-site stabilization was the treatment alternative assumed for cost-estimation purposes, however the treatment will be determined during design.

Soil Alternative 4 (S4) Excavation of All Soil with Mercury Levels over 620 mg/kg; Capping and Institutional Controls, and Limited Excavation to RDCSCC

Total Capital Cost:	$13,550,000
Annual O&M Costs:	$ 37,000
Total Present Worth Cost:	$14,060,000
Estimated Construction Timeframe:	8 months

This alternative consists of the following: excavation of the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and West Ditch; excavation of the buried drain line in the undeveloped area (if it exists); excavation and capping of the West Ditch; excavation of site-related contaminants on the Lin-Mor Property to the RDCSCC; air monitoring for mercury in the Wolf Warehouse; capping all areas with soil contaminant levels that exceed NRDCSCC (either maintenance of existing caps or placement of new caps); and placement of deed notices on those properties with soil contaminant levels that exceed the RDCSCC. These components of the remedy are described in S2, above. In addition, all soil with

levels of mercury above 620 mg/kg will be excavated prior to capping, treated if necessary, and disposed of at an offsite landfill.

Soil Alternative 5 (S5) Excavation of All Soil with Mercury Levels over 620 mg/kg, Capping and Institutional Controls, Excavation of Other Properties to RDCSCC

Total Capital Cost:	$14,140,000
Annual O&M Costs:	$ 37,000
Total Present Worth Cost:	$14,650,000
Estimated Construction Timeframe:	9 months

This alternative consists of the following: excavation of the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and West Ditch; excavation of the buried drain line in the undeveloped area (if it exists); excavation and capping of the West Ditch; excavation of site-related contaminants on the Lin-Mor Property to the RDCSCC; air monitoring for mercury in the Wolf Warehouse; excavation of all soil with mercury levels exceeding 620 mg/kg; capping all areas with soil contaminant levels that exceed the NRDCSCC (either maintenance of existing caps or placement of new caps); and placement of deed notices on those properties with soil with contaminant levels that exceed the RDCSCC. These components of the remedy are described in S2 and S4, above. In addition, the EJB, Blum, Prince Packing, and Borough of Wood-Ridge (Ethel Boulevard) properties will be excavated to meet RDCSCC. The soil excavated from the off-site properties may be placed on the undeveloped portion prior to capping. All other excavated soil will be treated, if necessary, and disposed in an off-site landfill.

The existing gravel sub-base of the Norfolk Southern will be maintained and a deed notice will be placed on that property.

Soil Alternative 6 (S6) Excavation of All Soils with Mercury Levels over 620 mg/kg, Capping and Institutional Controls, Excavation of Undeveloped Area and Other Properties to RDCSCC

Total Capital Cost:	$112,580,000
Annual O&M Costs:	$ 9,000
Total Present Worth Cost:	$112,700,000
Estimated Construction Timeframe:	28 months

This alternative consists of the following: excavation of the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and West Ditch; excavation of the buried drain line in the undeveloped area (if it exists); excavation and capping of the West Ditch; excavation of the Lin-Mor, EJB, Blum, Prince Packing, Borough of Wood-Ridge and Undeveloped Properties to the RDCSCC; excavation of soil with mercury levels above 620 mg/kg in the Developed Area; air monitoring for mercury in the Wolf Warehouse; capping all areas with soil contaminant levels that exceed the NRDCSCC (either maintenance of existing caps or placement of new caps); and placement of deed notices on those properties with soil contaminant levels that exceed the RDCSCC. The existing gravel sub-base of the Norfolk

Southern will be maintained and a deed notice will be placed on that property. All excavated soil will be disposed of off-site, subsequent to any treatment, and the properties will be backfilled with clean, certified fill material.

Soil Alternative 7 (S7) Excavation of Undeveloped, Developed, and Other Properties to RDCSCC, Use Restrictions on the Railroad, Excavation of West Ditch

Total Capital Cost:	$135,300,000
Total O&M Costs:	$ 0
Total Periodic Costs:	$ 0
Total Present Worth Cost:	$135,300,000
Estimated Construction Timeframe:	36 months

This alternative consist of the following: excavation of the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and West Ditch; excavation of the buried drain line in the undeveloped area (if it exists); excavation of the West Ditch; and excavation of the Developed Area, the Undeveloped Area, Lin-Mor, EJB, Blum, Prince Packing, and the Borough of Wood-Ridge properties to the RDCSCC. All excavated soil will be disposed off-site, and the properties will be backfilled with clean, certified fill material.

The existing gravel sub-base of the Norfolk Southern will be maintained and a deed notice will be placed on that property.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, NJDEP considered the factors set out in CERCLA §121, U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 Code of Federal Regulations (CFR) §300.430(e) (9) and Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria must be satisfied by any alternative in order to be eligible for selection:

Threshold Criteria

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with applicable or relevant and appropriate requirements (ARARs)** addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

Primary Balancing Criteria

3. **Long-term effectiveness and permanence** refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4. **Reduction of toxicity, mobility, or volume through treatment** refers to a remedial technology's expected ability to reduce the toxicity, mobility or volume of hazardous substances, pollutants or contaminants at the Site.

5. **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost** includes estimated capital and operation and maintenance costs, and net present worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

Modifying Criteria

8. **EPA acceptance** indicates whether, based on its review of the FS and Proposed Plan, the EPA supports, opposes, and/or has identified any reservations with the selected alternative.

9. **Community acceptance** is assessed based on a review of the public comments received on the technical reports and the Proposed Plan.

GROUND WATER ALTERNATIVES

Overall Protection of Human Health and the Environment

Alternative G1, no further action, is not considered protective of human health and the environment because it does not include ground water monitoring or required institutional controls to prevent use of the ground water. Future exposure to ground water would result in unacceptable risks.

Alternative G2 is considered protective of human health and the environment since institutional controls will restrict ground water use within the impacted area and any migration of contamination in ground water will be monitored. Alternative G3 is protective of human health and the environment since it involves the collection and ex-situ treatment of the downgradient portion of the ground water plume. Alternative G4 is protective of human health and the environment since it will treat ground water in the fastest time by aggressively removing the contaminant mass. Alternative G5 is protective of human health and the environment since it involves encapsulating contaminated ground water, institutional controls and monitoring. Although G5 does not encapsulate all contaminated ground water, it is anticipated that the ground water contamination outside the hydraulic barrier will decrease if this alternative is paired with a soil alternative that includes excavation of contaminated soil. Alternative G6 is protective of human health since it involves encapsulating ground water, hydraulic controls, and institutional controls and monitoring. However, this alternative includes encapsulating ground water that currently is below the Ground Water Remediation Standards. It is possible that the contaminants in ground water may migrate to ground water that is currently uncontaminated, but within the boundaries of the wall.

Compliance with ARARs

Alternative G1 does not include treatment, containment, or institutional controls therefore ARARs will not be met. Alternatives G2, G3, G4, G5 and G6 will meet all ARARs.

Long-Term Effectiveness and Permanence

All ground water alternatives (with the exception of G1) are effective in the long-term, since ground water use restrictions are placed on the impacted ground water until the concentrations of contaminants are below the Ground Water Remediation Standards. The long-term effectiveness of the ground water collection and treatment alternatives (G3 and G4) is ranked higher than the other three ground water alternatives because these involve reduction in mercury, arsenic and benzene concentrations in ground water. Alternative G4 ranks higher than Alternative G3 (the two pumping alternatives) in long-term effectiveness, since G4 removes a larger mass of mercury. The remaining three alternatives (G2, G5 and G6) are similar in their long-term effectiveness, since these alternatives rely on long-term containment of the impacted ground water. However, because of decreasing effectiveness of pump and treat systems over time, Alternatives G3 and G4 may leave residuals in ground water.

Reduction of Toxicity, Mobility, and Volume

Alternatives G3, G4 and G6 are the only alternatives that reduce toxicity, mobility and volume through treatment since they remove and treat mercury-impacted ground water through extraction and ex-situ treatment before disposal. Alternative G2 is not effective at reducing the potential for contaminants such as mercury and arsenic to migrate off-site. Alternatives G1, G2, and G5 do not reduce the toxicity, mobility and volume through treatment. Conversely, residuals remaining from GAC treatment (G3 and G6) and after ion exchange treatment in G4 will need to be disposed of after use.

Short-Term Effectiveness

Alternative G2 has minimal negative impacts with respect to the protection of workers during implementation, protection of community during remedial action, and environmental impacts of remedial action. The primary short-term risks are associated with proper worker protection during the collection of ground water samples to monitor compliance with the CEA. Alternatives G3 and G4, the two pumping alternatives, have slightly greater impacts to workers during construction than G2 since these alternatives involve the installation of extraction wells for pumping and treatment. Alternatives G5 and G6 have the largest short-term risks to workers, the community, and the environment, due to potential contact with impacted soil (wind blown dusts and/or impacts to surface water via storm water incidents) during installation of vertical hydraulic barrier and the additional safety considerations that must be followed for stabilization of the excavation. These risks are greater for Alternative G6 than G5 since the barrier in G6 is larger and hydraulic controls (i.e., pumping wells) also need to be installed.

The short-term effectiveness with respect to the time until the Ground Water Remediation Standards are achieved would be the shortest for G3 and G4 since these alternatives would reduce the concentrations of mercury, arsenic and benzene in ground water.

Implementability

All of the ground water alternatives can be implemented at the site. There are technical challenges with Alternatives G5 and G6 with the installation of the vertical hydraulic barrier adjacent to operating warehouses.

Cost

The total cost is a sum of the capital (construction) cost in addition to the present worth of the periodic costs and operation and maintenance of the alternative over time. Present worth is based on a discount rate of seven percent and a 30-year period. The present worth cost for the alternatives are as follows, from most expensive to least: Alternative G4, Ground Water Pump and Treat ($10,910,000); Alternative G6, Vertical Hydraulic Barrier Around Site Perimeter ($6,650,000); Alternative G3, Hydraulic Controls via Pumping ($3,630,000); Alternative G5, Vertical Hydraulic Barrier ($1,820,000); Alternative G2, Institutional Controls ($480,000); and Alternative G1, No Further Action (no cost).

SOIL ALTERNATIVES

Overall Protection of Human Health and the Environment

The no further action soil alternative (S1) is not protective of human health and/or the environment because it does not eliminate potential migration, either through infiltration control or airborne emission control, and does not eliminate potential direct contact exposure routes to impacted soil. Soil alternatives S2 through S7 are all considered protective of human health and the environment since they would eliminate potential direct contact to impacted soil, eliminate

potential migration of impacted soil, and include locating and removing the drain line in the undeveloped area, thereby eliminating a potential migration pathway from the developed area to Berry's Creek. Furthermore, soils with concentrations that exceed ecological benchmarks do not remain available to ecological receptors after the remedial alternatives have been conducted because each alternative (except S1, No Action) includes capping or removal.

Soil alternative S2 relies primarily on a cap, which is protective since it will prevent migration and will eliminate exposure. Alternative S3 is more protective than S2 since some contaminated soil will be removed in the undeveloped area prior to capping. Alternative S4 is more protective than S2 and S3 since some contaminated soil will be removed in the developed and undeveloped areas. Alternative S5 includes excavation of all contaminated soil over 620 mg/kg in the developed and undeveloped areas and excavation of soil exceeding the RDCSCC on the off-site properties, so that is more protective than S2, S3 and S5. Alternative S6 is more protective of human health and the environment since all contaminated soil exceeding the RDCSCC will be removed in the undeveloped areas and on the off-site properties. Alternative S7 is the most protective since all soil exceeding the RDCSCC will be removed on the developed, undeveloped and off-site properties.

Compliance With ARARs

All soil alternatives other than no further action, S1, are expected to comply with ARARs. Soil alternatives that include restricted use through engineering and institutional controls (S2, S3, S4, S5 and S6) would comply with ARARs through restrictions on deeds and long-term monitoring of the integrity of any engineering controls.

Long-Term Effectiveness and Permanence

The active treatment or removal alternatives, such as alternatives S5, S6 and S7, are generally more effective in the long term over passive alternatives such as alternative S2, which will leave behind capped contaminated soil. Alternatives S3 and S4 would be slightly more effective than alternative S2, however residual risks would continue with both of these alternatives since a majority of the contaminant mass would remain under a cap. S7 is the most effective in the long term since all of the impacted soil is removed from the site. Alternatives S6, S5, S4, S3, and S2 follow in effectiveness, respectively, since soil is removed with alternatives S6, S5, S4, and S3, while alternative S2 does not include any soil removal.

Reduction of Toxicity, Mobility, and Volume

Alternatives S1 and S2 do not reduce the volume or toxicity of contaminants through treatment however, S2 will reduce mobility via capping. Alternative S3 removes and treats approximately 2,100 cubic yards of impacted soil in the undeveloped area. Alternative S4 removes and treats approximately 7,150 cubic yards of impacted soil in both the developed and undeveloped areas. Alternative S5 removes approximately 14,000 cubic yards of soil for off-site disposal. Alternative S6 removes approximately 130,000 cubic yards of soil. Alternative S7 removes approximately 157,500 cubic yards of soil. Alternative S7, with respect to reduction of toxicity,

mobility, and volume through treatment, is rated the highest since 160,000 cubic yards of soil will be disposed of off-site.

Short-Term Effectiveness

Alternative S2 is most effective in the short term to workers and residents since there will be no fugitive dust emissions or increased truck traffic. Alternatives S3, S4, S5, S6, and S7 (stated in increasing order of potential impacts) have the potential for adverse impacts to both workers and the community during construction related to fugitive dust emissions and truck traffic hauling impacted soil. Alternatives S6 and S7 would require the closure of and/or restriction of traffic on Ethel Boulevard for a period of several months, including restrictions to the businesses located on Ethel Boulevard. Alternatives S2, S3, and S4 would take the shortest time to implement, ranging from 4 to 6 months, so short-term impacts would be minimal. Alternative S5 would take nearly 8 months to complete, S6 would take nearly 2.5 years to complete, and S7 would take over 3 years to complete, thereby increasing short-term impacts.

Implementability

Alternative S2 is the easiest to implement since all soil will remain in place and be capped. Alternative S3 is the next easiest to implement since the area of excavation is relatively small (approximately 2,800 cubic yards; 2,100 cubic yards from the undeveloped area and 700 cubic yards from Lin-Mor) and not within an area that is currently developed. Alternative S4 is somewhat more difficult to implement because the volume of soil to be excavated increases to approximately 7,150 cubic yards, and some of the excavation areas are in the developed area. Alternative S5 requires the additional excavation and transfer of impacted soil above the RDCSCC from the EJB, Blum, Prince Packing, and Borough of Wood-Ridge properties to the undeveloped fill area. The implementation of S6 is difficult because of the volume of soil that must be handled, staged, and trucked off-site for disposal which would take nearly two years due to weekly capacity limitations at the disposal facility. Alternative S7 is the most difficult to implement since it involves excavation at the U.S. Life and Wolf warehouses, both operating facilities. It would require demolition of those buildings and their foundations followed by removal of over 160,000 cubic yards of soil. It would take over 3 years to implement Alternative S7.

Cost

The total cost is a sum of the capital (construction) cost in addition to the present worth of the periodic costs and operation and maintenance of the alternative over time. Present worth is based on a discount rate of seven percent and a 30-year period. The present worth cost for the alternatives are as follows, from most expensive to least: Alternative S7, total excavation and off-site disposal ($135,300,000); Alternative S6, undeveloped area and off-site properties excavation to RDCSCC, limited excavation of developed area, cap, and institutional controls ($112,700,000); Alternative S5, excavation of all soil with levels above 620 mg/kg mercury, cap and institutional controls, and excavation of off-site properties to RDCSCC ($14,650,000); Alternative S4, excavation of all soil with levels above 620 mg/kg, cap and institutional controls ($14,060,000); Alternative S3, excavation of soil with levels of mercury above 620 mg/kg in the

undeveloped area, cap and institutional controls ($8,413,000); Alternative S2, cap and institutional controls for all properties ($6,090,000) and Alternative S1, no further action (no cost).

USEPA Acceptance

The USEPA concurs with the selected remedy. USEPA's concurrence letter is attached (Appendix II).

Community Acceptance

Community acceptance of the preferred alternative presented by the Proposed Plan was assessed during the public comment period. Based on the comments received, the community accepts this approach. The attached Responsiveness Summary (Appendix III) addresses all verbal comments received at the public meeting. No written comments were received.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Soil with mercury contamination exceeding 620 mg/kg is considered a principal threat waste at the Ventron/Velsicol Site because soil exceeding this level may be a continual source to ground water contamination. Alternative S4 addresses this principal threat through excavation and off-site disposal of soil exceeding 620 mg/kg mercury.

SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, and the detailed analysis of alternatives, and public comments, the NJDEP and EPA have determined that alternative G5 is the appropriate remedy for ground water and S4 is the appropriate remedy for soil because they best satisfy the requirements of CERCLA §121, 42 U.S.C. §9621, and the NCP's nine evaluation criteria for remedial alternatives, 40 CFR §300.430 (e) (9).

This alternative consists of the following:

Ground Water Component:

A vertical hydraulic barrier system will be installed to serve as a physical barrier to ground water flow and to encapsulate the areas of highest mercury concentrations under the Wolf Warehouse. The hydraulic barrier will be keyed approximately 2 feet into the confining layer underlying the site at a depth of approximately 20 feet. Figure 2 identifies the location of the proposed hydraulic barrier.

Soil generated from the installation of the hydraulic barrier (approximately 1,650 cubic yards) will be placed under the cap in the undeveloped area.

Ground water use restrictions will be placed on the extent of the ground water contamination plume in the form of a Classification Exception Area and a Well Restriction Area to restrict the use of contaminated ground water.

Ground water monitoring will be conducted to determine if hydraulic controls within the barrier are required. If required, hydraulic controls will be implemented. Ground water monitoring will also be conducted to ensure the hydraulic barrier is effective. The monitoring requirements will be determined during design.

Soil Component

The soil component of the remedy includes excavation of all mercury-contaminated soil with levels above 620 mg/kg, excavation of site-related contaminants to the RDCSCC on the Lin-Mor property, capping and institutional controls. This alternative consists of the following:

- Excavation of all mercury-contaminated soil above 620 mg/kg (approximately 7,150 cubic yards of soil) and off-site disposal of that soil, subsequent to any necessary treatment.

- Excavation of site-related contaminants on the Lin-Mor property to the RDCSCC. If the property owners of Lin-Mor agree to the placement of a deed notice, then excavation to the RDCSCC will not be required; however, a deed notice will be required.

- Capping areas and/or maintenance of the existing caps (i.e., parking lots and building foundations) with contamination in soil above the NRDCSCC.

- Soil within the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and the West Ditch will be excavated and that soil may be placed under the cap in the undeveloped area. Certified clean fill will be placed in the buffer areas and native vegetation and erosion controls will be installed.

- Soil will be excavated from West Ditch to promote proper drainage and remove contaminated soil. Specific details of the excavation depth, liner design and installation (if necessary), depth of certified clean fill placed into the ditch, and soil management will be determined during the design phase of the project.

- The drain line within the undeveloped area will be located and removed (if it exists) before installation of the cap.

- Deed notices will be required on all properties with contaminated soil exceeding the NJDEP Residential Direct Contact Soil Cleanup Criteria. If a deed notice(s) cannot be negotiated with a property owner(s), then all soil contamination above NJDEP Residential Direct Contact Soil Cleanup Criteria must be removed on that particular property or properties.

- To ensure the remedy is protective of surface water, monitoring of contaminant flux from ground water to surface water and sediment will occur.

The excavation in the undeveloped area is estimated to be a depth of four feet, however additional delineation will be conducted prior to excavation or post-excavation samples will be taken to ensure the impacted soils have been removed. Based on the four-foot depth, it is estimated that 2,100 cubic yards will be excavated.

Treatment may be required under the Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions. The method of treatment will be determined during design and will occur prior to disposal at an off-site landfill.

STATUTORY DETERMINATIONS

As previously noted, CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121 (b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances, pollutants, or contaminants at a Site. CERCLA §121(d), 42 U.S.C. §9621 (d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4). For the reasons discussed below, NJDEP has determined that the selected remedy at the Ventron/Velsicol Site meets the requirements of CERCLA §121, 42 U.S.C. §9621.

Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The National Contingency Plan, Section 300.430(f)(ii)(B) requires that the selected remedy attain Federal and State ARARs. The remedy will comply with the following action-, chemical- and location-specific ARARs identified for the Site and will be demonstrated through monitoring, as appropriate.

Action-Specific ARARs:

- N.J.A.C. 7:26E - Technical Requirements for Site Remediation
- P.L. 1997 c. 39 - Brownfield and Contaminated Site Remediation Act
- 40 CFR 6301 (c) - National Historic Preservation Act

Chemical-Specific ARARs/TBCs

- 40 CFR Part 141 – Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs)
- N.J.A.C. 7:26E-1.13(b) - Ground Water Remediation Standards
- NJDEP Soil Cleanup Criteria

Location-Specific ARARs:

- 40 CFR Part 6, Appendix A
- E.O. 11988, "Floodplain Management"
- E.O. 11990, "Protection of Wetlands"
- EPA's 1985 "Statement of Policy on Floodplains/Wetlands Assessments for CERCLA Actions"
- Coastal Zone Management Act
- N.J.A.C. 7:7A – New Jersey Freshwater Wetlands Protection Act

Cost Effectiveness

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital costs and annual costs have been estimated and used to develop the total cost. The cost effectiveness of an alternative is determined by weighing the cost against the alternative's ability to achieve ARARs

and remedial action objectives. The selected remedy for the Site, Alternatives G5 and S4, will achieve the goals of the response actions and is cost-effective because it will provide the best overall effectiveness in proportion to its costs.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy meets the statutory requirement to utilize permanent solutions and treatment technologies to the maximum extent practicable.

Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for remedies that employ treatment as a principal element.

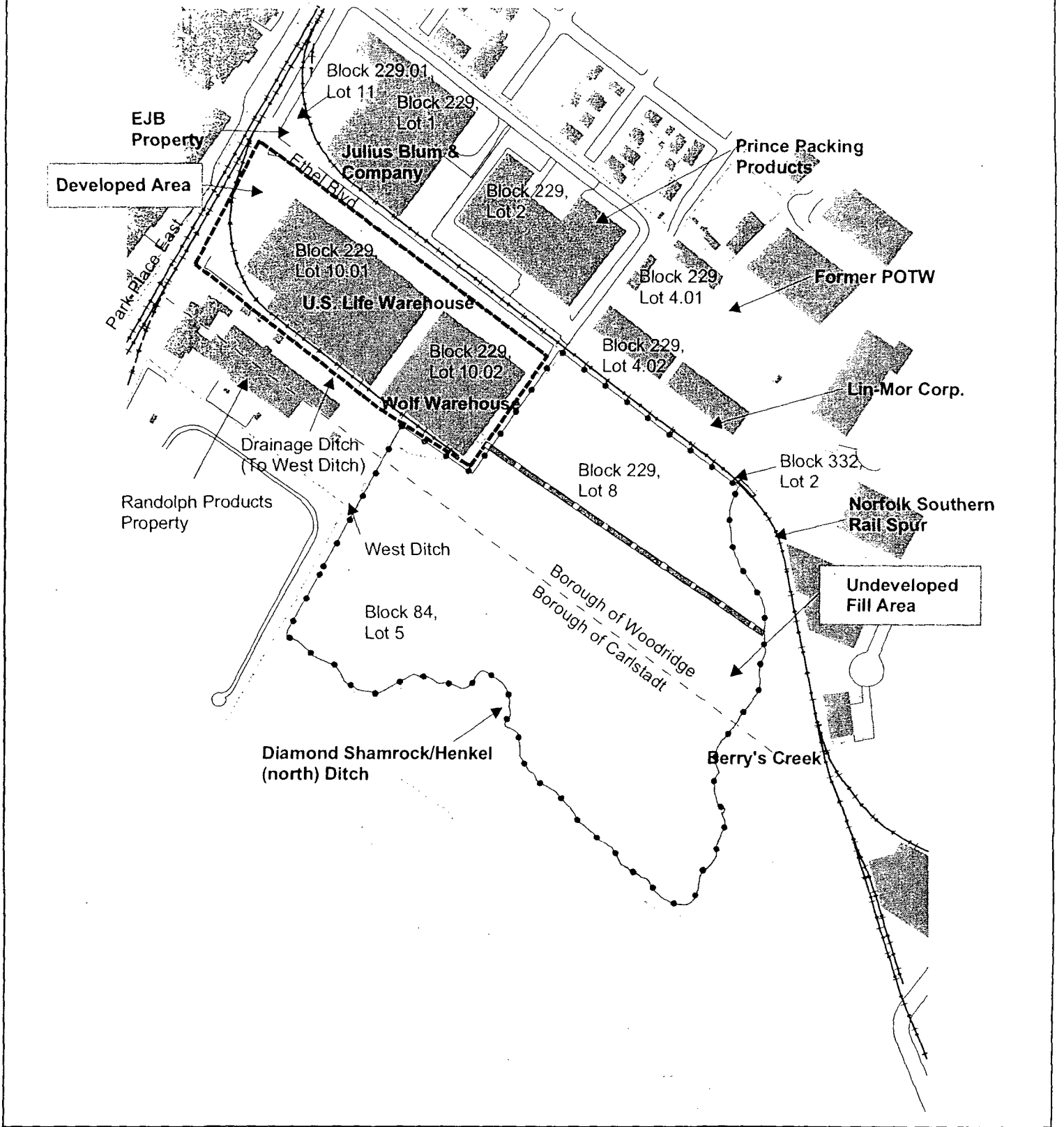
Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted at five-year intervals starting after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Ventron/Velsicol site was released for public comment in August 2006. The Proposed Plan identified Alternative G5, Vertical Hydraulic Barrier and Alternative S4, Excavation of All Soil with Mercury Levels over 620 mg/kg; Capping and Institutional Controls, and Limited Excavation to Residential Direct Contact Soil Cleanup Criteria as the Preferred Alternative for the site. NJDEP reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

FIGURES



Legend

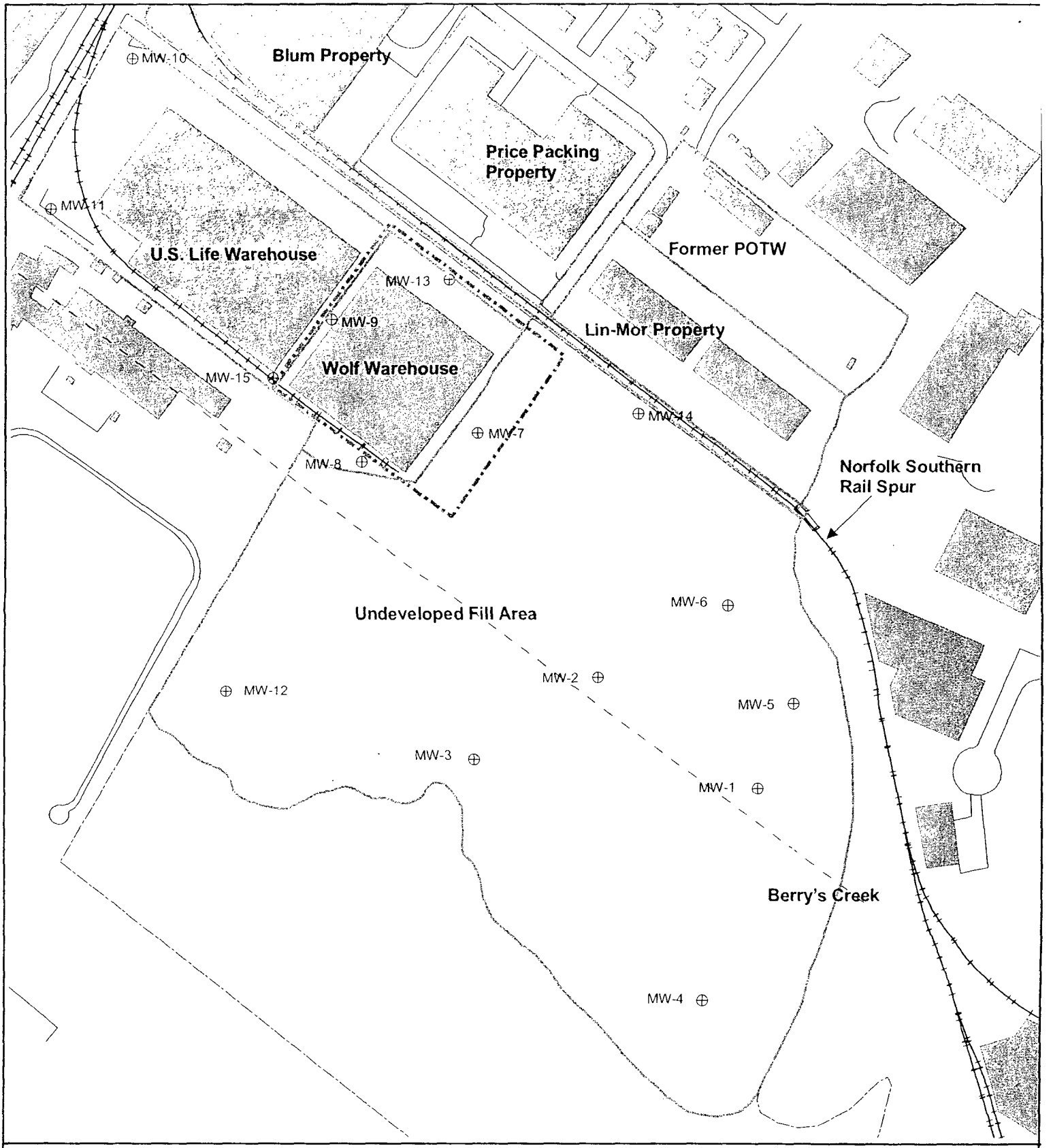
Streams
Roads
Railroad
Fence
Borough Boundary
OU1 FS Boundary--Undeveloped Area
OU1 FS Boundary--Developed Area
Approximate Location of Historical Discharge Pipe

N

0 165 330 Feet

Figure 1
Site Map
Operable Unit 1
Ventron/Velsicol Superfund Site
June 16, 2006

CH2MHILL



Legend

- Property Boundary
- Borough Boundary
- Streams
- Monitoring Wells
- Roads
- Vertical Hydraulic Barrier Alignment
- Railroad
- Existing Buildings
- Site Boundary

N

0 75 150 300 Feet

Figure 2
Groundwater Alternative G5 - Vertical Hydraulic Barrier
Ventron/Velsicol Superfund Site
OU 1 Feasibility Study
April 06, 2006

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TABLES

TABLE 1

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	EPC Units	Statistical Measure
		Min	Max					
Developed Area Surface Soil	Mercury	9.3	310	mg/kg	3/3	310	mg/kg	Max

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	EPC Units	Statistical Measure
		Min	Max					
Developed Area Surface Soil	Mercury	9.3	2300	mg/kg	15/15	1300	mg/kg	UCL-P

The hot spot of mercury detected in the Developed Area Surface Soil is 13800 mg/kg. As discussed, risk and hazard associated with exposure to the hot spot was estimated separately and is presented in Table 4.

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	EPC Units	Statistical Measure
		Min	Max					
Developed Area Subsurface Soil	Mercury	0.42	5150	mg/kg	35/35	2900	mg/kg	UCL-N

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	EPC Units	Statistical Measure
		Min	Max					
Undeveloped Area Surface Soil	Mercury	0.331	5900	mg/kg	40/40	1800	mg/kg	UCL-P
	Naphthalene	0.062	120	mg/kg	7/27	49	mg/kg	UCL-N

The hot spot of mercury detected in the Undeveloped Area Surface Soil is 295000 mg/kg. As discussed, risk and hazard associated with exposure to the hot spot was estimated separately and is presented in Table 4.

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	EPC Units	Statistical Measure
		Min	Max					
Undeveloped Area Subsurface Soil	Mercury	0.15	34700	mg/kg	103/104	730	mg/kg	ULC-P
	Naphthalene	0.009	22	mg//kg	14/42	6000	mg/kg	UCL-N

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	EPC Units	Statistical Measure
		Min	Max					
Undeveloped Area Surface Sediment	Mercury	18.95	1290	mg/kg	7/7	1290	mg/kg	Max

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	EPC Units	Statistical Measure
		Min	Max					
Groundwater	Mercury	0.0108	54.243	ug/l	39/46	19	ug/l	UCL-N
	Naphthalene	9	100	ug/l	2/13	44	ug/l	UCL-N
	Benzene	1.2	140	ug/l	8/27	60	ug/l	UCL-N
	Arsenic	2.6	41.5	ug/l	8/43	9.4	ug/l	UCL-N

Key

mg/kg: milligram per kilogram; parts per million
ug/l: micrograms per liter; parts per billion
UCL-N: Normal Distribution, Upper Confidence Limit
UCL-P: Parametric Distribution, Upper Confidence Limit
Max: Maximum detected concentration

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

The tables present the chemicals of concern (COCs) and exposure point concentration for each of the COCs detected in the surface and subsurface soil, sediment, and groundwater (*i.e.*, the concentrations that will be used to estimate the exposure and risk from each COC in each medium). The tables include the range of concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentration (EPC), and how the EPC was calculated.

TABLE 2

Non-Cancer Toxicity Data Summary

Pathway: Ingestion/Dermal

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Dermal RfD	Dermal RfD units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD: Target Organ	Dates of RfD:
Mercury	Chronic	3e-04	mg/kg-day	2.1e-05	mg/kg-day	Immune	1000	IRIS	2/15/05
Naphthalene	Chronic	2e-02	mg/kg-day	2e-02	mg/kg-day	Body Weight	3000	IRIS	2/15/05
Benzene	Chronic	4.0e-03	mg/kg-day	4.0e-03	mg/kg-day	Blood	300	IRIS	2/15/05
Arsenic	Chronic	3e-04	mg/kg-day	3e-04	mg/kg-day	Skin	3	IRIS	2/15/05

Pathway: Inhalation

Chemical of Concern	Chronic/ Subchronic	Inhala-tion RfC Value	Inhalation RfC Units	Inhala-tion RfD	Inhalation RfD units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfC/RfD: Target Organ	Dates:
Mercury	Chronic	3e-04	mg/m^3	8.6e-05	mg/kg-day	CNS	30	IRIS	2/15/05
Naphthalene	Chronic	3e-03	mg/m^3	8.6e-04	mg/kg-day	Nasal	3000	IRIS	2/15/06
Benzene	Chronic	3e-02	mg/m^3	8.6e-03	mg/kg-day	Blood	300	IRIS	2/15/05
Arsenic	Chronic	NA		NA					

KEY
NA: No information available
IRIS: Integrated Risk Information System, U.S. EPA
mg/kg-day: milligrams per kilogram per day
mg/m^3: milligrams per cubic meter

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern. When available, the chronic toxicity data have been used to develop oral reference doses (RfDs).

TABLE 3

Cancer Toxicity Data Summary

Pathway: Ingestion, Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Mercury	NA				D		
Naphthalene	NA				C		
Benzene	5.5e-02	1/(mg/kg-day)	5.5e-02	1/(mg/kg-day)	A	IRIS	2/15/05
Arsenic	1.5	1/(mg/kg-day)	1.5	1/(mg/kg-day)	A	IRIS	2/15/05

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Mercury	NA						
Naphthalene	NA						
Benzene	7.8e-06	1/(ug/m^3)	2.7e-02	1/(mg/kg-day)	A	IRIS	2/15/05
Arsenic			1.5e01	1/(mg/kg-day)	A	IRIS	2/15/05

Key:

NA: No information available
IRIS: Integrated Risk Information System, U.S. EPA
NCEA: National Center for Environmental Assessment, U.S. EPA

EPA Group:
A - Human carcinogen
B1 - Probable Human Carcinogen-Indicates that limited human data are available
B2 - Probable Human Carcinogen-Indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern. Toxicity data are provided for both the oral and inhalation routes of exposure.

TABLE 4

Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Future
Receptor Population: Long-term Worker – Developed Area (see Table 10.2 RME of HHRA)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Developed Area Surface Soil	Mercury	Immune	2.1	NA	NA	2.1
							Total Receptor Hazard Index for all media and exposure routes. =	5.2
							Total Immune HI for Chemicals of Concern=	2.1

TABLE 4

Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Current/Future
Receptor Population: Construction Worker – Developed Area (Table 10.6 RME of HHRA)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Subsurface Soil	Developed Area Subsurface Soil	Mercury	Immune	7.5	NA	NA	7.5
							Total Receptor Hazard Index =	7.8
							Total Immune HI =	7.5

TABLE 4

Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Current/Future
Receptor Population: Trespassers/Visitors – Undeveloped Area (see Table 10.8 RME of HHRA)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil/Sediment	Surface Soil and Sediment	Undeveloped Area Surface Soil and Sediment	Mercury	Immune	2.5	NA	NA	2.5
							Total Receptor Hazard Index for all media and exposure routes =	3.8
							Total Immune HI for Chemicals of Concern=	2.5

HI values do not include exposure to the mercury/lead hot spot area. The total receptor HI with the hot spot is 17. All calculations can be found in the BHHRA.

TABLE 4

Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Current/Future
Receptor Population: Trespassers/Visitors – Undeveloped Area (see Table 10.9 RME of HHRA)
Receptor Age: **Adolescent/Pre-Adolescent**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil/Sediment	Surface Soil and Sediment	Undeveloped Area Surface Soil and Sediment	Mercury	Immune	3.65	NA	NA	3.65
							Total Receptor Hazard Index =	5.3
							Total Immune HI (the value of 3.2 is for mercury in sediment only. The total value of 4.2 includes all contaminants, media, and exposure routes) =	3.65

HI values do not include exposure to the mercury/lead hot spot area. The total receptor HI with the hot spot is 25. All calculations can be found in the BHHRA.

TABLE 4

Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Future
Receptor Population: Long-term Worker – Undeveloped Area (see Table 10.5 RME of HHRA)
Receptor Age: **Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface soil	Air	Indoor Air (derived from subsurface soil	Naphthalene	Nasal	NA	4.8	NA	4.8
							Total Receptor Hazard Index =	9.6
							Total Nasal HI =	4.8

HI values do not include exposure to the mercury/lead hot spot area. The total receptor HI with the hot spot is 23. All calculations can be found in the BHHRA.

TABLE 4
Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Future
Receptor Population: Construction Worker – Undeveloped Area (see Table 10.7 RME of HHRA)
Receptor Age: **Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface soil	Subsurface Soil	Undeveloped Area Subsurface Soil	Mercury	Immune	1.9	NA	NA	1.9
							Total Receptor Hazard Index =	2.8
							Total Immune HI for Chemicals of Concern =	1.9

TABLE 4

Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Future
Receptor Population: Resident – Domestic Use of Groundwater (see Table 10.12 RME of HHRA)
Receptor Age: **Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Ground-water	Ground-water	Groundwater	Mercury	Immune	1.7	NA	0.13	1.9
			Arsenic	Skin	0.86	NA	0.0045	0.86
Ground-water	Air	Indoor Air (showering/ bathing)	Napthalene	Nasal	NA	11	NA	11
			Benzene	Blood	NA	1.4	NA	1.4
							Total Receptor Hazard Index =	23
							Total Nasal HI for Chemicals of Concern =	11

TABLE 4

Risk Characterization Summary - Non-Carcinogens (RME)

Scenario Timeframe: Future
Receptor Population: Resident – Domestic Use of Groundwater (see Table 10.13 RME of HHRA)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Ground-water	Ground-water	Groundwater	Mercury	Immune	6.1	NA	0.38	6.5
			Arsenic	Skin	3.0	NA	0.0013	3.0
Ground-water	Air	Indoor Air (showering/ bathing)	Napthalene	Nasal	NA	32	NA	32
			Benzene	Blood	NA	4.4	NA	4.4
							Total Receptor Hazard Index =	75
							Total Nasal HI for Chemicals of Concern =	32

Key

NA : Route of exposure is not applicable to this medium or was not quantitatively evaluated.

Summary of Risk Characterization - Non-Carcinogens

The table presents hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure. The Risk Assessment Guidance for Superfund states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse non-cancer effects.

TABLE 5

Risk Characterization Summary – Carcinogens (RME)

Scenario Timeframe: Future
Receptor Population: Resident – Domestic Use of Groundwater (see Tables 8.22 RME and 8.23 RME of HHRA)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Groundwater	**Arsenic**	2e-04	NA	9e-07	2e-04
Groundwater	Air	Indoor Air (showering/ bathing)	Benzene	NA	1e-04	NA	1E-04
						Total Risk =	4e-04

TABLE 5

Risk Characterization Summary – Carcinogens (RME)

Scenario Timeframe: Future
Receptor Population: Resident – Domestic Use of Groundwater (see Tables 8.24 RME and 8.25 RME of HHRA)
Receptor Age: Child **(This gets confusing because benzene was evaluated for AIR as the exposure medium and INDOOR AIR (SHOWERING/BATHING) as the exposure point. It was also evaluated for ingestion and dermal absorption for "groundwater sitewide" as the exposure point. Therefore, there are values where you have NA. The table should be restructured to be consistent with the HHRA.)**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Groundwater	Arsenic	1e-04	NA	5e-07	1e-04
Groundwater	Air	Indoor Air (showering/ bathing)	Benzene	NA	9e-05	NA	9E-05
						Total Risk =	2e-04

Key

NA : Route of exposure is not applicable to this medium or was not quantitatively evaluated.

Summary of Risk Characterization - Carcinogens

The table presents risk estimates for the significant routes of exposure. These risk estimates are based on a reasonable maximum exposure and were developed by taking into account various conservative assumptions about the frequency and duration of the receptors exposure to soil and groundwater, as well as the toxicity of the COCs.

Table 6: Site-Related Ground Water Contaminants and Remediation Goals

Contaminant	NJ Ground Water Remediation Standard (µg/kg)
Arsenic	3
Benzene	1
Mercury	2

Table 7: Site-Related Soil Contaminants and Remediation Goals

Contaminant	RDCSCC (mg/kg)	NRDCSCC (mg/kg)
Arsenic	20	20
Bis(2-ethylhexyl)phthalate	49	210
Chrysene	9	40
Copper	600	600
Lead	400	600
Mercury	14	270
Thallium	2	2

RDCSCC = New Jersey Residential Direct Contact Soil Cleanup Criteria
NRDCSCC = New Jersey Non-Residential Direct Contact Soil Cleanup Criteria

APPENDIX I

Ventron/Velsicol Site Administrative Record

- *Superfund Record of Decision*, Venton/Velsicol Superfund Site (NJDEP, October 2006)
- Notice of Public Meeting, *The Bergen Record*, August 3, 2006, page A-12
- *Superfund Proposed Plan*, Ventron/Velsicol Superfund Site (NJDEP, August 2006)
- *Feasibility Study Report, Operable Unit 1* (CH2MHill, April 6, 2006)
- *Operable Unit 1 Human Health Risk Assessment Report* (Exponent, July 2005)
- *Operable Unit 1 Remedial Investigation Report* (Exponent, June 2004)
- *Operable Unit 1 Ecological Risk Assessment Report* (Exponent, April 2001)
- Resolution of the Berry's Creek/Wood-Ridge Site Action Committee (NJDEP, August 1996)
- Stipulation and Supplementary Order Approving Cooperative Agreement for Remedial Investigation and Feasibility Study and Amending Procedural Order Involving Remedy (October 1984)

APPENDIX II

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

SEP 28 2006

Irene Kropp, Assistant Commissioner
Site Remediation Program
New Jersey Department of Environmental Protection
401 East State Street
P.O. Box 028
Trenton, New Jersey 08625

Re: Ventron/Velsicol Operable Unit 1 Record of Decision

Dear Ms. Kropp:

EPA has reviewed the draft Record of Decision (ROD) to address contamination at the upland portion of the Ventron/Velsicol Site (Operable Unit 1). The comments received on the Proposed Plan during the public comment period did not alter the preferred alternative. EPA concurs with the remedy selected. Components of the selected alternatives for ground water (Alternative G5) and soils (Alternative S4) are described below:

Ground Water – Vertical Hydraulic Barrier, Institutional Controls, Monitoring (Alternative G5)

- A vertical hydraulic barrier system (e.g., slurry wall or sheet pile wall) will be installed to serve as a physical barrier to ground water flow and to encapsulate the areas of highest mercury concentrations.

- Ground water use restrictions will be placed including a Classification Exception Area and a Well Restriction Area to prevent use of contaminated ground water.

- Ground water monitoring will be conducted to determine if hydraulic controls within the barrier are required. If required, hydraulic controls will be implemented. Ground water monitoring will also be conducted to ensure the hydraulic barrier is effective.

Soil – Containment of Mercury-Contaminated Soil Under the Wolf Warehouse; Excavation of Remaining Soils with Mercury Greater Than 620 milligrams per kilogram (620 mg/kg); Capping of Developed and Undeveloped Areas; Excavation of a 55-foot Buffer Area Adjacent to Wetlands and Waterways; Excavation or Capping for Neighboring Properties; and Institutional Controls (Alternative S4)

- Soils greater than 620 mg/kg mercury that are currently under the Wolf Warehouse foundation would remain on site, relying on the foundation as a containment structure. An estimated 7,150 cubic yards of mercury-contaminated soil above 620 mg/kg not under the Wolf Warehouse would be excavated and disposed of off site. Treatment will be conducted prior to disposal, as necessary, to meet RCRA Land Disposal Restrictions. Remnants of the former drain line within the undeveloped area would be located and removed, if they still exist.

- All areas with soil contamination exceeding the NJDEP Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) will be capped to prevent direct contact with residual soil contamination. Existing parking lots and building foundations will be maintained as part of the capped areas.

- In the undeveloped area, soil within the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and the West Ditch would be excavated. The excavated soil and debris may be placed under the cap in the undeveloped area. Certified clean fill would be placed in the excavated buffer areas and native vegetation established.

- Deed notices would be required on all properties with contaminated soil exceeding the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC). If a deed notice(s) cannot be negotiated with a property owner(s), then all site-related soil contamination above RDCSCC must be removed on that particular property or properties (for example, the Lin-Mor property).

- Soil would be excavated from the West Ditch to promote proper drainage. Specific details of the excavation depth, liner design and installation (if necessary), depth of certified clean fill placed into the ditch, and soil management will be determined during the design phase of the project.

- To ensure the remedy is protective of surface water and adjacent wetlands, monitoring of contaminant flux from ground water to surface water and sediment will be performed.

Because the selected remedy will result in contamination remaining on site, five-year reviews of the remedy will be required to ensure that the remedy is working as expected.

EPA concurs with the selected remedy as described above. The selected remedy will address direct contact risks from contamination on the site and will allow for future non-residential land use.

If you have any questions please feel free to call me at 212-637-4390, or have your staff speak with Douglas Tomchuk, the EPA Remedial Project Manager for the site, at 212-637-3956.

Sincerely yours,

George Pavlou, Director
Emergency and Remedial Response Division

cc: Gwen Zervas, NJDEP

APPENDIX III

Responsiveness Summary

A. Overview

This is a summary of the comments and questions from the public regarding the Proposed Plan, dated August 2006, for the remediation of Operable Unit 1 of the Ventron/Velsicol Superfund Site, and the New Jersey Department of Environmental Protection's (NJDEP) responses to those comments and questions.

A public comment period was held from August 3, 2006 through September 2, 2006 to provide interested parties the opportunity to comment on the Proposed Plan for the Ventron/Velsicol Site. During the comment period, the NJDEP held a public meeting on August 9, 2006 at 7:00 PM at the Wood-Ridge Municipal Building to discuss the results of the Remedial Investigation/Feasibility Study (RI/FS) reports and to present the NJDEP/USEPA preferred alternative for remediation of the site.

The selected alternative includes the installation of a vertical hydraulic barrier to serve as a physical barrier to ground water flow as well as excavation of contaminated soil and capping. The Proposed Plan's suite of remedial alternatives were developed for remediation of the site in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

B. Summary of Comments Received during the Public Comment Period and NJDEP responses

Only one verbal comment was received at the Public Meeting on August 9, 2006. No written comments were received during the public comment period.

Comment 1:

During major storm events, for example, Hurricane Floyd in 1999, the streets around the Ventron/Velsicol Site become flooded. Is the flood water actually contaminated water coming from Berry's Creek?

Response 1:

Since the installation of the tide gate in Berry's Creek periodic flooding in the area of the Site has not been an issue. However, during unusual storm events flooding may occur. It is difficult to determine the exact origin of the flood water during these unusual events, however, the quantity of water is so great during these storms that any water that may come from the creek would be greatly diluted and therefore not of any human health concern.

APPENDIX IV

Appendix IV

Ventron/Velsicol OU1 Superfund Site

Statement of Findings: Wetlands and Floodplains

Need to Affect Wetlands and Floodplains

The Ventron/Velsicol OU1 Superfund Site contains wetlands and is partially situated in the 100-yr floodplain. The locations of the site, wetlands, and the 100-yr floodplain are shown in Figure 1. Site wetlands include Section 10 wetlands along and in the West Ditch, along the Diamond Shamrock/Henkel (north) Ditch, and along Berry's Creek. Section 404 wetlands occur on site along Berry's Creek north of the tide gate and in a depression called the onsite basin, located in the undeveloped fill area east of the Wolf Warehouse. A small section of Section 404 wetland identified between the U.S. Life Warehouse and the Wolf Warehouse in the wetland delineation report was later determined to be underlain by asphalt and hence not a jurisdictional wetland. Adjacent to the site, wetlands also occur in the Diamond Shamrock/Henkel (north) Ditch, the marsh area south of the site, and portions of Berry's Creek.

The remedial investigation and risk assessments concluded that contaminated soil and sediment at the site including that in wetlands and the floodplain pose risk to human health and ecological receptors. In addition, groundwater was considered to pose risk to humans and ecological receptors that might come in contact with it. The feasibility study considered six groundwater and seven soil remedial alternatives. The selected alternative for groundwater includes a hydraulic barrier in the vicinity of the Wolf Warehouse and is not expected to affect wetlands and floodplains. All soil alternatives except for no further action require 1) excavation of approximately 450 cubic yards of wetlands/floodplain soils in the West Ditch followed by regrading, capping, and filling that is compatible with wetland/floodplain restoration and 2) excavation of approximately 10,000 cubic yards of wetlands/floodplain soils in the 55-foot buffer area adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch, and West Ditch followed by backfill with clean fill to grade that is compatible with wetland/floodplain restoration. Approximately 5,000 square yards of wetland vegetation along the 55 foot buffer and consisting primarily of common reed (*Phragmites australis*) would be removed during these remedial activities. All soil alternatives except for no further action would also result in capping of the on-site basin in the undeveloped fill area. The selected remedial alternative is illustrated on Figure 1.

The New Jersey Department of Environmental Protection (NJDEP) and the U.S. Environmental Protection Agency (EPA) have determined that there is no practicable alternative that is sufficiently protective of human health and the environment that would not result in the excavation and capping of these soils and sediments. Consequently, since remedial action is necessary, any remedial action that might be taken would necessarily affect wetlands and floodplains associated with the site.

Facts Considered in Deciding to Affect Wetlands and Floodplains

The primary facts considered in the decision to affect wetlands and floodplains were 1) contaminated soil and sediment in wetlands and floodplain areas of the site pose unacceptable risks to human health and ecological receptors and 2) there is no practicable alternative that is sufficiently protective of human health and the environment that would not result in the excavation and capping of these soils and sediments. The no further action alternative does not involve excavation or capping of contaminated soils and sediments (i.e., no remedial actions would take place within delineated wetlands or floodplains). However, contaminated soils and sediments would remain in place and would continue to be a potential source of contamination to the site and to adjacent wetlands and floodplains. Consequently, the no further action alternative would not be protective of human health and the environment. The implementation of any of the action alternatives would be more protective of human health and the environment than the no further action alternative, and all action alternatives would involve substantial actions within wetlands and floodplains.

Compliance with State or Local Wetland, Floodplain, and Coastal Zone Protection Standards

The selected remedy will comply with state and local standards for protection of wetlands, floodplains, and coastal zones. Standards include New Jersey laws (N.J.S.A.) and regulations (N.J.A.C.) pertaining to work within wetlands (the Freshwater Wetlands Protection Act [N.J.S.A. 13:9B], the Wetlands Act of 1970 [N.J.S.A. 13:9A], the Freshwater Wetlands Protection Act Rules [N.J.A.C. 7:7A], and the New Jersey Meadowlands Commission Zoning [N.J.S.A. 13:17]), floodplains (the Flood Hazard Area Control Act [N.J.S.A. 58:16A] and the Flood Hazard Control Act Rules [N.J.A.C 7:13]), and coastal zones (the Waterfront Development Act [N.J.S.A. 12:5-3] and the Coastal Permit Program Rules [N.J.A.C. 7:7]).

Wetlands disturbances in the Hackensack Meadowlands Development Area (i.e., the portion of the site located in Carlstadt) are exempt from the NJDEP wetlands program but will require permits from the Army Corps of Engineers or the New Jersey Meadowlands Commission (formerly the Hackensack Meadowlands Development Commission). In addition, local zoning requirement such as those from the Borough of Wood-Ridge will be met.

The selected remedy will also comply with federal applicable or relevant and appropriate substantive requirements relating to wetlands and floodplains including Executive Order 11990: *Protection of Wetlands*, Executive Order 11988: *Floodplain Management*, 40 CFR Part 6 Appendix A, and EPA's 1985 Statement of Policy on Floodplains/Wetlands Assessments for CERCLA Actions.

Measures to Minimize Potential Harm to Wetlands and Floodplains

Implementation of the selected remedy will entail excavation of soil within the 55-foot buffer area

adjacent to Berry's Creek, the Diamond Shamrock/Henkel (north) Ditch and the West Ditch and excavation and capping of the West Ditch (Figure 1). These actions will result in temporary physical disturbance of wetland and floodplain habitats in these areas. Wetland and floodplain assessments will be performed during the remedial design phase. Measures to minimize potential adverse impacts that cannot be avoided will be evaluated as part of and incorporated into the remedial design. Measures to be used during and after the remedy to prevent soils or sediments from being transported to other parts of adjacent wetlands or floodplains during remediation and/or flood events could include common practices, such as installation of silt fencing, hay bales, hay/straw mulch, jute matting, temporary berms, silt curtains, coffer dams, and operational controls. Areas of the 55-foot buffer zone from which soil is to be excavated will be remediated by placement of clean fill, re-vegetation with native species, and installation of appropriate erosion controls. Areas of the West Ditch subject to excavation and capping will also be remediated by placement of clean fill to restore a natural hydrological gradient.

The wetland assessment will determine the baseline conditions for the wetlands prior to remedial action. Further, this assessment will be used to design a wetlands restoration plan to reestablish wetland functions and values to the greatest extent possible during the restoration process. A post-remediation monitoring plan will be developed for remediated areas. The monitoring plan will evaluate the progress of wetland restoration toward the desired results including prevention of the establishment of unwanted invasive species. Mitigation options will be evaluated for any wetland losses that cannot be replaced via on-site restoration.

Effects of Proposed Action on the Natural and Beneficial Values of Wetlands and Floodplains

Excavation of soil within the 55-foot buffer area, excavation and capping in the West Ditch, and capping of the onsite basin will eliminate pathways to ecological receptors inhabiting those locations as well as human who may be exposed to these areas. Soil will be excavated from the West Ditch to promote proper drainage, which should help to restore normal hydrological function to the wetland. In addition, the remedial action objectives (RAOs) for OU1 include the prevention or minimization of potential downgradient and off-site migration of contaminated groundwater to the marsh area and Berry's Creek and the migration of contaminants in surface soil and sediments to the marsh area and Berry's Creek via surface runoff and windblown dust (for soil only). Since the selected remedy will be expected to achieve the RAOs, soils or sediments with contaminants will no longer function as a source of contamination to off-site areas or to ecological receptors in those areas. Accordingly, it is anticipated that no long-term adverse effects to wetland or floodplain resources will result due to implementation of the selected remedy since any short-term negative impacts to the natural or beneficial uses associated with soils or sediments that are already affected by existing contamination will be more than compensated for by the long-term benefit to the marsh area and Berry's Creek once those soils and sediments are removed or capped.

A previous evaluation of wetlands on the site concluded that vegetation communities were altered due to past human activities on the site and that the wetland is dominated by dense stands of common reed (*Phragmites australis*). Habitat restoration of the 55-foot buffer zone

and wetland areas following remedial activities should restore a natural plant community that will provide higher value to wetland resources than the existing habitat.

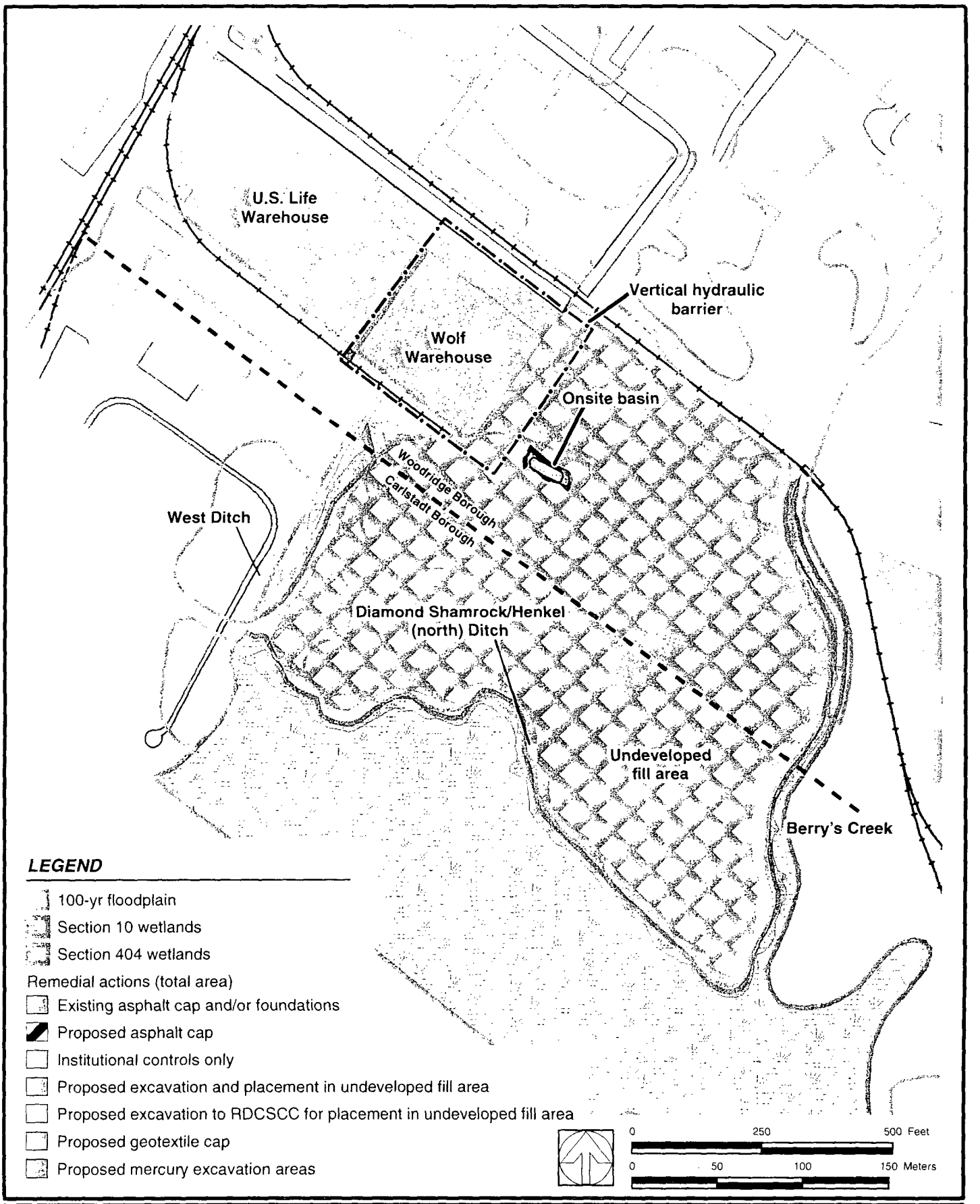

Figure 1. Selected remedial alternative with wetlands and 100-yr floodplain

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