Old Roosevelt Field Contaminated Groundwater Area Superfund Site

Garden City, New York

August 2007

PURPOSE OF THIS DOCUMENT

This document describes the remedial alternatives considered for the Old Roosevelt Field Contaminated Groundwater Area Superfund site and identifies the preferred remedy with the rationale for this preference. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) and EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination at the site and the remedial alternatives summarized in this Proposed Plan are described in the July 2007 Remedial Investigation (RI) report, August 2007 Feasibility Study (FS) report, and the soil vapor intrusion investigation report. EPA encourages the public to review these documents to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted at the site.

This Proposed Plan is being provided as a supplement to the RI/FS reports to inform the public of EPA's preferred remedy and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the preferred groundwater alternative. EPA's preferred remedy includes the installation of a groundwater extraction well to capture and treat the contaminant plume. The extraction well will be located near multi-port well SVP-4 and would capture and treat the contaminated groundwater with elevated concentrations of trichloroethene (TCE) and tetrachloroethene (PCE) to prevent further migration of the contaminant plume towards Garden City supply wells GWP-10 and GWP-11. Contaminated groundwater extracted from the new well will be treated using either air-strippers or carbon adsorption units. The treated groundwater will be discharged to a nearby recharge basin.

The remedy described in this Proposed Plan is the preferred remedy for the site. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the Proposed Plan and in the detailed analysis section of the RI/FS report because EPA may select a remedy other than the preferred remedy.

MARK YOUR CALENDAR

August 22, 2007 - September 20, 2007: Public comment period related to this Proposed Plan.

September 11, 2007 at 7:00 P.M.: Public meeting at the Village of Garden City Village Hall, 351 Stewart Avenue, Garden City, NY.

COMMUNITY ROLE IN SELECTION PROCESS

EPA relies on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS reports and this Proposed Plan have been made available to the public for a public comment period which begins on August 22, 2007 and concludes on September 20, 2007.

A public meeting will be held during the public comment period at the Village of Garden City Village Hall on September 11, 2007 at 7:00 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedy, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

INFORMATION REPOSITORIES

Copies of the Proposed Plan and supporting documentation are available at the following information repositories:

Garden City Public Library
60 Seventh Street
Garden City, New York 11530
(516) 742-8405
www.nassaulibrary.org/gardenc/

Hours: Call or see website for summer hours.

Hempstead Public Library
115 Nichols Court
Hempstead, New York 11550
(516) 481-6990
www.nassaulibrary.org/hempstd/

Hours: Call or see website for summer hours.

USEPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308

Hours: Monday - Friday, 9:00 A.M. - 5:00 P.M.

www.EPA.gov/region02/superfund/npl/oldroosevelt

Written comments on the Proposed Plan should be addressed to:

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SCOPE AND ROLE OF ACTION

Site remedial activities are sometimes segregated into different phases, or operable units, so that remediation of different environmental media or areas of a site can proceed separately in an appropriate manner. For the Old Roosevelt Field Contaminated Groundwater Area site, EPA decided to address all site contamination as one operable unit.

SITE BACKGROUND

Site Description

The Old Roosevelt Field Contaminated Groundwater Area Site (site) is an area of groundwater contamination within Garden City, in central Nassau County, New York. The site is located on the eastern side of Clinton Road at the intersection with Old Country Road. The site includes a thin strip of open space along Clinton Road (known as Hazelhurst Park), a large retail shopping mall with a number of restaurants, and a movie theater. Several office buildings (including Garden City Plaza) which share parking space with the shopping mall are situated around its perimeter. Public supply wells GWP-10 and GWP-11 are east of Clinton Road on the southwestern corner of the site. Two recharge basins are directly east and south of the public water supply wells. The eastern basin is known as Pembrook Basin and is on property owned by the shopping mall. The basin situated to the south is Nassau County Storm Water Basin number 124.

Site History

The site was used for aviation activities from 1911 to 1951. The original airfield encompassed 900 to 1,000 acres east of Clinton Road and south of Old Country Road. By the time the field opened in July 1912, there were 5 cement and 30 wooden hangars along Old Country Road, 4 grandstands along Clinton Road, and several flying schools.

The United States (U. S.) military began using the field prior to World War I. The New York National Guard First Aero Company began training at the airfield in 1915, and in 1916, the U.S. Army used the field to train Army and Navy officers. The Army removed the grandstands, built barracks along Clinton Road, and built larger hangars along Old Country Road. In 1918, the Army changed the name of the airfield to Roosevelt Field in honor of Quentin Roosevelt, a son of Theodore Roosevelt who had trained there and was killed during the war.

After World War I, the U. S. Air Service authorized aviation-related companies to operate from Roosevelt Field, but maintained control until July 1, 1920, at which time the Government relinquished control of the field. Subsequently, the property owners sold portions along the southern edge of the field and split the remainder of the property into two flying fields. The eastern half, with sod runways and only two hangars, continued as Roosevelt Field. The western half, which had many hangars, flying schools, and aviation maintenance shops, became known as Curtiss Field.

By 1929, the eastern field (Roosevelt) had served as the starting point or terminus of many notable flights, including Lindbergh's takeoff for his historic trans-Atlantic flight in May 1927. The western field (Curtiss) was used for flying circuses, a flying school, aircraft sales and service, and flight tests. Both fields were bought in 1929 by Roosevelt Field, Inc., and the entire property was once again called Roosevelt Field. Improvements were made, including the installation of several large steel and concrete buildings for hangars, shops, and office space along Old Country Road. As of November 1929, numerous aviation-related businesses operated in the hangars and other buildings surrounding the western field. By 1932, paved runways and 50 buildings made Roosevelt Field the country's largest and busiest civil airfield. While the western field developed into the large aviation center, the eastern field remained unpaved, with few buildings, until it was leased in 1935 and became a racetrack.

Roosevelt Field was used by the Navy and Army during World War II. In July 1939, the Army Air Corps contracted Roosevelt Field, Inc. to provide airplane and engine mechanics training to Army personnel at their school. In early 1941, there were more than 200 Army students and approximately 600 other students at the Roosevelt Aviation School. At the beginning of 1942, after the U.S. had entered the war, civilian flying and private hangar rental ceased at Roosevelt Field due to a ban on private flying in defense areas.

As of March 1942, there were 6 steel/concrete hangars, 14 wooden hangars, and several other buildings at Roosevelt Field. The Army training school was concentrated in the buildings located along Clinton Road. In addition to the training activities, the Roosevelt Field facilities were used to receive, refuel, crate, and ship Army aircraft.

In November 1942, the Navy Bureau of Aeronautics established a modification center at Roosevelt Field to install British equipment into U.S. aircraft for the British Royal Navy. The Navy leased five steel/concrete hangars along Old Country Road; built a barracks, mess hall, and sick bay; and commissioned the U.S. Naval Air Facility (NAF) Roosevelt Field by February 1943. By September 1943, the Navy had built wooden buildings between four of the hangars, and in October 1943 leased six additional hangars. NAF Roosevelt Field was responsible for aircraft repair and maintenance, equipment installation, preparation and flight delivery of lend-lease aircraft, and metal work required for the installation of British modifications. The metal work constituted a substantial portion of the facility's work load. The facility also performed salvage work of crashed Royal Navy planes. The Navy vacated all but six hangars shortly after the war ended, and removed their temporary buildings by the time their lease expired on June 30, 1946. Restoration of buildings and grounds was completed by August 1946, and Roosevelt Field operated as a commercial airport until it closed in May 1951.

After the airfield closed, the large Roosevelt Field Shopping Center was constructed at the site and opened in 1957. The old field is currently the site of the shopping mall and office building complexes and is surrounded by commercial areas and light industry. Three of the old Navy hangars remained standing until some time after June 1971, with various occupants, including a moving/storage firm, discotheque, amusement center, and bus garage.

It is likely that chlorinated solvents were used at Roosevelt Field during and after World War II. Chlorinated solvents such as tetrachloroethene (PCE) and trichloroethene (TCE) have been widely used for aircraft manufacturing, maintenance, and repair operations since about the 1940s. By May 1938, the Bureau of Aeronautics had a specification covering TCE and had approved at least one company to supply TCE. The finish specifications for at least one type of plane that the Navy modified at Roosevelt (eight of which were on site in April 1943) called for aluminum alloy to be cleaned with TCE. An aircraft engine overhaul manual issued in January 1945 specified TCE as a degreasing agent.

In addition to the Village of Garden City supply wells, seven cooling water wells pumped groundwater from the Magothy for use in building air conditioning systems. Cooling water wells pumped variable amounts of water, with greater extraction rates during the hot summer months. These wells operated from approximately 1960 to 1985. After extracted groundwater was used in air conditioning systems, the untreated water was returned to the aquifer system via surface recharge in the Pembrook recharge basin or, after minimal treatment, to a drain field west of Buildings 100 and 200.

The discharge of contaminated water into the recharge basin and drain field continued until the mid-1980s when the cooling water wells were taken out of service. Surface discharge of contaminated groundwater spread contamination through the Upper Glacial and Magothy aquifers. The recharge basin and drain field also created localized groundwater mounding, which may have spread contamination at the water table. However, the sandy nature of the recharge basin soils likely did not result in retention of VOCs within the unsaturated zone. In addition, the zone below the recharge basin has been flushed with stormwater runoff for 20 years; residual contamination from Roosevelt Field is not likely to remain in the area. The Pembrook recharge basin currently only receives surficial stormwater runoff from parking lots surrounding the mall and the office buildings. The drain field/diffusion wells near Building 100 are under the paved parking lot west of Building 100 and 200 and are not currently identifiable in the field. Significant groundwater contamination is present at depth at SVP-4, which is located near the general area of the diffusion wells/drain field.

Supply wells 10 and 11 were installed by the Village of Garden City in 1952 and were put into service in 1953. Well 10 is screened from 377 to 417 feet below the ground surface (bgs) and well 11 is screened from 370 to 410 feet bgs. Both wells have shown the presence of PCE and TCE since they were first sampled in the late 1970s and early 1980s, and concentrations increased significantly until 1987, when an air-stripping treatment system was installed at the wells. Sample results of treated well water from May 1993, September 1995, and June/July 1999 indicated that breakthrough of the treatment system had occurred, and as a result, modifications to the air-stripping treatment system were made to improve its operation. The highest levels of volatile organic compound (VOC) contamination were noted in untreated groundwater during the mid-to late 1990s, and levels have steadily declined since, although the levels remain above EPA and NYS drinking water standards.

SITE HYDROLOGY/HYDROGEOLOGY

Site Hydrology

No naturally-occurring surface water bodies are present in the vicinity of the Roosevelt site. The closest stream is East Meadow Brook, which is about 1.5 miles southeast of the site and flows south towards Great South Bay and the Atlantic Ocean. The largest body of freshwater near the site is Hempstead Lake, located at the head of Millbrook Creek, approximately four miles southwest of the site. Overflow from Nassau County Recharge Basin #124 is directed to the Horse Brook Drain, which flows south to Hempstead Lake, and ultimately to tidal waters to the south.

In general, the sandy nature of natural soils on Long Island promotes fast infiltration of precipitation (rainwater) from the ground surface. Almost the entire area of the site, with the exception of Hazelhurst Park, is paved or is occupied by buildings; therefore, surface rainwater runoff is routed into storm water collection systems and commonly is discharged directly to either dry wells or recharge basins.

The Pembrook recharge basin and two Nassau County recharge basins are man-made water table recharge basins located on or near the site. One of the Nassau County basins is located immediately south of the Pembrook Basin, approximately 1,500 feet southwest of the Roosevelt Field Shopping Center; the other county recharge basin is located about 1,000 feet southeast of the shopping center. The privately-owned Pembrook Basin receives surface water runoff during storm events. The Nassau County basins receive storm water runoff from the municipal storm water collection system.

Site Geology

The site is located within the Atlantic Coastal Plain Physiographic Province. The geology of Long Island is characterized by a southeastward-thickening wedge of unconsolidated sediments unconformably overlying a gently-dipping basement bedrock surface.

The Upper Glacial deposits and the Magothy Formation are the geologic units of interest for the site.

Site Hydrogeology

Groundwater on Long Island is derived from precipitation. The volume of water that percolates down to the water table and recharges the groundwater is the residual of the total precipitation not returned to the atmosphere by evapotranspiration or lost by runoff. Due to the permeable nature of the soils and the generally gentle slope of the land surface, infiltration is high. At the Roosevelt site, which is mostly covered by impervious surfaces such as buildings, paved parking lots, and roads, surface runoff is directed to dry wells or the nearby recharge basins.

The aquifers of concern at the Roosevelt site are the Magothy aquifer and the Upper Glacial aquifer, which form a single, unconfined aquifer, although with different properties. They are the most productive and heavily utilized groundwater resource on Long Island. The depth to the water table ranges from 25 to 50 feet bgs (below ground surface).

Based on measurements in the 8 multi-port wells and 10 existing wells made as part of the Remedial Investigation, groundwater flow is to the south/southwest. Pressure measurements in the ports indicate the vertical groundwater flow is downward. The five multi-port wells in the mall area have similar vertical gradients, with the differences between water levels in the shallow and deep ports within each well ranging from 1.8 to 2.9 feet. Further to the south, the vertical gradients become larger: 3.2 feet in SVP-7; 8.2 feet in SVP-8, and 9.7 in SVP-6. The higher vertical gradients in SVP-8 and SVP-6 are most likely caused by pumping at the Village of Hempstead public supply wells, about a block from multi-port wells SVP-6 and SVP-8.

RESULTS OF THE REMEDIAL INVESTIGATION

The first step in evaluating the nature and extent of contamination at and emanating from the site was to identify regulatory standards and criteria to assess and screen detected constituents in groundwater and soil gas.

Groundwater

EPA and New York State Department of Health have promulgated health-based protective Maximum Contaminant Levels (MCLs), which are enforceable standards for various drinking water contaminants. MCLs, which ensure that drinking water does not pose either a short- or long-term health risk, were used as screening criteria for the groundwater. Table 1 summarizes the MCLs for the contaminants of concern (COCs).

Table 1

Chemical	Groundwater MCL [1]
PCE	5
TCE	5

1,1-Dichloroethene	5
cis-1,2-Dichloroethene	5
Carbon tetrachloride	5

Units: (1) micrograms/liter (µg/L)

Groundwater

Eight multi-port monitoring wells were drilled during the remedial investigation (see Figure 1). Four wells, each with 10 ports, were installed in the Roosevelt Field mall area. One upgradient (background) well with 10 ports is located on the north side of Old Country Road and three wells, each with six ports, are located in the downgradient area, south of two Village of Garden City supply wells. Ten existing monitoring wells were also sampled (see Figure 1).

Site-related VOCs were selected based on historical data, since sampling of the Garden City supply wells has occurred on a regular basis for more than 20 years. The site-related VOCs are TCE, PCE, 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), and carbon tetrachloride.

Two rounds of VOC samples were collected from the eight multi-port monitoring wells and the 10 existing wells. The highest levels of PCE and TCE (350 and 280 µg/L, respectively) are concentrated at SVP/GWM-4 at approximately 250 to 310 feet deep. It should be noted that the SVP-4 location was selected for monitoring because a distilling well/drain field was operated in the area during the 1980s, to dispose of cooling water contaminated with the site-related VOCs. The next highest levels occur downgradient (to the south) of SVP/GWM-4 in existing well GWX-10019, at a slightly shallower depth at approximately 223 to 228 feet bgs, and at the two supply wells GWP-10 and GWP-11, at approximately 370 to 417 feet deep. Multi-port well SVP/GWM-7, located southwest of the supply wells, showed 20 µg/L of TCE and 7.7 µg/L of PCE at approximately 310 to 315 feet. Further downgradient, monitoring well SVP/GWM-8, installed during the RI, showed 34 µg/L of PCE at approximately 100 to 105 feet and 57 µg/L of PCE at the same depth from round 1 and round 2 sampling, respectively. TCE was detected at levels below the MCL in both rounds. Monitoring well SVP/GWM-6 showed a detection of 8.2 µg/L of TCE at 245 to 250 feet in round 1 and 2.3 µg/L in round 2 at the same depth. PCE was detected in several depths during both sampling rounds, but at levels below the MCL.

GWP-10 and GWP-11 each have a capacity to pump approximately one million gallons per day (mgd) of groundwater from the Magothy aquifer. Groundwater flow and contaminant movement is downward and south from the mall area to the Garden City supply wells. Contamination was observed south (downgradient) of the Garden City supply wells, as observed in the wells sampled.

Further downgradient of the supply wells, PCE and TCE contaminant levels in the most downgradient multi-port well (SVP/GWM-8) are seen at shallower depths than at the plume core in the mall area. Other sources of VOC contamination in the area south of the site may have contributed contamination.

The Village of Hempstead Water Supply Wellfield approximately one block south (downgradient) of multi-port monitoring wells SVP-6 and SVP-8, has been contaminated with VOCs since 1980s. Two of the wells in the Village of Hempstead Wellfield showed detections of 10.1 µg/L of TCE and 9.2 µg/L early this year through their routine monitoring. The source of this contamination is currently unknown since several potential sources are located in the vicinity of the Hempstead Wellfield.

Soil Gas

Two types of soil gas samples were collected: a screening survey on a 100-foot grid on the northern and western sides of the mall parking lot (see Figure 2) and laboratory samples collected around 100 and 200 Garden City Plaza and in Hazelhurst Park (see Figure 3). A total of 34 samples were collected for laboratory analysis. Based on the results of the soil gas screening, EPA conducted an investigation of vapor intrusion into structures within the area that could potentially be affected by the groundwater contamination plume. More information about the vapor intrusion investigation can be found in a separate report in the information repository for the site.

Soil gas screening results from approximately 15 feet bgs and 35 feet bgs are summarized below. The soil gas screening samples were measured in the field with an instrument called a ppbRAE meter. The results are in parts per billion per volume (ppbv).

15 Feet bgs: Five of the samples collected at approximately 15 feet bgs had total VOC readings above 100 ppbv: Location A0 at the corner of Old Country Road and Clinton Road (106 ppbv); location A11 in Hazelhurst Park east of Clinton Road (136 ppbv); location D17 west of Garden City Plaza Building 100 (531 ppbv); location D19 west of Garden City Plaza Building 200 (534 ppbv); and location F20 south of Garden City Plaza Building 200 (163 ppbv). Of all the soil gas readings collected at approximately 15 feet bgs, 85 percent were at or below 10 ppbv; 8 percent were between 11 and 50 ppbv, and 4 percent were between 51 and 100 ppbv.

35 Feet bgs: Nine of the samples collected at approximately 35 feet bgs had total VOC readings above 100 ppbv: Locations A9, A10, and A11 in Hazelhurst Park east of Clinton Road (245 ppbv, 233 ppbv, and 148 ppbv, respectively); location B15 west of the northwest corner of Garden City Plaza Building 100 (368 ppbv); location C20 one of the southern-most samples (112 ppbv); location D17 west of Garden City Plaza Building 100 (494 ppbv); location E14

north of the northeast corner of Garden City Plaza Building 100 (211 ppbv); location H1 southeast of the Citibank building, near the entrance road to the mall (152 ppbv); and location K0 on the eastern side of the mall entrance road (185 ppbv). Of all the soil gas readings collected at approximately 35 feet bgs, 83 percent were at or below 10 ppbv; 9 percent were between 11 and 50 ppbv, and 2.5 percent were between 51 and 100 ppbv.

Soil gas samples collected in canisters for laboratory analysis were compared to the soil gas screening criteria in Table 2c in the EPA 2002 document titled "*Draft Document for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soil*". TCE detections exceeded the screening criterion of 2.2 µg/m^3 in one sample near Garden City Plaza building 200 (SGRF-25 at 23 µg/m^3). Three samples collected along Hazelhurst Park (adjacent to Clinton Road) had TCE detections that exceeded the criterion (SGHP-2 at approximately 3.9, SGHP-3 at 12, and SGHP-4 at approximately 3 µg/m^3). No other results exceeded the screening criteria.

Soil

To complete the evaluation of potential residual source areas in the area of the old airfield, EPA collected 41 soil samples at locations with soil gas screening survey results above 100 ppbv and at selected additional locations in Hazelhurst Park along Clinton Road. Soil samples were generally collected at 2 depths, 15 and 40 feet bgs. The actual depths of samples were adjusted slightly because the drilling rig occasionally encountered obstacles in the subsurface. No VOCs were detected in any of the soil samples collected. While it is believed that airfield activities were the source of the groundwater contamination identified in the RI, based on the results of the soil gas and soil borings, there do not appear to be any continuing sources in the soil in the areas that were sampled.

SUMMARY OF SITE RISKS

As part of the RI/FS, EPA conducted a baseline risk assessment to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land and groundwater uses. The baseline risk assessment includes a human health risk assessment (HHRA) and an ecological risk assessment.

The cancer risk and noncancer health hazard estimates in the HHRA are based on current reasonable maximum exposure scenarios and were developed by taking into account various health protective estimates about the frequency and duration of an individual's exposure to chemicals selected as chemicals of potential concern (COPCs), as well as the toxicity of these contaminants. Cancer risks and non-cancer health hazard indexes (HIs) are summarized below (please see the text box on the following page for an explanation of these terms).

A screening level ecological risk assessment (SLERA) was not conducted to assess the risk posed to ecological receptors because contaminated groundwater does not discharge to any surface water bodies within the area of the site. Since no groundwater discharges to surface water, exposure pathways are not complete and ecological receptors are not exposed to contaminants from the site. Therefore, ecological risks are negligible.

Human Health Risk Assessment

Current site land use is primarily commercial, including office buildings and a shopping mall. The neighboring properties are mixed-use (commercial and residential) in nature. Future land use is expected to remain the same, although the unlikely possibility that the mall and office buildings would be developed into a residential area was considered in the HHRA. The baseline risk assessment began by selecting COPCs in groundwater that would be representative of site risks. The COCs for the site are PCE and TCE in groundwater.

The baseline risk assessment evaluated health effects that could result from exposure to contaminated groundwater though ingestion of, dermal contact with, and inhalation of volatile organic compounds. Although residents and businesses in the area are served by municipal water, groundwater is designated by the State as a potable water supply, meaning it could be used for drinking in the future. Therefore, potential exposure to groundwater was evaluated.

Based on the current zoning and anticipated future use, the risk assessment focused on a variety of possible receptors, including current and future site workers and potential future residents (adult and child). A complete discussion of the exposure pathways and estimates of risk can be found in the *Human Health Risk Assessment* for the site in the information repository.

In the unlikely event that untreated site groundwater were to be used as drinking water, exposure to groundwater contaminated with PCE and TCE would be associated with combined excess lifetime cancer risks and noncancer health hazard indices of 2×10^{-3} and 10 for the future adult resident, 6×10^{-3} and 35 for the future child resident, and 2×10^{-4} and 3 for the future on-site worker.

These cancer risks and noncancer health hazards indicate that there is significant potential risk from direct exposure to groundwater to potentially exposed populations. For these receptors, exposure to PCE and TCE in groundwater 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 threshold of 1, or both. Concentrations of PCE and TCE are also in

WHAT IS RISK AND HOW IS IT CALCULATED?

Human Health Risk Assessment:

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in ten thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one in ten thousand to a one in a million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as Chemicals of Concern or COCs in the final remedial decision or Record of Decision.

excess of the Federal and State MCLs of 5 µg/l for both PCE and TCE.

EPA is currently planning a further investigation of vapor intrusion into structures within the area that could be potentially affected by the groundwater contamination plume. More information about the vapor intrusion investigation can be found in a separate report in the information repository for the site. If the results of the investigations indicate that there is concern with site-related vapors migrating into buildings, EPA would perform mitigation as necessary.

It is the lead agency's current judgment that the Preferred Alternative identified in the Proposed Plan is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives 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), to-be-considered guidance, and site-specific risk-based levels. The remediation goals for the site are the groundwater MCLs.

The following remedial action objectives were established for the site:

- Prevent or minimize potential, current, and future human exposures including inhalation, ingestion and dermal contact with VOC-contaminated groundwater that exceeds the MCLs;
- Minimize the potential for off-site migration of groundwater with VOC contaminant concentrations greater than MCLs;
- Restore groundwater to beneficial use levels as specified in the National Contingency Plan (NCP) and
- Mitigate site-related vapor migrating into the commercial buildings, if necessary.

Table 1 summarizes the groundwater cleanup standards.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1) of 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which 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 Section 121(d) of 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 Section 121(d)(4) of 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the site can be found in the FS report. The FS report presents three groundwater alternatives described below.

The duration time for each alternative reflects the estimated time required for the entire groundwater contaminant plume associated with the site to be reduced to levels below the MCLs.

The remedial alternatives are:

Alternative 1: No Action

Capital Cost:	$0
Annual Operation & Maintenance (O&M) Cost:	$0
Present-Worth Cost:	$0
Duration:	46 years

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative would not include any physical remedial measures to address the contamination at the site. The preliminary groundwater model predicted it would take 46 years for the contaminant concentrations in the plume to decrease below the MCLs via natural attenuation processes.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years.

Alternative 2: Monitoring and Institutional Controls

Capital Cost:	$300,000
Annual O&M Cost(2):	$150,000/$110,000(3)
Present-Worth Cost:	$2,290,000
Duration:	46 years

(2) Includes long-term monitoring costs only

(3) The long-term monitoring program would be reduced after 25 years due to the reduction in the size of the plume.

Alternative 2 includes long-term monitoring of the contaminant plume through annual sampling and analysis of 7 existing multi-port wells and 2 existing single-screen monitoring wells (GWX-10019 and GWX-10020).

The results of the long-term monitoring program would be used to evaluate the migration and changes in the contaminant plume over time to ensure attainment of the MCLs. The preliminary groundwater model predicted it would take 46 years for the contaminant concentrations in the plume to decrease below the MCLs via natural attenuation processes. This alternative would also include future vapor intrusion sampling, if deemed necessary to determine if there is a concern with site-related vapor migrating into the buildings.

In addition, this alternative would include institutional controls that restrict future use of groundwater at the site. Specifically, the New York State Department of Health State Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, EPA would rely on the current zoning in the area including and surrounding the mall to restrict the land use to commercial industrial uses. If a change in land use is proposed, additional investigation of soils in this area would be necessary to support the land use change.

A site management plan (SMP) would also be developed and would provide for the proper management of all site remedy components post-construction, such as institutional controls, and shall also include: (a) monitoring of site groundwater to ensure that, following remedy implementation, the groundwater quality improves; (b) conducting an evaluation of the potential for vapor intrusion, and mitigation, if necessary, in the event of future construction; (c) provision for any operation and maintenance required of the components of the remedy; and (d) periodic certifications by the owner/operator or other person implementing the remedy that any institutional and engineering controls are in place.

Because MCLs will take longer than five years to achieve, a review of site conditions will be conducted no less often than once every five years.

Alternative 3: Groundwater Extraction and Ex-situ Treatment (Pump and Treat)

Capital Cost:	$6,240,000
Annual O&M Cost:	$850,000/$790,000(4)
Present-Worth Cost:	$13,160,000
Duration:	35 years

(4) The long-term monitoring program would be reduced after 25 years due to the reduction in the size of the plume.

Alternative 3 includes a groundwater extraction well(s) which would be installed downgradient from monitoring well SVP-4, to capture the portion of the contaminant plume with high PCE and TCE concentrations without impacting the pumping capacity of supply wells GWP-10 and GWP-11, which have a pumping zone of influence radius of approximately 1,000 feet. The number of extraction wells needed would be determined after the completion of the pre-design investigation described below. Extracted groundwater would be treated via air strippers for approximately 10 years, with the treated water discharged to Nassau County recharge basin #124. Based on the preliminary groundwater model, it is estimated that MCLs would be achieved in the zone of influence of the new pumping well in approximately 10 years, at which time the contamination in the extracted groundwater would have reached drinking water standards (MCLs). It is also noted that at the end of the same 10-year period, the supply wells GWP-10 and 11 would withdraw groundwater, before wellhead treatment, with contamination at or close to MCLs. It would take another 25 years for contaminant residuals in the aquifer to reach MCLs through natural attenuation processes. In summary, the preliminary model estimated that complete restoration of the aquifer to levels below the MCLs would require a total of 35 (10 + 25) years.

Alternative 3 includes a pre-design investigation which would include installation of at least 3 new multi-port wells: one well to the north of existing well GWX-9953 to confirm the northern boundary of the plume, a second well to the west of GWX-9953 to confirm the total depth of the plume, and a third well to the south of the Village of Garden City supply wells to better define the leading edge of the plume. Figure 1 shows the locations of existing wells.

Alternative 3 would also include evaluation and future upgrading, if necessary, of the wellhead treatment at the Garden City supply wells 10 and 11, which have been impacted by site-related contamination. This wellhead treatment system would be needed until it has been determined that these public supply wells are no longer being impacted by the site-related contaminants above health-based standards.

In addition, if future vapor intrusion investigations indicate that there is a concern with site-related vapors migrating into the commercial buildings, EPA would perform mitigation, as necessary.

In addition, this alternative would include institutional controls that restrict future use of groundwater at the site. Specifically, the New York State Department of Health State Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, EPA would rely on the current zoning in the area including and surrounding the mall to restrict the land use to commercial industrial uses. If a change in land use is proposed, additional investigation of soils in this area would be necessary to support the land use change.

A site management plan (SMP) would also be developed and would provide for the proper management of all site remedy components post-construction, such as institutional controls, and shall also include: (a) monitoring of site groundwater to ensure that, following remedy implementation, the groundwater quality improves; (b) conducting an evaluation of the potential for vapor intrusion, and mitigation, if necessary, in the event of future construction; (c) provision for any operation and maintenance required of the components of the remedy; and (d) periodic certifications by the owner/operator or other person implementing the remedy that any institutional and engineering controls are in place.

Alternative 3 would also include long-term monitoring of the contaminant plume through annual sampling and analysis. For cost estimating purposes, 7 existing multi-port wells, 2 existing single-screen monitoring wells (GWX-10019 and GWX-10020), and the new multi-port wells to be installed as part of the pre-design investigation would be monitored. The results of the long-term monitoring program would be used to evaluate changes in the contaminant plume over time and to ensure achievement of MCLs.

Because MCLs will take longer than five years to achieve, a review of site conditions will be conducted no less often than once every five years.

Contingency Plan

Capital Cost:	$5,660,000
Annual O&M Cost:	$680,000

In the event that public supply wells GWP-10 and GWP-11 were to be taken out of service permanently or were to be operated at a significant reduction of their current pumping rates, a contingency plan would be implemented to capture and treat the contaminant plume in that area. The contingency plan would include the installation of a new well or wells in the vicinity of supply wells GWP-10 and GWP-11 and an ex-situ treatment system.

COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with ARARs addresses whether or not a remedy would 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.

- 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. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

- 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.

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

- Cost includes estimated capital and O&M costs, and net present-worth costs.

- State acceptance indicates if, based on its review of the RI/FS and Proposed Plan, the state concurs with the preferred remedy at the present time.

- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A summary of the comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

Alternative 1 would not include any monitoring or remedial measures, and as such, would not be protective of public health and the environment. Alternative 2 would only require long-term monitoring of the groundwater plume, institutional controls and would provide for future vapor intrusion investigation(s). As such, Alternative 2 would only be marginally protective of human health and the environment. Alternative 3 would provide overall protection of human health and the environment through implementation of a remedial pump and treat system to extract and treat the groundwater contamination and vapor intrusion mitigation in the commercial buildings, if deemed necessary.

Compliance with ARARs

EPA and NYSDOH have promulgated health-based protective MCLs (40 CFR Part 141, and 10 NYCRR, Chapter 1), which are enforceable standards for various drinking water contaminants. Only Alternative 3 would meet drinking water standards.

Long-Term Effectiveness and Permanence

Alternatives 1 and 2 would not provide any long-term effectiveness and permanence. Alternative 2 would provide a small degree of long-term effectiveness and permanence through institutional controls. Alternative 3 would provide long-term effectiveness and permanence by extracting contaminated groundwater from the aquifer and treating it to remove the contaminants and provide for vapor intrusion mitigation in the commercial buildings, if deemed necessary.

Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternatives 1 and 2 would not reduce Toxicity/Mobility/Volume through treatment since no treatment would be implemented. Alternative 3 would reduce the mobility and volume of the contaminant plume through groundwater extraction and reduce the toxicity of water through ex-situ treatment using air strippers. Alternative 3 would prevent the contaminant plume with concentrations above the MCLs from migrating downgradient. Alternative 3 would also provide for mitigation due to vapor intrusion in the commercial buildings, if deemed necessary.

Short-Term Effectiveness

Alternative 1 would not have any short-term impact. Alternative 2 would have minimal short-term impact to the community and the environment due to the sampling of wells. Alternative 3 would have some additional impact to the community due to the drilling of wells and the construction of the groundwater extraction well(s) and treatment systems, but the duration would be short and the disturbance would be minimal.

Implementability

All three alternatives are implementable. Alternative 1 would be the easiest to implement, since it involves no action. Alternative 2 would be the next easiest to implement, since it only involves annual sampling of monitoring wells and would not have any ground intrusion activities. Alternative 3 would be also be easy to implement. Access for installation of extraction well(s) and construction of a treatment facility would be required and various contractors would need to be procured. Construction activities could be conducted using standard equipment and procedures.

Cost

Alternative 1 would not involve any costs. Alternative 2 would have relatively lowt costs since it only includes annual sampling of monitoring wells and vapor intrusion investigation of the commercial buildings. The costs associated with Alternative 3 primarily reflect the installation and operation of a groundwater extraction and treatment system and vapor intrusion mitigation systems in the commercial buildings, if deemed necessary.

Alternative	Capital Cost	Annual O&M	Total Present-Worth
1	$0	$0	$0
2	$300,000	$150,000/ $110,000(5)	$2,290,000
3	$6,240,000(6)	$850,000/ $790,000(7)	$13,160,000

(5) Includes long-term monitoring costs only. The monitoring program would be reduced after 25 years.
(6) If the contingency plan is necessary, the capital costs would increase by $5,660,000.
(7) The monitoring program would be reduced after 25 years.

State Acceptance

The New York State Department of Environmental Conservation is currently reviewing this Proposed Plan.

Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD following review of the public comments received on the Proposed Plan.

PROPOSED REMEDY

Based upon an evaluation of the various alternatives, EPA recommends Alternative 3 (Groundwater Extraction and Ex-situ Treatment [Pump and Treat]) as the preferred remedy for groundwater and installation of vapor intrusion mitigation systems, if deemed necessary. Specifically, the proposed remedy would include the following:

To reduce the contaminant concentrations reaching the two Garden City supply wells GWP-10 and GWP-11, a groundwater extraction well(s) would be installed south of SVP-4. This well(s) would capture and treat the portion of the contaminant plume identified at SVP-4, while ensuring that the pumping capacity of supply wells GWP-10 and GWP-11 is not affected. Extracted groundwater would be treated to remove contaminants. Under this alternative, a low profile air stripper would be envisioned as the representative process option to remove the VOC contaminants. During the remedial design, other treatment technologies would be considered as more information becomes available. Based on the maximum concentrations of PCE and TCE detected in SVP-4 during the RI, the maximum combined amount of VOCs (PCE and TCE) generated in the off-gas from the air stripper is estimated to be 1.5 pounds per day. As a result, off-gas treatment should not be necessary. The treated water would meet the discharge standards for groundwater. The treated groundwater would be discharged to Nassau County recharge basin #124. This alternative assumes that the supply wells GWP-10 and GWP-11 continue pumping at the same rate as the past five years.

Evaluation of the current air strippers at supply wells GWP-10 and GWP-11 would be performed, if necessary. The upgrade or replacement costs of the air strippers would be estimated and upgrading or replacement of the strippers would be performed, as necessary.

A pre-design investigation to better define the contaminant plume would be conducted. The areal and the vertical extent of the contaminant plume in the areas of monitoring wells SVP-2 and SVP-4 would be better defined. As part of this effort, it is estimated that at least three new multiport monitoring wells would need to be installed.

Groundwater modeling would be conducted after the pre-design investigation and before the remedial design. The groundwater model used in the FS would be refined based on the new data. During the remedial design, the most recently available pumping data would be incorporated into the model and the optimal location and number of extraction wells would be determined.

If future vapor intrusion investigations indicate that there is concern with site-related vapor migrating into the commercial buildings, EPA would perform mitigation, as necessary.

In addition, this alternative would include institutional controls that restrict future use of groundwater at the site. Specifically, the New York State Department of Health State Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, EPA would rely on the current zoning in the mall-complex area to restrict the land use to commercial/industrial uses. If a change in land use is proposed, additional investigation of soils in this area would be necessary to support the land use change.

A site management plan (SMP) would also be developed and would provide for the proper management of all site remedy components post-construction, such as institutional controls, and shall also include: (a) monitoring of site groundwater to ensure that, following remedy implementation, the groundwater quality improves; (b) conducting an evaluation of the potential for vapor intrusion, and mitigation, if necessary, in the event of future construction; (c) provision for any operation and maintenance required of the components of the remedy; and (d) periodic certifications by the owner/operator or other person implementing the remedy that any institutional and engineering controls are in place.

Long-term monitoring would be conducted which would involve annual groundwater sample collection and analysis from 12 monitoring wells (9 existing wells and 3 new wells), and preparation of annual groundwater sampling reports. The results from the long-term monitoring program would be used to evaluate the migration and changes in the contaminant plume over time.

In the event that public supply wells GWP-10 and GWP-11 were to be taken out of service permanently or were to be operated at a significant reduction of their current pumping rates, a contingency plan would be implemented to capture and treat the contaminant plume in that area. The contingency plan would include the installation of a new well or wells in the vicinity of supply wells GWP-10 and GWP-11 and an ex-situ treatment system.

Because MCLs will take longer than five years to achieve, a review of site conditions will be conducted no less often than once every five years using data obtained from the long-term monitoring program until the groundwater is restored to drinking water quality. The site review will typically include an evaluation of the extent of contamination and an assessment of contaminant migration and attenuation over time.

Basis for the Remedy Preference

EPA has identified Alternative 3 as the preferred alternative, since it would effectuate the groundwater cleanup while providing the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. Alternative 3, which would include extraction and treatment of contaminated groundwater, would result in the restoration of water quality in the aquifer more quickly than natural processes alone and provide for vapor intrusion mitigation, if deemed necessary.

EPA believes that the preferred remedy would remove contaminated groundwater from the aquifer, be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions to the maximum extent practicable. The preferred remedy also would meet the statutory preference for the use of treatment as a principal element.