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Record of Decision:

OLEAN WELL FIELD
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RECORD OF DECISION
DECISION SUMMARY

Olean Well Field

City of Olean, Cattaraugus County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1996

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Olean Well Field

City of Olean, Cattaraugus county, New York

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedial actions for the Olean Well Field Site (Site), which were chosen in accordance with the Comprehensive Environment Response, Compensation and Liability Act of 1980, as ammended (CERCLA), 42 U.S.C. §§ 9601-9675 and the National Oil and Hazardous Substances Pollution Contingency Plan. This decision document explains the factual and legal basis for selecting the remedies for the Site. The attached index (Appendix III) identifies the items that comprise the Administrative Record upon which the selection of the remedial actions is based.

The State of New York concurs with the selected remedy per the attached letter (Appendix IV).

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

This operable unit, which is the second of two operable units for the Site, addresses the violatile organic compound (VOC) contamination at four properties, as described below. The first operable unit focused on determining the nature and extent of volatile organic compound (VOC) contamination in the groundwater. The first operable unit ROD, which was signed on September 24, 1985, specified the installation of two air strippers, which are effectively removing VOC contaminants from the groundwater to concentrations, which are below the maximum allowable concentrations that have been set by EPA and the New York State Department of Health, for drinking water. Groundwater is a source of drinking water for the City and Town of Olean, New York.

The major components of the selected remedy for the second operable unit for the Alcas property includes the following:

! Vacuum Enhanced Recovery (VER) of VOCs from contaminated soil.
! Upgradient and downgradient groundwater monitoring.
! Implementation of groundwater use restrictions.

The major components of the selected remedy for the Loohn's Dry cleaners and Launderers property include the following:

- Vacuum Enhanced Recovery or Soil Vapor Extraction with air sparging (SVE/AS). Should design studies indicate that VER and SVE/AS are impracticable due to the influence of the Allegheny River, the source area will be excavated.
- Upgradient and downgradient groundwater monitoring.
- Implementation of groundwater treatment if VER and SVE/AS or excavation does not adequately improve the quality of the City Aquifer, and if the property continues to affect the groundwater entering the municipal wells.
- Implementation of groundwater use restrictions.

The major components of the selected remedy for the McGraw-Edison property include the following:

- Groundwater treatment
- Upgradient and downgradient groundwater monitoring.
- Implementation of groundwater use restrictions.

The major components of the selected remedy for the AVX property include the following:

- Excavation and removal of contaminated soil.
- Off-Site low temperature desorption of soil contaminants, if necessary.
- Upgradient and downgradient groundwater monitoring.
- Implementation of groundwater treatment, if excavation and removal of the contaminated soil does not adequately improve the quality of the City Aquifer and if the property continues to affect the groundwater entering the municipal wells.
- Implementation of groundwater use restrictions.

The Site Monitoring Plan, which is being implemented as part of the remedy selected for operable unit one, will be modified to determine the effect of the remedies on the upper and lower aquifers and the influence groundwater to Municipal Wells 18M and 37/38M.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedies meet the requirements for remedial actions set forth in CERCLA §121, 42 U.S.C. §9621: (1) they are protective of human health and the environment; (2) they attain a level or standard of control of the hazardous substances, pollutants and contaminants, which at least attain the legally applicable or relevant and appropriate requirements (ARARs) under federal and state laws, (3) they are cost-effective; (4) they utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable; and (5) they satisfy the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants or contaminants at a site.

Pursuant to CERCLA §121(c), 42 U.S.C. §9621(c), a review of the remedial action will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment, because this remedy will result in hazardous substances remaining on-site above health-based levels.

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SITE NAME, LOCATION AND DESCRIPTION

The Olean Field Site is located in the eastern portion of the city of Olean and east and south of the City in the Towns of Olean and Portville in Cattaraugus County, New York. The Well Field is roughly rectangular in shape and encompasses approximately 800 acres (see Figure 1). The Site is approximately 65 miles southeast of Buffalo, New York and 7 miles north of the New York/Pennsylvania border at 42° 05' latitude, 78° 25' longitude. State Routes 16 and 417 provide access to the area.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Three municipal water supply wells (18M, 37M and 38M) were constructed in the mid- to late 1970s to provide water for the City of Olean, New York. The supply wells draw water from the lower aquifer also known as the City Aquifer. Prior to the construction of these municipal wells, city water was supplied by a surface-water treatment facility, which drew water from the Olean Creek. In January 1981, trichloroethene (TCE) and other chlorinated organic solvents were detected in the Olean water supply. The municipal wells were shut down at that time as TCE levels exceeded acceptable drinking water standards set by the New York State Department of Health (NYSDOH). Surface-water treatment facility operations were reactivated.

On October 23, 1981, the EPA Region II Field Investigation Team (FIT) evaluated the Site for inclusion on the National Priorities List. as a result of this evaluation, the Site was included on the National Interim Priorities List, published on October 23, 1981, and was included on the first official Superfund National Priorities List (NPL), published on September 9, 1983.

In November 1981, an EPA consultant initiated a preliminary hydrogeologic investigation at the Site (also referred to as the "Remedial Action Master Plan" or "RAMP"). This investigation, completed in October 1982, included, among other things, the installation of monitoring wells and sampling of those wells, and an aquifer pump test utilizing municipal wells 18M and 37M.

Following the discovery by the Cattaraugus County Department of Health and NYSDOH that a number of private wells in the City and Town of Olean, all of which received groundwater from the upper aquifer, were contaminated with TCE, EPA performed an initial removal action in January 1982. This action involved the installation of carbon adsorption filters on 16 contaminated private wells in the City and town of Olean and periodic monitoring of those wells. EPA ultimately conducted two additional removal actions at the Site. The first of these commenced in June 1984 and included the replacement of one of the carbon filters installed for the additional removal action, installation of carbon units on ten additional contaminated private wells, and monitoring. The second action, implemented in March 1985, involved the installation of two additional carbon filter systems.

EPA conducted additional activities including a 1993 investigation by the FIT, which involved installation of two wells upgradient of the Cooper Industries/McGraw-Edison company facility (McGraw-Edison), a potentially responsible party (PRP) for the Site, and a 1985 FIT action including an aquifer pump test and further sampling at the municipal wells.

A Remedial Investigation and Feasibility Study (RI/FS) was funded through an EPA Cooperative Agreement and performed in 1984-85 by a contractor to the New York State Department of Environmental Conservation (NYSDEC). During the course of the RI/FS, it became apparent that a plume of TCE was threatening a number of private wells in the city and Town of Olean before a permanent remedy for the Site could be implemented. A focused feasibility study was performed and an Initial Remedial Measure (IRM) was conducted which included regular monitoring of private wells and installation of carbon adsorption units, as necessary, until the permanent remedy was in place.

In 1983-84, pursuant to an administrative order issued by EPA, McGraw-Edison performed an investigation at its facility. This and subsequent investigations performed by McGraw-Edison revealed that soil and groundwater in both aquifers at the facility were contaminated with TCE, 1,1,1- trichloroethane (1,1,1-TCA), 1,1-dichloroethylene, 1,1-dichloroethane, trans-1,2-dichloroethane, tetrachloroethane (PCE) and methylene chloride. The studies further indicated that a pathway exists for migration of contaminants away from the McGraw-Edison facility and toward the contaminated municipal wells.

AVX Corporation (AVX), another PRP at the Site, performed an investigation of its facility in 1984-85 pursuant to an administrative order issued by EPA. this investigation indicated that soils and groundwater were contaminated with TCE, 1,1,1-TCA, tetrachloroethylene and other VOCs. Data collected by AVX during this and subsequent investigations demonstrated that contamination migrates downward from the surficial soils at the AVX facility through the till and into the lower aquifer.

Alcas Cutlery Corporation (Alcas), another PRP, conducted an investigation at its facility pursuant to an administrative order issued by EPA in 1984. The investigation found that soil at the Alcas facility was contaminated with VOCs. Upper and lower aquifer ground water was also determined to be contaminated with TCE and trans-1,2-dichloroethylene. Subsequent EPA analyses showed elevated TCE concentrations of up to 12 parts per million (ppm) in monitoring well B-2, which is screened in the lower aquifer at the facility and located approximately 100 yards from municipal well 18M.

EPA issued a Record of Decision (ROD) on September 24, 1985, which required the following: 1) installation of an air stripper to treat the groundwater from municipal well 18M, which is located on the north side of the Allegheny River, and a second air stripper to treat the groundwater from municipal wells 37M and M38M, which are located south of the River. Because wells 37M and 38M are located next to one another, only one air stripper was required.; 2) extension of the City of Olean's public water supply line into the town of Olean to connect approximately 93 residences served by private wells, including those equipped with carbon filters as part of EPA's Removal Actions conducted in 1982, 1984 and 1985; 3) inspection of an industrial sewer at McGraw-Edison and performance of any necessary repairs on the sewer; 4) recommendation for institutional controls to restrict the withdrawal of contaminated groundwater; 5) institution of a Site Monitoring Plan; and, 6) initiation of a supplemental RI/FS (SRI/FS) to evaluate source control measures at facilities that are contributing to the groundwater contamination.

On February 7, 1986, EPA issued a Unilateral Administrative Order, Index Number II CERCLA-60201, under Section 106(a) of CERCLA, 42 U.S.C. §9606, (the 106 Order) to AVX, Alcas, McGraw-Edison, Cooper Industries, Inc.(Cooper), Aluminum Company of America (ALCOA), and W.R. Case and Sons Cutlery Co. (Case), (the PRPs). The 106 order required the PRPs to carry out the remedial actions selected in the ROD. All of the PRPs, with the exception of Case, performed the actions pursuant to the 106 Order. The trustee in bankruptcy for the bankruptcy estate of Case subsequently entered into a consent decree with the United States which required the bankruptcy estate to pay a portion of EPA's past costs and a penalty for Case's failure to comply with the 1986 unilateral order. In exchange, Case was granted a covenant not to sue for all past and future liability.

The extension of the City of Oleans's water line was completed in 1988. In 1989, the private well users were connected to the water line extension. Also in 1989, the industrial sewer at the McGraw-Edison property was inspected and repaired. In February 1990, physical construction of the air strippers was completed and the municipal wells were put back on line. Current pumping rates for Municipal well 18M and the combined pumping rates for Municipal Wells 37M and 38M are approximately 1.2 and 1.9 million gallons per day (MGD), respectively. Since the system began operating, treated water from the air strippers has met State and Federal drinking water standards.

On November 13, 1989, EPA issued an administrative order to Alcas. The order required the Alcas to excavate approximately 10 cubic yards of contaminated soil from an area at the Alcas property where TCE had previously been used as a weed killer. The work was completed in 1989.

On June 25, 1991, an Administrative Order on Consent, Index Number II CERCLA-10202 (the SRI/FS Order) was entered into between EPA and Alcas, AVX, McGraw-Edison, Cooper Industries and ALCOA. The SRI/FS was a mixed work project. the PRPs were required to undertake a study of their respective facilities and write the SRI/FS. EPA conducted studies on 10 additional properties and gave the information to the PRPs for incorporation into the SRI/FS. In 1994, EPA oversaw the completion of a removal action at the Olean Steel property (see figure 1). Olean Steel, which was one the properties investigated as part of the supplemental RI, is a scrap metal recycling operation. EPA ordered the owner of the property to remove approximately 500 pails and drums and 120 cubic yards of contaminated debris and soil from the property. The debris and soil was contaminated with phenol, chromium, lead, bis(2-ethylhexyl)phthalate, copper and zinc. In 1994, a groundwater sample was collected by EPA from an upper aquifer well, as a follow up to the Removal Action. Analysis of the sample revealed arochlor-1254, a polychlorinated biphenyl compound, at a concentration of 5.4 ppb. However, because the groundwater at Olean Steel is not hydraulically connected to the Olean Well Field Site, EPA is referring this matter to the NYSDEC for further action.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA's public meeting for the Record of Decision for the first operable unit was held on March 29, 1988. The major concern of the community then was on the potential economic impact of EPA's selected remedies on the companies which were held responsible for the for the Site. The local community feared the loss of jobs; while the City feared the loss of tax revenue, which would result from job loss.

The supplemental RI report, supplemental FS report, and the Proposed Plan for the second operable unit for the sight were released to the public for comment during the period: July 9,1996, through August 26, 1996. These documents were made available to the public in the administrative record file at the EPA Region II Superfund Records Center, located on the 18th floor at 290 Broadway, New York, New York and the information repository at the Olean Public Library, located at Second and Laurens Street in Olean, New York. The notice of availability for the above-referenced documents was published in the Olean Times Herald on July 9, 1996. The public comment period on these documents was held from July 9, 1996 to August 26, 1996.

On July 16, 1996, EPA and NYSDEC conducted a public meeting at the Olean Municipal Building to inform local officials and interested citizens about the Superfund process, discuss the Agency's preferred remedial alternatives, review current and planned remedial activities at the Site, and respond to any questions or comments raised.

Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary, attached hereto as Appendix V.

SCOPE AND ROLE OF OPERABLE UNIT TWO

The remedies discussed in this Record of Decision constitute the second and last of two operable units planned for the Site. The first operable unit focused on determining the extent and level of VOC contamination in the groundwater. Groundwater is a source of drinking water. The Record of Decision for the first operable unit, which was signed on September 24, 1985, specified the installation of two air strippers on Municipal Wells 18M and 37/38M, which have been treating VOC contaminated groundwater since 1990. The treated groundwater is pumped into the City and Town of Olean public water supply system.

A SRI/FS, which was conducted pursuant to the 1985 ROD, identified four areas on-Site which are acting as sources of VOC contamination to the groundwater. VOC contaminated soil, itself, does not pose an unacceptable risk, however, it is the source of contamination to the groundwater. contaminated groundwater is the principal threat posed by the Site.

This second operable ROD sets forth EPA's selected remedies for the four sources of VOC contamination to the groundwater. The goal of the second operable unit is to restore the aquifer to its beneficial use as a drinking water supply.

SUMMARY OF SITE CHARACTERISTICS

GEOGRAPHY

Olean is located in the Allegheny River Valley near the border of the northwestern Appalachian plateau. The Allegheny River, a principal tributary of the Ohio River, flows west-northwest through the southern portion of the Site. Olean and Haskell Creeks, tributaries of the Allegheny, are located to the west and east of the Site, respectively. Surface runoff, direct precipitation, and groundwater inflow sustain the annual flow in these river/stream systems.

Site Geology and Hhydrogeology

The Olean Well Field is underlain by approximately 300 feet of unconsolidated sediments. Previous groundwater investigations in the Olean Well Field have shown that the upper 100 feet of sediment can be divided into five lithologic units based on color, texture, grain size, and mode of deposition. These lithographic units have geen grouped into four hydrogeologic units referred to as the upper aquifer, upper aquartard, lower aquifer, and lower aquartard.

The upper aquifer is comprised of glaciofluvial coarse sands and sandy gravels, and recent fluvial deposits of fine sands and silts with some clay. The upper aquifer is not continuous across the Olean Well Field. The thickest portion of the aquifer (approximately 41 feet) is found along the Allegheny River. The aquifer thins to the north, pinching out south of the AVX facility.

The upper aquartard is located above the lower aquifer. This unit is a low permeability lodgment till composed of greater than 50 percent silt and clay. The thickness of the upper aquartard in the study area ranges from as little as 6 feet in the south to over 30 feet in the north. In the northern portion of the Olean Well Field, this unit is present at the surface and consists of surficial till.

The lower aquifer, also referred to as the City Aquifer, consists of glacial outwash deposits of sand, silt, and gravel. The lower aquifer is approximately 70 feet thick in the northern portion of the Olean Well Field and thins to approximately 30 feet south of the Allegheny River. The lower aquifer is the main source of water for the city and Town of Olean. In addition, several industrial facilities (Olean Steel, McGraw-Edison, and AVX) utilize wells completed in the lower aquifer for process water.

The lower aquartard has been described as silt, clay, and fine to very fine sand deposited in a preglacial environment.

The upper aquifer is recharged by the infiltration of precipitation. Recharge to the lower aquifer is via leakage from the upper aquifer (or till where the upper aquifer is not present) through the upper aquartard. The magnitude of leakage over the study area is variable and is dependent on the thickness and permeability of the till (upper aquartard) and relative head differences between the upper aquifer (or till) and lower aquifer.

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY

Pursuant to the June 25, 1991, SRI/FS Order, EPA and five PRPs for the Site collected soil gas, soil and groundwater samples at 13 properties to determine if the properties are sources of contamination to the Olean Well Field Site. The PRPs were responsible for sampling the AVX, Alcas and McGraw-Edison properties. Ebasco, under contract to EPA, sampled 10 other properties, which are located throughout the Site. These properties included: Olean Steel; Olean Wholesale; the immediate vicinity of Fay Avenue and Shaefer Street; a Private Dump located at the end of Butler and Andrews Avenues; the "Borrow Pit," a common disposal area located along Riverside Drive; Sandburg Oil; Mastel Ford; Griffith Oil; Loohn's Cleaners and Launderers, Inc. (Loohn's); and Olean Tile. Figure 1 shows the locations of the 13 properties investigated.

With the exception of Olean Steel, soil gas surveys were conducted on 100-by-100 foot grid spacings across each property during September and October 1991. A grid could not be established at the Olean Steel property due to the presence of large amounts of scrap metal on the property. Two additional soil gas surveys were conducted in February 1993 and February 1995 at finer grid spacings of 25 feet.

In 1991, using the results of the soil gas surveys to locate the soil borings, forty-six borings were located and drilling at the suspected source areas. In February 1993 and February 1995, a total of 25 additional soil borings were drilled to better determine the extent of contamination at the suspected source areas. Each soil boring extended down to the water table to determine the verticle extent of contamination.

Sediment samples were taken at three locations in a wetlands area behind the AVX facility. The samples were taken to determine the potential impact of the AVX property on the wetlands area.

Four upper and four lower aquifer groundwater monitoring wells were installed to collect data to determine the extent of groundwater contamination in the upper and lower aquifers and the impact of the source areas on the groundwater. The upper aquifer wells were installed at Olean's Wholesale, Olean Steel, McGraw-Edison, and the Loohn's Dry Cleaners properties. The lower aquifer wells were installed at Olean Wholesale, Olean Steel, Loohn's and Sandburg Oil.

In addition to the groundwater samples obtained from the 8 wells described above, samples were collected from 24 existing wells (13 upper aquifer; 11 lower aquifer wells), which were installed during previous studies of the Site. In addition, groundwater grab samples were collected from the 25 soil borings, which were drilled at the properties being investigated in 1993 and 1995.

A 72-hour pump test was conducted on the upper aquifer at the McGraw-Edison property in 1991. The results of the test assisted in determining the feasibility of pumping contaminated groundwater from the aquifer for treatment.

Finally, pilot tests were preformed to determine whether vacuum enhanced recovery (VER) or soil vapor extraction with air sparging (SVE/AS) would be an effective means of in-situ treatment of VOC contaminated soils at areas of similar subsurface conditions in the study area. SVE/AS and VER are two treatment technologies possible under remedial Alternative 4 for the site. See section below entitled "Description of Remedial Alternatives" for an explanation of the two technologies.

A summary of the soil, sediment and groundwater samples, which were collected at the 13 properties which were investigated during the SRI follows.

AVX

Soil gas, soil and groundwater samples were collected from the AVX properties in 1991 and 1993.

VOCs were detected at significant concentrations in the southern portion of the property at soil boring SB06 (see Figure 1). The maximum concentrations detected were 1,1,1-TCA (1,300,000 ppb), TCE (500,000 ppb), PCE (270,000 ppb), xylene (73,000 ppb), and cis-1,2 dichloroethene (1,2-DCE) (45,000 ppb). Lower levels of PCE (610 ppb) and TCE (29 ppb) were detected in a sample from SB05.

Soil samples were collected from four other borings at the facility. VOC contaminants were either not detected in these samples or were detected at levels, which were below the numerical cleanup goals established to meet the soil Remedial Action Objectives (RAOs) for the Site. See the section on RAOs below.

Analysis of a groundwater grab sample taken from the bottom of soil boring SB06 revealed TCE (110,000 ppb), 1,1,1-TCA (360,000 ppb), 1,2-DCE (73,000 ppb), PCE (14,000 ppb), toluene (21,000 ppb), 1,1-DCE (16,000 ppb), 1,1-DCA (26,000 ppb), acetone (180,000 ppb), and xylene (3,900 ppb). Each of these compounds exceeded its State or federal Maximum Contaminant Level (MCL) value (i.e., drinking water standards). See Table 1.

The soil and groundwater sample results confirmed that the AVX property is a source of VOC contamination to the Olean Wellfield Superfund Site groundwater.

Alcas

Soil gas, soil and groundwater samples were collected from the Alcas property in 1991 and 1993.

Significant levels of VOCs were detected in the southern portion of the facility in soil samples from boring SB07 (see Figure 1). The following maximum soncentrations of VOCs were detected: TCE (12,000 ppb) and PCE (200 ppb). In addition, 1,2-DCE (1,000 ppb), TCE (690 ppb), and vinyl chloride (100 ppb) were detected in a sample from boring SB04.

Soil samples were collected from five other borings at the facility. VOC contaminants were either not detected in samples from these borings or were detected at levels which were below the RAOs for the Site.

Analysis of a groundwater gab sample taken from the bottom of boring SB07 showed TCE (8,800 ppb), 1,1,1-TCA (500 ppb), 1,2-DCE (640 ppb), and vinyl chloride (25 ppb). Each of these compounds exceeded its State or federal MCL value. See Table 1.

Chromium, copper and manganese were also detected in the soil from boring SB05 at 944,000 ppb, 93,600 ppb, and 4,680,000 ppb, respectively.

The soil and groundwater sample results confirmed that the Alcas property is a source of VOC contamination to the Olean Well Field Superfund Site groundwater.

McGRAW-EDISON

Soil gas, soil and groundwater samples were collected at the McGraw-Edison property in 1991 and 1993.

Soil samples were collected from nine borings at the facility. VOCs were either not detected in soil samples from those borings or were detected at low levels, which were below the RAOs for the Site.

TCE was detected at 860 ppb in a saturated (below the water-table) soil sample, which was collected from 24 to 26 feet below the ground surface. The sample was collected during the installation of the upper aquifer well EW-3, which is located in the southeastern part of the property.

Analysis of the groundwater from well EW-3 showed 2,1000 ppb of TCE. A ground water grab sample from boring SB08 revealed TCE and 1,2-DCE at 400 ppb and 51 ppb, respectively. Each compound exceeded its State or federal MCL value. See Table 1.

Groundwater samples were also collected in December 1991 from upper aquifer monitoring wells A-1, C-1, and EW-3. TCE was detected in samples from wells A-1, C-1, and EW-3 at concentrations of 40 ppb, 50 ppb, and 2,400 ppb, respectively, which exceeded the State and federal MCL of 5 ppb for this contaminant.

The saturated soil and groundwater sample results confirmed that the McGraw-Edison property is a source of VOC contamination to the Olean Well Field Superfund Site groundwater.

LOOHN'S CLEANERS AND LAUNDERERS

Soil gas, soil and groundwater samples were collected from the Loohns property in 1991 and 1995.

Significant concentrations of VOCs were detected in the soil from borings SB09, SB12, SB47 and SB48. The soil sampled from boring SB09 showed TCE (24,000 ppb), 1,2-DCE (59,000 ppb), PCE (91,000 ppb) and 2-butanone (5,400 ppb). Soil samples from boring SB12 revealed PCE (38,000 ppb) and TCE (18,000 ppb). Samples from boring SB47 revealed TCE (4,3000 ppb), PCE (370,000 ppb), 2-butoanone (2000,000 ppb) and TCE (400,000 ppb). Finally, a soil sample from Boring SB48 showed 1,2-DCE (2,000 ppb), TCE (510 ppb) and PCE (18,000 ppb).

Soil samples were collected from two other borings at the facility. VOC contaminants were either not detected in samples from these borings or were detected at levels which were below RAOs for the Site.

In January 1995, grab samples of groundwater from borings SB47 and SB48 revealed TCE (29 ppb) in the grab boring SB48 and cis-1,2-DCE (23 ppb) in the grab sample from boring SB47.

In addition, a lower aquifer well was installed at boring SB47 and an upper aquifer well was installed at boring SB48. Cis-1,2 DCE, TCE and PCE were detected at 6.3 ppb, 88 ppb and 1,800 ppb, respectively, in groundwater from the upper aquifer well. PCE was detected at 11 ppb in the lower aquifer well. Each compound exceeded its State or federal MCL value listed on Table 1.

The soil and groundwater sample results confirmed that the Loohn's property is a source of VOC contamination to the Olean Well Field Superfund Site groundwater.

OLEAN STEEL

Soil gas, soil and groundwater samples were collected at Olean Steel in 1991, 1993, and 1995.

In 1991, four soil borings, an upper aquifer well, MW03, and a lower aquifer well, MW04, were drilled and sampled at the locations shown in Figures 1 and 2. VOCs were not detected above the numerical cleanup goals established to meet the RAOs for soil. Analysis of groundwater samples obtained from these wells in December 1991 did not reveal VOCs above the numerical cleanup goals established to meet the RAOs for groundwater.

In 1993, two additional soil borings were drilled at the locations shown on Figure 1. Low concentrations of VOCs were detected.

In 1994, another groundwater sample was collected from MW04 by EPA as a follow up to the Removal Action which was conducted in 1994 (See discussion of Site History on pages 4 and 5). Analysis of the sample revealed arochlor-1245, a polychlorinated biphenyl compound, at a concentration of 5.4 ppb.

In February 1995, one additional boring (SB44) was drilled down to the top of the upper aquifer. VOCs were not detected above the numerical cleanup goals established to meet the RAOs for soil.

VOC contaminants were either not detected in the soil and groundwater samples from the Olean Steel property or were detected at levels which were below the numerical cleanup goals established to meet the RAOs for the Site. The soil and groundwater sample results indicate that the Olean Steel property is not a source of VOC contamination.

In addition, after review of the groundwater flow data for the upper aquifer, EPA has also concluded that Olean Steel is not hydraulically connected to the Olean Well Field Site. After discussion with NYSDEC, EPA is however referring the PCB sample results to the NYSDEC for further action.

MASTEL FORD

Soil gas, soil and groundwater samples were collected at the Mastel Ford property in 1991, 1993, and 1995.

In 1991, three soil borings were drilled at the locations shown on Figure 1. Minimal concentrations of VOCs were detected.

In 1993, two additional soil borings were drilled at the Mastel Ford facility. Minimal concentrations of VOCs were detected.

In February 1995, a sixth soil boring SB45 was drilled down to the top of the upper aquifer. No significant contamination was found.

Two groundwater grab samples were collected in 1993 from soil borings SB31 and SB32 and one grab sample was collected in January 1995 from SB45. VOCs were not detected in the sample SB31. Minimal levels of VOCs were detected in the grab samples from SB32 and SB45.

VOC contaminants were either not detected in the soil and groundwater samples from the property or were detected at levels which were below the numerical cleanup goals established to meet the RAOs for the Site. These results indicate that the Mastel Ford property is not a source of contamination to the Olean Well Field Superfund Site groundwater.

SANDBURG OIL

Soil gas, soil and groundwater samples were collected at the Sandburg Oil property in 1991, 1993 and 1995.

In 1991, one soil boring (SB23) was drilled. Analysis of soil from the boring showed benzene (9 ppb) and xylene (4,500 ppb). These VOCs are associated with petroleum and petroleum product derivatives.

In February 1995, a third soil boring (SB46) was advanced down to the top of the upper aquifer. A groundwater grab sample collected from the boring revealed: ethylbenzene (540 ppb), xylene (157 ppb), naphthalene (110 ppb) and 2-methylnapthalene (54 ppb). These VOCs are associated with petroleum and petroleum product derivatives.

A lower aquifer monitoring well was installed in the borehold for SB46. Methylene chloride was the only VOC detected (15 ppb) in the groundwater, which exceeded State and federal MCLs. However, the presence of the compound in the groundwater was not attributed to Sandburg Oil, since it was not detected in the soil at concentrations above the numerical cleanup goals established to meet the RAOs for the Site.

The soil and groundwater sample results confirmed Sandburg Oil as a source of petroleum-related contamination to the Olean Well Field Superfund Site groundwater. Because CERCLA prevents EPA from using the Superfund to clean up or oversee the cleanup of petroleum contamination, EPA is referring this property to the NTSDEC for action under the State petroleum clean up program.

GRIFFITH OIL

Soil gas, soil and groundwater samples were collected at the Griffith Oil property in 1991, 1993 and 1995.

During 1991, three soil borings were drilled and sampled at the locations shown on Figure 1. SVOCs were detected from samples from soil boring SB24, namely, 2-methyl naphthalene (7,600 ppb) and phenanthrene (1,100 ppb).

Two groundwater grab samples were collected at soil borings SB41 and SB42 during 1993. Minimal concentrations of VOCs were detected.

In January 1995, soil boring SB49 was drilled down to the top of the upper aquifer. The location of SB-49 is shown in Figure G1-6 of the SRI/FS report. Analysis of the soil revealed elevated concentrations of benzene (650 ppb), toluene (5,900 ppb) and xylene (23,000 ppb), which are associated with petroleum and petroleum product derivatives.

Analysis of groundwater from an upper aquifer well DW6R-01, located on the Griffith Oil property, revealed six VOCs, namely, methyl chloride (14 ppb), 1,1-DCA (6.1 ppb), cis-1,2-DCE (79 ppb), TCE (78 ppb), benzene (220 ppb) and ethyl benzene (5.7 ppb).

Although nonpetroleum-related VOC contaminants were also detected (1,1-DCE, cis-1,2-DCE, and TCE) in the groundwater, they were not attributed to Griffith Oil, since the VOCs, which were detected in the soil, were below the numerical cleanup goals established to meet the soil RAOs for the Site. The sample results therefore indicate that the Griffith Oil property is not a source of the VOC contamination.

The soil and groundwater sample results confirmed Griffith Oil as a source of petroleum-related contamination to the Olean Well Field Superfund Site groundwater.

The NYSDEC is currently overseeing a spill response clean-up of fuel oil and gasoline spills at the Griffith Oil facility.

FAY AVENUE/SCHAEFER STREET

Soil gas, soil and groundwater samples were collected in the immediate vicinity of Fay Avenue and Schaefer Street in 1991 and 1993, in order to determine whether past alleged dumping activities may be a source of contamination to the groundwater.

In 1991 and 1993, three soil boring were drilled and sampled at the locations shown on Figure 1. All VOC concentrations were below the numerical cleanup goals established to meet the soil RAOs for the Site.

One groundwater grab sample was collected at soil boring SB40 during 1993. In this sample only, cis-1,2-DCE was detected at 2 ppb.

The soil and groundwater sample results indicate that the Fay Avenue/Shaefer area is not a source of contamination to the Olean Well Field Superfund Site groundwater. VOC contaminants were either not detected in the soil and groundwater samples from the property or were detected at levels which were below the numerical cleanup goals established to meet the RAOs for the Site.

OLEAN TILE

Soil gas, soil and groundwater samples were collected at the Olean Tile property in 1991 and 1993.

In 1991, four soil borings were drilled at the locations shown on Figure 1. VOCs were not detected with one exception - acetone was detected (26 ppb) in sample SB13-0002.

In 1993, three additional soil borings were drilled at the locations shown on Figure 1. The following VOCs were detected in soil samples from boring SB34: toluene (28,000 ppb); xylene (10 ppb), and 2-butanone (14 ppb).

Two groundwater grab samples were collected at soil borings SB35 and SB36 during the 1993 soil boring program. VOCs were not detected in the samples.

EPA does not believe toluene is a source of contamination to the groundwater which reaches the municipal wells. The compound was detected from 4 to 10 feet below the surface. No organic contaminants were detected from 11 feet to 42 feet. The boring terminated at a depth of 42 feet; groundwater was not observed in the borehole. Therefore, EPA believes that the toluene contamination is isolated and should not impact the groundwater. However, because of the elevated level of toluene found, EPA will be evaluating this matter further using its Site Assessment program.

In February 1995, a surface water sample was collected from the Allegheny River to determine if any contamination emanating from the Olean Tile property was impacting the river. Results of the water sample analysis indicated that no VOCs, including toluene, were detected.

The soil, groundwater and surface water sample results indicate that Olean Tile is not a source of contamination to the Olean Well Field Superfund Site groundwater or the Allegheny River.

OLEAN WHOLESALE

Soil gas, soil and groundwater samples were collected from the Olean Wholesale property in 1991 and 1993.

In 1991, four soil borings were sampled at the locations shown on Figure 1. VOCs were detected at concentrations, which were below the numerical cleanup goals established to meet the RAOs for the Site.

In 1993, soil samples were collected from one additional soil boring. No VOCs were detected.

Groundwater samples were collected in December 1991 from upper aquifer monitoring well MW02 and lower aquifer monitoring well MW01. VOCs were not detected in the samples from either well.

One groundwater grab sample was collected at soil boring SB43 in 1993. TCE was detected at 7 ppb.

The soil and groundwater sample results indicate that Olean Wholesale is not a source of contamination to the Olean Well Field Superfund Site groundwater. VOC contaminants were either not detected in soil samples from the property or were detected at levels which were below the numerical cleanup goals established to meet the RAOs for the Site.

PRIVATE DUMP

Soil gas and soil samples were collected from the Private Dump in 1991, in order to determine whether past alleged uncontrolled dumping activities may be a source of contamination to the groundwater.

In 1991, two soil borings (SB25 and SB26) were drilled and sampled at the locations shown on Figure 1. Three sediment samples (SD01, SD02, and SD03) were also collected from a swampy area. VOCs were not detected in the soil with one exception - toluene (6 ppb) and 2-butanone (60 ppb) were detected at boring SB26. PCE was detected in the sediment at 10 ppb.

No soil samples were collected in 1993.

The soil sample results indicate that the Private Dump is not a source of contamination to the Olean Well Field Superfund Site groundwater.

BORROW PIT

Soil gas, soil and sediment samples were collected from the Borrow Pit in 1991 and 199, in order to determine whether past alleged uncontrolled dumping activities may be a source of contamination to the groundwater.

In 1991, one soil boring (SB28) was sampled at the location shown in Figure 1. VOCs were not detected.

Three sediment samples (SD4, SD5, and SD6) were also collected from a pounded area (see Figure 1) in 1991. Minimal levels of VOCs were detected.

In 1993, one additional soil boring (SB39) was drilled at the location shown on Figure 1. VOCs were not detected with one exception - methylene chloride (12 ppb).

One groundwater grab sample was collected from soil boring SB39 in 1993. The only VOC detected was TCE at 13 ppb.

The soil and groundwater sample results indicate that the Borrow Pit is not a source of contamination to the Olean Well Field Superfund Site groundwater. VOC contaminants were either not detected in the soil samples from the property or were detected at levels which were below the numerical cleanup goals established to meet the RAOs for the Site.

BACKGROUND SOIL SAMPLES

In 1991, two soil borings (SB29 and SB30) were drilled and sampled off-Site at the intersection of King and Seneca Streets, in the City of Olean. The samples were collected as background samples to establish a baseline upon which the Site data could be compared. PCE and methylene chloride were detected at 8 ppb and 10 ppb, respectively, in a soil sample from boring SB29. Also, inorganic analysis of the samples indicated metal concentrations were within background concentrations of metals for the soils in the eastern United States.

SITE-WIDE GROUNDWATER SAMPLES

Groundwater samples were also collected from twenty-four existing monitoring wells on Site in December 1991, November 1994, and March 1995. The wells included: A-1, C-1, CW-1B, CW-3B, CW-4, CW-4A, CW-5, CW-5A, CW-7A, CW-9A, CW-10, CW-10A, CW-12, CW-12A, CW-13, CW-13A, CW-15A, CW-18, CW-18A, well located at S&S Car Cleaners, DW6R-01, Alcas D-2, AVX-5D, and MEC-A-2. See Figure 2 for the well locations.

Maximum concentrations of VOCs detected between 1989 and 1995 in samples from several of the existing wells were as follows:

Contaminant	Monitoring Well	Concentration Detected	Federal MCL	State MCL
TCE	Alcas D2	6,500 ppb	5 ppb	5 ppb
	AVX-5D	2,000 ppb	C-1	40 ppb
	CW-7A	590 ppb	CW-9A	400 ppb
	CW-10	340 ppb	CW-18A	1,400 ppb
	MEC-A2	170 ppb	S&S Cleaners	39 ppb
1,1,1-TCA	AVX-5D	7,200 ppb	200 ppb	5 ppb
	CW-7A	7 ppb	CW-18A	15 ppb
Cis-1,2 DCE	AVX-5D	15,000 ppb	70 ppb	5ppb
	CW-18A	41 ppb		
PCE	CW-18A	3.1 ppb	5 ppb	5 ppb

In addition, bis (2-Ethylhexyl) phthalate, an SVOC, was detected in CW-5 (190 ppb) and CW-12 (560 ppb).

State and federal MCLs, were exceeded for Chromium in samples from the existing wells CW-12 and CW-12A (1,720 ppb). Chromium was detected in CW-12 (22,500 ppg) and CW-12A (1,720 ppg). The federal and State MCL values for chromium at 100 ppb and 50 ppb, respectively. However, analysis of the groundwater, before it is treated at municipal wells 18M and 38M, has not revealed chromium or any other inorganic contaminants. Because of the proximity of the monitoring wells to well 18M and the high concentration of chromium detected, EPA believes that chromium also be added to the list of contaminants which are analyzed for as part of the Site

Monitoring Plan, which was required as part of the remedy selected for the September 24, 1985 ROD.

UPPER AQUIFER PUMP TEST

A 72-hour constant rate pumping test was performed on well EW-3 in January 1992 at the McGraw-Edison facility to determine the transmissivity and storativity of the upper aquifer in the Olean Well Field. Results from this test will be used in designing a system for treating contaminated groundwater from the upper aquifer.

DIRECTION OF GROUNDWATER FLOW

Groundwater water level measurements were collected in selected upper aquifer and lower aquifer monitoring wells located throughout the Site on February 13, 1992, February 27, 1992, and March 26, 1992.

Water-level measurements were also collected from existing monitoring wheels in the vicinity of Haskell Creek and used in the preparation of potentiometric surface maps, which are included in the SRI report.

The potentiometric surface map for the upper aquifer indicates that lines of equal elevation for the upper aquifer generally parallel the Allegheny River. This indicates that groundwater flow is towards the river from both sides of the river valley. In general, the horizontal component of groundwater flow is consistent with the flow pattern for the upper aquifer described in the RI/FS conducted in 1984.

Groundwater in the lower, or City Aquifer, flows from east to west. Flow conditions in the lower aquifer have been altered since the 1985 RI in that during the RI, the municipal wells were inactive and the AVX production well was pumping at approximately 200 gpm. Since 1990, the three municipal wells have been pumping at a combined rate of 2,150 gpm and the AVX production well has been decreased to approximately 50 gpm due to decreased demand. The principle difference between the groundwater flow regime at the time of the 1985 RI report and the March 1992 SRI potentiometric maps, is the increased hydraulic gradient in the study area which resulted from the pumping stress imposed by the now active municipal wells. A figure identifying the capture zones is included in the SFS report.

CULTURAL RESOURCE SURVEY

In April 1992, an EPA contractor conducted a Stage 1A Cultural Resources Survey (CRS-1A) of the Site which entailed a review of the historic maps and archival records on file at the New York State Office of Parks and Recreation, Historic Division; the Cattaraugus County Historical Society; and the Assessor's and Engineer's Office of the City of Olean. The contractor also reviewed previous cultural resource surveys of the region and conducted on-Site reconnaissance. A copy of the CRS-1A report is included in the Administrative Record for the Site, which is located in the public repositories listed on page 2.

After review of the CRS-1A report and pursuant to the National Historic Preservation Act, EPA has decided that additional cultural investigations must be completed at the Alcas and Loohn's facilities. Specifically, the Alcas and the Loohn's have been determined to be sensitively for the discovery of cultural resources. As such, a Stage 1B Cultural Resources Survey will be completed early in the remedial design. If, based on the results of the CRS report, it is necessary to carry out additional CRS work at the site, it will be completed during the remedial design to meet the requirements of the National Historic Preservation Act.

SUMMARY OF SITE RISKS

Based upon the results of the SRI, a baseline risk assessment was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the human health and ecological risk which could result from the contamination at the if no remedial actions were taken.

Human Health Risk Assessment

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 concern at the site 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.

EPA's baseline risk assessment addressed the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to at the site under current and future land-use conditions. The contaminants of concern which were detected in the groundwater and the soild at each of the properties investigated are listed in Tables 2 and 3, respectively.

The baseline risk assessment evaluated the health effects which would result from exposure to groundwater contamination through three pathways, namely, ingestion, dermal contact and inhalation of volatilized contaminants during showering. The groundwater exposure scenarios are presented in Table 4.

Risks due to contaminants in the surface and subsurface soil were calculated for exposure as a result of ingestion or inhalation of contaminants by construction workers. A residential exposure scenario was not calculated because all of the properties studied during the SRI/FS are zoned and operated as either industrial or commercial, and it is expected that such use would continue in the future.

Risk due to dermal contact with soils was assessed qualitatively due to the absence of dermal absorption factors for all Site-related containments except cadmium. Cadmium was found at five of the 13 properties investigated. However, of the five properties the highest concentration of cadmium detected was just above 4 ppm, which would not pose an unacceptable risk.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic effects due to exposure to site chemicals are considered separately. 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 compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference does (RfDs) have been developed by EPA for indicating the potential for adverse health effects. the reference doses for the compounds of concern at the site are presented in Tables 7 and 8. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result 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. A summary of the noncarcinogenic risks associated with these chemicals across various exposure pathways is found in Tables 5 and 6.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have ben developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, 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. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Tables 7 and 8.

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 level indicates that an individual has no greater than a one in ten thousand to one in a 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 the site.

The results of the baseline risk assessment indicate that ingestion of and dermal contact with untreated groundwater at the Site poses unacceptable risks to human health. Cancer risks due to ingestion of groundwater were determined to be approximately one-in-one-hundred for adults and young children (1.49 x 10-2 and 1.3 x 10-2, respectively) and six-in-one-thousand (5.94 x 10-3) for older children. Noncarcinogenic HIs for these exposure groups were 3.36 for adults, 14.7 for young children and 6.73 for older children. The aforementioned cancer and non-cancer risks are referenced in Table 5.

Cancer risks due to dermal contact with groundwater contaminants were determined to be 2.35 x 10-3 for adults, 9.21 x 10-4 for young children and 6.68 x 10-4 for older children. The HI for each group was less than one.

Cancer and noncancer risks due to inhalation of contaminants from untreated groundwater during showering were within EPA's acceptable risk range. Cancer risks for adults were determined to be 6.38 x 10-5 for adults and 5.98 x 10-5 young children, and 2.73 x 10-5 for older children. The HI for each group was less than one.

Risks were also calculated for ingestion and inhalation of surface and subsurface soil contaminants by construction workers. The risks were calculated for a two year exposure period and are referenced in Table 6. Cancer risks were found to be acceptable for each of the thirteen properties investigated. Noncancer risks were also found to be acceptable at twelve of the thirteen properties with the exception of McGraw-Edison. A minimal non-cancer risk (HI of 1.14) due to soil ingestion was calculated for McGraw-Edison. The elevated risk is due mainly to arsenic.

The cumulative upper-bound cancer risks for exposure to untreated groundwater at the Site are 1.73 x 10-2 for adults, 1.39 x 10-2 and 6.64 x 10-3 for older children, which are greater than the acceptable risk range of 10-4 to 10-6. The estimated total risks are primarily due to trichloroethene, which contributed significantly to the carcinogenic risk calculations and was attributable releases of the contaminant onto the ground and eventually into the groundwater.

Ecological Risk Assessment

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.

EPA conducted an assessment of a wetlands area, which is located to the south of the AVX facility. The assessment was conducted to determine if the wetlands area overlapped the area of contamination at the AVX facility. Sediment samples were taken to determine if AVX was impacting the wetlands area.

The wetlands area, which encompasses approximately 18.5 acres, is bordered to the north by Seneca Avenue, he south by a Conrail right-of-way and AVX, the east by Dugan Road and the west by AVX. Three sediment samples were collected from the wetlands area south of the AVX property and north of the Conrail railroad tracks. Analysis of the samples did not reveal any VOC contamination. Several semi-volatile organic compounds (SVOCs) were detected, but were attributed to the Conrail railroad tracks. Also the SVOCs were not determined to be impacting the groundwater.

No other studies were conducted to assess other ecological risks since the Site is located in an urban commercial/industrialized area. The three other source areas, Alcas, McGraw-Edison and Loohn's, which are included as part of the Site, are developed properties with lawns, planting, and one or more buildings with asphalt entry ways and parking areas. There are no significant habitats present at the Site which could potentially support indigenous wildlife receptor species. These properties, however, may provide a habitat for various non-native species which have adapted to highly urbanized areas (e.g., rats, starlings and pigeons).

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide 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 significant 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.

Uncertainties in the exposed 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, as well as 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 risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report. The report is part of the Administrative Record for the Site, which may be found in the public repositories listed on page 2.

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.

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 (TBC) guidance values, and risk-based levels established by th risk assessment.

Remedial action objectives for the Site were developed for two contaminated media - groundwater and soil. Both sets of objectives are designed to restore the upper and lower aquifers to their beneficial use a source of drinking water.

Groundwater objectives include: 1) removal and/or control of the sources of contamination to the groundwater; and, 2) removal of sources of contamination already in the groundwater.

Soil objectives include the elimination of leaching of contaminants of concern from the soil at each of the source areas into the groundwater.

In order to determine which source areas require remediation, EPA compared contaminants in the groundwater and soil at all of the properties to various criteria. For soil, EPA used the NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) cleanup numbers, which represent concentrations of VOCs which will not leach from the soil and dissolve into the groundwater at levels which are above federal or State MCL concentrations. For groundwater, EPA used federal and State MCLs. Facilities where soil and groundwater contamination levels exceeded these criteria were targeted for remediation. These criteria, which will also be used as cleanup goals, are presented in Table 1.

As a result of this analysis, EPA has determined that the AVX, Alcas, Loohn's and McGraw-Edison properties are sources of contamination to the groundwater and therefore require remediation.

For the AVX and Loohns source areas, the remediation will be phased. First, a soil cleanup will take place, after which EPA will monitor the groundwater to determine if VOC concentrations are decreasing at a rate sufficient to meet the goal of aquifer restoration in a reasonable time frame. If necessary, EPA will install a groundwater pump and treat system at the two source areas to facilitate aquifer restoration.

Because of the close proximity of the Alcas source area to municipal well 18M, remediation of the contamination will only consist of a soil remediation phase. Additional groundwater remediation is not necessary since any groundwater which is contaminated by the property is captured and treated by an air stripper, which is currently operating at the municipal well.

Remediation of the McGraw-Edison facility will only consist of a groundwater phase, since the soil was not found to be contaminated. (The contamination in the saturated soil zone will be addressed by the groundwater cleanup.)

The Sandburg Oil and Griffith Oil properties were also determined to be sources of groundwater contamination, although the contamination was found to be petroleum-related. As such, CERCLA prohibits the use of Superfund Trust Fund monies to clean up or to oversee the clean up of the petroleum contamination. EPA will therefore refer the contamination at these properties to the NYSDEC for action under the State's petroleum cleanup program.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action be among other things protective of human health and the environment and cost-effective, and must 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 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 §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).

Discussed below are the six remedial alternatives which were evaluated in detail for addressing the contamination associated with the Olean Well Field Site. The time to implement a remedial alternatives reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate with the responsible parties, procure contracts for design and construction, or conduct operation and maintenance at the site.

Alternative 1 - No Action

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison of other alternatives. No Action results in leaving the source area properties as they currently exist with no additional work to be performed. At present, groundwater recovery and treatment with air strippers on the municipal water supply wells and on a production well at the McGraw-Edison site are in operation. A quarterly Site Monitoring Program is also being carried out as part of the remedy selected by the September 24, 1985 ROD.

Because this alternative would result in contaminants being left on-Site above health based levels, CERCLA Section 121(c), 42 U.S.C. §9621(c) requires that the Site be reviewed every 5 years.

There are no capital or operation and maintenance costs associated with this alternative.

Construction Time: Since this is a no action alternative, no time would be required for construction.

Alternative 2 - Institutional Controls and Access Control

This alternative includes educational programs, such as public meetings and presentations, designed to increase public awareness about the hazards present in the identified source areas. In addition, this alternative includes the implementation of institutional controls, such as deed restrictions, and other notices, contractual agreements, local law or ordinances or other governmental actions for the purpose of restricting installation and use of groundwater wells throughout the Site, ensuring that excavation of soils in or near an identified soil source area is accompanied by implementation of a worker/local area health and safety plan and appropriate off-Site treatment and/or disposal of contaminated soils, and ensuring that the property remains for industrial use. Institutional controls restricting groundwater use, land use and excavation would be required until the groundwater has been demonstrated to meet RAOs as set forth in Table 1.

Because this alternative would result in contaminants being left on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Capital, present worth, and operation and maintenance costs for this alternative are summarized in Table 9. Costs were developed by source area. Capital costs would include fencing and manpower to obtain land access use and deed restrictions and to educate the public on the level and extent of contamination at the Site. Operation and maintenance costs would include Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: this alternative could be implemented within 3 to 6 months.

Alternative 3 - Capping and Groundwater Treatment

This alternative would involve the following major elements:

- Capping of contaminated soil.
- Implementation of land use/access restrictions to maintain integrity of the cap and groundwater use restrictions.
- Monitoring programs at selected monitoring wells and at the Olean Well Field municipal wells.
- Implementation of groundwater treatment if capping does not sufficiently remediate the groundwater.
- Conducting a 5-year review.

Stage 1

Alternative 3 would require capping of impacted soils at the soil source areas with a clay and soil cap. This would reduce further migration of the contamination from the soil to the groundwater. Land use and deed restrictions and groundwater monitoring, as described for Alternative 2, would also be implemented. Land use restrictions would prevent any activities which would adversely affect performance of the cap. Deed restrictions would also be imposed to prevent the installation of private drinking water wells.

The soil source areas would be covered with a clay cap. The surface area capped would be approximately 9,800 square feet at Alcas, approximately 3,200 square feet at AVX and approximately 6,000 square feet at Loohns. Since no soil contamination was detected at the McGraw-Edison property, a cap would not be necessary.

Stage 2

After capping is completed at Alcas, AVX and Loohns, EPA will assess the effect on the groundwater after waiting the time for three pore volumes of groundwater to travel from all three source area properties to the municipal wells. It is estimated that it will take four years for the three pore volumes of groundwater to pass or flush from the source areas to the municipal wells. Therefore, groundwater monitoring will be required. The effectiveness of the remediation will be evaluated at four year intervals. If it is determined that the City Aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remedial source are continues to effect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed at either AVX or the Loohns Dry Cleaners source areas. However, such treatment will not be necessary at the Alcas source area due to the close proximity of the source area to municipal well 18M.

If groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluate the impact of a groundwater pump and treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially adverse affect on the wetlands area.

Because this alternative would result in contaminants being left on-Site above health-based levels, CERCLA requires that the Site be reviewed every five years.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 9. Costs were developed by source area. Capital costs were developed for the construction of a cap at each source area and construction of a groundwater collection and treatment systems at the Loohns and AVX source areas. The capital cost for the Alcas source area does not include groundwater treatment, since contaminated groundwater from the source area will be captured and treated by the air stripper at municipal well 18M. The capital cost for the Alcas source area includes only construction of the cap. Operation and maintenance and present worth costs for AVX and Loohn's were developed for maintenance of a cap and groundwater treatment system for thirty years and Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Capping of the source area properties could be implemented within 1 year. Groundwater treatment, if determined to be necessary, could be implemented within 9 to 12 months after the design of the groundwater extraction and treatment system has been completed.

Alternative 3A - Groundwater Pumping and Treating

This alternative would involve the following elements:

! Groundwater treatment at the source areas
! Implement groundwater use restrictions.

Under this alternative, groundwater recovery system would be installed. Contaminants in the recovered groundwater would be removed by an air stripping system. The treated groundwater would be treated further, if necessary, with granulated activated carbon (GAC) and discharged to the City of Olean sewer system and ultimately to the Publicly Owned Treatment Plant. If necessary to meet New York state air emission limits, the off-gas from the air stripping system would be treated with vapor phase GAC.

This alternative would also involve deed restrictions which would be imposed to prevent the installation of private drinking water wells.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 9. Operation and maintenance and present worth costs are for Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Groundwater recovery/treatment systems, if determined to be necessary, could be constructed at the AVX or Loohns properties within 9 to 12 months. Groundwater treatment at McGRAW-EDISON, could be implemented within 3 to 6 months, since an air stripper with sufficient excess capacity already exists on site. McGraw-Edison installed the air stripper in the early 1980's to treat groundwater for industrial use on-Site.

Alternative 4 - Soil Vapor Extraction (SVE/Vacuum Enhanced Recovery (VER) and Groundwater Treatment

This alternative consists of implementing the following:

- SVE/VER of contaminated soil.
- Monitoring programs at selected monitoring wells and at Olean Well Field municipal wells.
- Implementation of groundwater treatment if SVE does not result in sufficiently lower contaminant concentrations in the ground water.
- Implement groundwater use restrictions

Stage 1

Two different types of in-situ treatment systems were considered for treating VOC contaminated soil: SVE with Air Sparging (SVE/AS) and Vacuum Enhanced Recovery (VER)

Evaluations of the Alcas and AVX properties determined that a SVE/AS treatment system would not be effective. However, pilot tests were conducted at the source areas in 1994 and the tests confirmed that vacuum enhanced recovery (VER) could effectively desorb VOCs from the contaminated subsurface at both properties. Additional data needs to be collected for the Loohns property in order to determine whether SVE/AS or VER would be the more effective means of soil treatment. EPA intends to collect these data during a pilot test, which would be conducted as part of a remedial design for the Loohn's source area.

This remedial alternative would also include the imposition of deed restrictions that would prevent the installation of private drinking water wells.

Descriptions of VER and SVE/AS are provided as follows:

A VER system uses negative air pressure which is applied to a series of recovery wells. The negative pressure, which is generated by a high vacuum pump, causes the movement of soil vapor and some groundwater towards the wells for recovery. The vapor recovery causes desorption (removal of contaminants which are adsorbed onto soil particles) and volatilization of VOCs by continuously removing contaminated vapors and forcing clean air into the contaminated areas. An off-gas treatment system will use granulated activated carbon (GAC) to remove contaminants which are above federal and New York State air emission levels. Any groundwater which is recovered with the soil vapor, would also be treated with GAC prior to discharge to the City sewer system.

An SVE/AS system would use a soil vapor recovery process, which is discussed above, combined with air injection wells which would extend below the water table. Air, which is injected under pressure into the wells, would enter water below the water table.

The air bubbles, which are formed, traverse horizontally and vertically through the water column. Volatile compounds, which are exposed to the sparged air, volatilize intot he gas phase and are carried into the vadose zone where they are captured by the vapor recover system. An off-gas treatment system will use GAC to remove contaminants which are above federal and New York State air emission levels. Any groundwater which is recovered with the soil vapor, would also be treated with GAC prior to discharge to the City sewer system or to the surface water with a New York State Pollution Discharge Elimination System permit.

Essentially, a VER system works by applying a higher vacuum to the subsurface than a SVE/AS system. The higher vacuum allows VER to operate more effectively than SVE/AS in varied geological settings.

The SVE/VER system would be operated until contaminant levels in the soil vapor and water effluents cease to decline and remain constant at a negligible rate. At which time, the system would be shut off. EPA expects that the soil cleanup objectives in Table 1 will be met.

Stage 2

After soil remediation is completed at Alcas, AVX and Loohns, EPA will assess the affect on the groundwater after waiting four years to allow three pore volumes of groundwater to pass, or flush through, from the source areas to the municipal wells. The groundwater quality will be monitored and the effectiveness of the remediation will be evaluated at four-year intervals. If it is determined that the City Aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source are continues to affect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed at either the AVX or the Loohn's Dry Cleaners source areas. However, additional groundwater treatment will not be necessary at the Alcas source area due to the close proximity of the source area to municipal well 18M.

If groundwater treatment determined to be necessary for the AVX source area, EPA will also evaluate the impact of a groundwater pump and treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially adverse affect on the wetlands area.

Capital, present worth, and operation and maintenance cost for this alternative are summarized in Table 9. Costs were developed by source area. Capital costs were developed for the construction of SVE/VER systems at the source areas and construction of groundwater collection and treatment systems at the Loohns and AVX source areas. Because contaminated groundwater from the source area will be captured and treated by the air stripper at municipal well 18M, the capital cost for the Alcas source area does not include groundwater treatment. Operation and maintenance and present worth costs were developed for maintenance of an SVE/VER system for five years and groundwater treatment system for thirty years for AVX and Loohn's and Site-wide sampling and analysis of the groundwater for thirty years.

Constrruction Time: Installation of SVE/VER system at the source area properties could be implemented within one year. Groundwater treatment, if determined to be necessary, could be contructed within 9 to 12 months after the date the decision is made.

Alternative 5 - Soil Removal And Groundwater Treatment

Alternative 5 would consist of implementing the following:

- Excavation and removal of contaminated soil above and below the water table.
- Off-Site low temperature desorption of soil contaminants (if necessary).
- Monitoring programs at selected monitoring wells and at Olean Well Field municipal wells.
- Implementation of groundwater treatment if excavation and removal of the contaminated soil does not sufficiently lower contaminant concentrations in the groundwater.
- Implement land use/access and groundwater use restrictions.

Stage 1

The soil source area(s) would be excavated and the soils tested to determine if the excavated soils are classified as RCRA hazardous waste material. If hazardous, the soils would be transported off-Site to a facility for low temperature desorption of soil contaminants. If not hazardous, the soils would be disposed of at a local landfill. Clean fill material would be brought in to restore each of the areas to grade. Confirmatory soil sampling and analyses would be conducted during soil excavation to ensure that all soils with contaminant levels exceeding the RAQs as set forth in Table 1 are removed.

Until restoration of the excavated areas is complete, land use/access restrictions would be placed on the source area restricting current and future use. These actions would also include the imposition of deed restrictions that would be imposed to prevent the installation of private drinking water wells. During all phases of the soil removal, it would be necessary to implement dust and volatile emission control measures, soil erosion, and sediment control measures.

Stage 2

After soil remediation is completed at Alcas, AVX and Loohns, EPA will assess the affect on the groundwater after waiting four years to allow three pore volumes of groundwater to pass, or flush through, from the sources areas to the municipal wells. The groundwater quality will be monitored and the effectiveness of the remediation will be evaluated at four-year intervals. If it is determined that the City Aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed at either the AVX or the Loohn's Dry Cleaners source areas. However, additional groundwater treatment will not be necessary at the Alcas source area due to the close proximity of the source area to municipal well 18M.

If groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluate the impact of a groundwater pump and treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially adverse effect on the wetlands area.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 9. Costs were developed by source area. Capital costs were developed for the removal of contaminated soil at each source area and construction of groundwater collection and treatment systems at the Loohn's and AVX source areas. Because contaminated groundwater from the source area will be captured and treated by the air stripper at municipal well 18M, the capital cost for the Alcas source area does not include groundwater treatment. Operation and maintenance and present worth costs were developed for maintenance of the groundwater treatment systems for thirty years for AVX and Loohn's and Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Removal of contaminated soil from Alcas, AVX and Loohns could be implemented within one year. Groundwater treatment, if determined to be necessary, could be constructed within 1 year after the date the decision is made.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considers the factors set forth in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the National Contingency Plan (NCP), 40 CFR § 300.430(e)(9)(iii) and OSWER Directive 9355.3-01 entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA." The detailed analysis consists 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:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate short-and long-term 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.

2. Compliance with ARARs addresses whether or not a remedy would attain all of the applicable (legally enforceable), or relevant and appropriate (requirements that pertain to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the site) requirements of 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:

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. 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.

4. Reduction of toxicity, mobility, or volume via 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 periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital and operation and maintenance costs, and the present-worth costs.

The following "modifying" criteria were considered fully after the formal public comment period on the Proposed Plan was completed:

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

9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

The following is a comparative analysis of these alternatives by source area, which is based upon the evaluation criteria noted above.

ALCAS SOURCE AREA

This subsection presents the comparative analysis of alternatives for the Alcas source area. Available data for this source area indicate that the upper aquifer cannot effectively be pumped, and that the lower aquifer is within the capture zone of the municipal wells. Therefore, groundwater treatment via pump-and-treat (Alternative 3A and Stage 2 of Alternatives 3, 4 and 5) is not considered applicable for the Alcas source area.

Alternative 4, as discussed in this subsection, does not include soil vapor extraction with air sparging (SVE/AS). A field investigation conducted in July 1994 determined that a SVE/AS treatment system would not be effective due to a non-homogenous subsurface geology. A pilot test conducted in November 1994 confirmed that vacuum enhanced recovery (VER) could effectively desorb VOCs from the contaminated subsurface. Effective mass removal of VOCs was observed during the test for both the vapor and the dissolved phases.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This Alternative would not meet the remedial action objectives (RAOs) for the Site.

Alternative 2 (Institutional Controls) provides some level of protection of human health, since groundwater and land use restrictions would be implemented to reduce exposures to contaminated soil and groundwater; however, since no remediation of contamination takes place under this alternative, it is not protective of the environment. This alternative would meet only some of the RAOs for the Site, since it prevents exposure to contaminants, but does not provide treatment of the source area to expedite cleanup of the City Aquifer.

Alternative 3 (Capping) would reduce the risk of exposure to contaminated soils and potentially reduce the migration of contaminants from this source area to the groundwater. After implementation of the alternative, the risk of exposure to contaminated soils would be reduced. Groundwater and land use restrictions would be implemented to further reduce the risk of exposures and to ensure cap intergrity. This alternative could meet the groundwater RAOs by preventing exposure to contaminants and reducing migration of contaminants from the source area to the groundwater, thereby expediting cleanup of the City Aquifer. However, there is probability that after implementation of this alternative, migration of contaminants from the source area could continue as a result of groundwater flow beneath the cap, with the result that cleanup of the City Aquifer is not expedited.

Alternatives 4 (Vacuum Enhanced Recovery) and 5 (Excavation, Treatment and Disposal), which both include reduction or elimination of the source area by removal and treatment, would be protective of human health and the environment. Alternative 4 would reduce the level of contaminants in the source area using vacuum enhanced recovery (VER), while Alternative 5 would completely eliminate the identified source area by excavation and off-Site treatment and disposal. Upon completion of either of these alternatives, the soil RAOs for the Site would be achieved.

Compliance with ARARs

Chemical-, location- and action-specific ARARs were evaluated for the Alcas source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water, and federal and state air emission limits (chemical-specific ARARs); historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirements (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed these levels, with a potential increase in contaminant levels, since the Alcas source area would continue to contribute contamination to the aquifer. Alternative 1 involves no remedial activities, and therefore does not trigger any location- or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location- and action -specific ARARs. Neither of these alternatives would comply with the soil RAOs, which are TBCs (to be considered levels) for soil remediation.

Alternative 3 would not initially comply with chemical-specific ARARs for the groundwater, since the contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by reducing the migration of contaminants from the soil it is expected that this alternative could result in compliance with the chemical-specific ARARs. This alternative may not fully comply with groundwater RAOs since it may not be adequate in reducing the migration of contaminants from the soil. Compliance with location- and action-specfic ARARs would be achieved through proper implementation of this alternative.

Alternative 4 would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, significant quantities of contaminants in both the soil and groundwater would removed by VER, thereby eliminating additional contributions of contamination to the City Aquifer and eventually resulting in compliance with chemical-specific ARARs. Proper design and implementation of the VER system and treatment of the extracted groundwater and vapor would ensure that the implementation of the alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of VER treatment, would also be in compliance with the soil RAOs.

Alternative 5 would provide the most rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations would be rapidly reduced by implementation of this alternative. Contaminated soil, including an extensive amount of soil in the saturated zone, that is acting as a source of contamination to the groundwater would be removed in this alternative, thereby eliminating additional contributions of contamination to the City Aquifer and resulting in compliance with chemical-specific ARARs. Proper design and implementation of the excavation, transportation and disposal of the contaminated soil would ensure that the implementation of this alternative would be in compliance with location- and action-specific ARARs. The alternative would also be in compliance with the soil RAOs.

Short-term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase in short-term risks to workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes administrative actions and minimal construction activities (e.g., fence construction). Workers and the nearby community would be subject to a slightly increased risk of exposure to contaminants due to disturbance of contaminated soil during these activities. These risks would be minimized thought the implementation of a site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Implementation of this alternative could be completed in approximately 6 months.

Alternative 3 includes construction activities for placement of a cap over the source area. Workers and the nearby community would be subject to an increased risk of exposure to contaminants due to disturbance of contaminated soil (e.g., grading) during these activities. These risks would be minimized thought the implementation of a site-specific health and safety plan (e.g., use of personal protective equipment) and appropriate engineering controls (e.g., dust suppression) Implementation of this alternative could be completed in approximately 1 year.

Alternative 4 includes construction activities; however, as this alternative involves in situ treatment, the disturbance of contaminated soils during construction activities would be limited. Any increased risks due to disturbance of contaminated soil would be mitigated through the implementation of a site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). This alternative could be constructed in approximately 1 year. Operation of the system should not result in any increased risk of exposure.

Alternative 5 includes the most intensive construction activities, including excavation and off-Site transportation of contaminated soil. Workers and the nearby community would be subject to an increase in the risk of exposure to contaminants due to disturbance of contaminated soil during excavation and transportation of contaminated materials for off-Site treatment (if necessary) and disposal. These risks would be mitigated by implementation of a site-specific health and safety plan, a site-specific traffic control plan and appropriate engineering controls (e.g., dust suppression). This alternative could be completed in approximately 1 year.

Long-term Effectiveness

Alternative 1 does not remove or contain the source of contamination. Therefore, the current risks from exposure to contaminated groundwater and soil would remain, and future risk may even be greater as the source area continues to release contaminants to the groundwater. Long-term monitoring and assessment would required under this alternative, and there is the potential that additional remedial activities might be necessary in the future.

Alternative 2 also does not remove or contain the source of contamination, but does provide some reduction in the risk of exposure to contaminated soil and groundwater vial access and use restrictions, provided these restrictions are adequately maintained and enforced. Long-term monitoring would required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it could be difficult to maintain institutional controls in the long term.

Alternative 3 provides containment of the contaminated source area, which would reduce the risk of exposure to contaminated soil and would reduce migration of contaminants from the source area to groundwater. Long-term monitoring and maintenance would required under this alternative to ensure to integrity of the cap. Due to lateral movement of groundwater, it is possible that the cap may not adequately prevent migration of contamination from the source area to the groundwater, and that additional remedial activities could be necessary in the future.

Alternative 4 provides treatment of both the source area and associated groundwater. This alternative provides a permanent remedy for the contaminated source area, including source areas below the water table, since contaminants are removed from the soil. During the operation of, and upon completion of, the VER treatment, long-term monitoring would be required to assess the completeness of the remediation and to monitor improvements in the quality of the City Aquifer; however, no further remediation of the source area should be required.

Alternative 5 provides removal of the source areas. This alternative provides a permanent remedy, in that contaminated soils removed from the Site would not pose any future risk would not be subject to any further remedial action on the future. No long-term monitoring or maintenance would be required for the source area; however, long-term monitoring would be required under this alternative to monitor improvements in the water quality of the City Aquifer.

Reduction of Toxicity, Mobility or Volume Through Treatment

Alterative 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

Alternative 3, if properly maintained, should reduce the mobility of contaminants without treatment, thereby minimizing additional contamination of the groundwater from this source area. This alternative does not provide any reduction in toxicity or volume of contaminated material, and does not provide for treatment of the soil which is preferred.

Alternative 4 provides treatment of contaminated soil and capture and treatment of contaminated groundwater. A pilot test, which was conducted at Alcas in November 1994, confirmed that a VER system would reduce the mobility of contaminants by capture, and upon completion of the remediation would significantly reduce the volume of contaminated soil at this source area. Reduction of the contaminant levels in the groundwater within the influence of a VER system should also be achieved under this alternative.

Alternative 5 provides a reduction in mobility and volume of contaminated soil by excavation and off-Site treatment and disposal of contaminated media. Contaminated soil removed from the Site would no longer pose any risk of further contamination of the groundwater.

Implementability

Alternative 1 would be easily implemented, as it does not include any remedial activities. Alternative 2 may be difficult to implement, since it requires cooperation from individual property owners, which would be difficult to enforce. Minor construction activities (e.g., fence) included in this alternative would be easy to implement, and would not require a significant administrative effort. Long-term maintenance would be required for Alternative 2.

Capping (Alternative 3) is a readily available and well-developed technology that could be completed using conventional construction techniques. Long-term maintenance of the cap would be required.

For Alternative 4, on-site construction activities would be minor, consisting of well installation and construction or mobilization of a small treatment system. This would result in a minimal disruption of facility operations and would also minimize any effects to the on-Site building, which may be situated close to or over the subsurface contamination. In addition, a VER system may be modified, as necessary, to remediate larger or inaccessible areas. However, in situ treatment technologies are still considered innovative, and there are only a small number of vendors offering these services. In addition, effective operation requires intensive monitoring and assessment. Administratively, coordination with local authorities and other agencies may be required for the discharge of treated water and vapor; however, this alternative does not involve any off-Site transportation of hazardous materials.

Alternative 5 would require excavation to depths of approximately 16 feet with approximately 12 feet below the water table. Dewatering and shoring would be required; however, this alternative could be implemented using conventional construction techniques. Off-Site RCRA storage, treatment and disposal facilities are available for treatment and disposal of VOC-contaminated soil. Administratively, this alternative would require coordination with the local authorities and other agencies for transportation, treatment and disposal of hazardous materials.

Cost

The 30-year net present worth (NPW) of the remedial alternatives for the Alcas source area range from $0 to $1,013,495 based on a discount rate of 7%. Alternatives 1 and 2 are the least expensive to implement, with

NPWs of $0 and $152,295, respectively. Alternative 3 is slightly more expensive, with a NPW of $298,158. Alternative 4 is significantly more expensive, with a NPW of $837,721. Alternative 5 is the most expensive, with a NPW of $1,013,495. Cost estimates are summarized in Table 9.

AVX SOURCE AREA

This subsection presents the comparative analysis of alternatives for the AVX source area. Available data indicate that groundwater and soil are contaminated and are amenable to remediation. Therefore, the evaluation presented in this subsection considers all stages of each of the alternatives (i.e., no action for Alternative 1; institutional controls for Alternative 2; groundwater remediation for Alternative 3A; and stages 1 and 2 for Alternatives 3, 4 and 5).

Alternative 4, as discussed in this subsection, does not include soil vapor extraction with air sparging (SVE/AS). An evaluation of the AVX property concluded that a SVE/AS treatment system would not be effective, due to low soil permeability at the property. However, a pilot test conducted in August 1994 confirmed that vacuum enhanced recovery (VER) could effectively desorb VOCs from the contaminated subsurface. Effective mass removal of VOCs was observed during the test for both the vapor and the dissolved phases.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This alternative would not meet the RAOs for the Site.

Alternative 2 (Institutional Controls) provides some protection of human health, since groundwater and land use restrictions would be implemented to reduce exposures to contaminated soil and groundwater; however, since no remediation of contamination takes place under this alternative, it is not protective of the environment. Because this alternative prevents exposure to contaminants, but does not provide treatment of the source area to expedite cleanup of the City (lower) Aquifer, it would meet only some of the RAOs for the Site.

Alternative 3 (Capping) would reduce the risk of exposure to contaminated soils and potentially reduce the migration of contaminants from the source area to the groundwater. After implementation of the alternative, the risk of exposure to contaminated soils would be reduced. Groundwater and land use restrictions would be implemented to further reduce the risk of exposures and to ensure cap intergrity. This alternative would meet the RAOs for soil by preventing exposure to contaminants, and should meet the RAOs for groundwater by reducing migration of contaminants from the source area to the groundwater, thereby expediting cleanup of the City Aquifer. The groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four-year intervals. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved and therefore would be protective.

Alternative 3A (Groundwater Pump-and-Treat) is identical to the pump-and-treat portion (i.e., stage 2) of Alternative 3, the difference being that the groundwater treatment system would be installed immediately upon selection of this alternative. The evaluation is identical to stage 2 of Alternative 3.

Alternative 4 (Vacuum Enhanced Recovery) and 5 (Excavation, Treatment and Disposal), which both include reduction or elimination of the source area by removal and treatment, would be protective of human health and the environment. Alternative 4 would reduce the level of contaminants in the source are using vacuum enhanced recovery (VER), while Alternative 5 would completely eliminate the identified source area by excavation and off-Site treatment and disposal. Upon completion of either Alternative 4 or 5, the RAOs for the Site should be achieved. The groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four-year internals. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved.

Compliance with ARARs

Chemical-, location- and action-specific ARARs were evaluated for the AVX source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water and federal and state air emission limits (chemical-specific ARARs); wetlands protection and historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirements (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed these levels, with a potential increase in contaminant levels, since the AVX source area would continue to contribute contamination to the aquifer. Alternative 1 involves no remedial activities, and therefore does not trigger any location- or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location- and action-specific ARARs. Neither of these alternatives would comply with the soil RAOs.

Alternative 3 would not initially comply with chemical-specific ARARs for the groundwater, since the contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by reducing the migration of contaminants from the soil it is expected that this alternative could result in compliance with the chemical-specific ARARs. This alternative may not fully comply with groundwater RAOs since it may not be adequate in reducing the migration of contaminants from the soil. Stage 2, if required, would supplement stage 1 to bring this area into compliance with ARARs. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved. This alternative would not comply with the soil RAOs, since it does not include removal or treatment of contaminated soil.

It would take longer to come into compliance with chemical-specific ARARs with Alternative 3A for groundwater that those alternatives that include source area remediation of the soil (i.e., Alternatives 3, 4 and 5), since contamination could continue to migrate from the contaminated soil source area, which is not remediated under this alternative. Through proper implementation of this alternative, compliance with location-and action-specific ARARs would be achieved. This alternative would not comply with the soil RAOs, since it does not include treatment or removal of contaminated soil, which would eliminate the leaching VOCs into the groundwater.

Alternative 4 would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, significant quantities of contaminants in both the soil and groundwater would be removed by VER, thereby eliminating additional contributions of contamination to the City Aquifer and eventually resulting in compliance with chemical-specific ARARs. It is expected that compliance with chemical-specific ARARs would be achieved over time. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper design and implementation of the VER system and the groundwater pump-and-treat system (if necessary) would ensure that the implementation of both stages of this alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of VER treatment (stage 1), would also be in compliance with the soil RAOs.

Alternative 5 would provide the most rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations would be rapidly reduced by implementation of this alternative. Contaminated soil that is acting as a source of contamination to the groundwater would be removed in this alternative, thereby eliminating additional contributions of contamination to the City Aquifer and resulting in compliance with chemical-specific ARARs. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper design and implementation of the excavation, transportation and disposal of the contaminated soil and proper operation of the pump-and-treat system (if necessary) would ensure that the implementation of both stages of this alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of soil excavation and disposal (stage 1), would also be in compliance with the soil RAOs.

Short-Term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase in short-term risks to workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes administrative actions and minimal construction activities (e.g., fence construction). Workers and the nearby community would be subject to a slightly increased risk of exposure to contaminants due to disturbance of contaminated soul during these activities. These risks would be minimized through the implementation of a Site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Implementation of this alternative could be completed in approximately 6 months.

Alternative 3 includes construction activities for placement of a cap over the source area. Workers and the nearby community would be subject to an increased risk of exposure to contaminants due to disturbance of contaminated soil (e.g., grading) during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan (e.g., use of personal protective equipment) and appropriate engineering controls (e.g., dust suppression). Implementation of stage 1 of this alternative could be completed in approximately 1 year. If it is determined that stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional Site disturbances during construction of the system, resulting in additional risks of exposures to contaminated groundwater for workers. Workers may also be exposed to excessive noise during construction activities. These risks would be minimized through the implementation of a site-specific health and safety plan. There would be no increased risk to the public during construction of the pump-and-treat system, since contaminated soil would be contained beneath the cap; however, operation of the pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions. These risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of stage 2 could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (up to 30 years). The short-term effectiveness of Alternative 3A is identical to the short-term effectiveness of stage 2 of Alternative 3.

Alternative 4 includes construction activities; however as this alternative involves in situ treatment, the disturbance of contaminated soils during construction activities would be limited. Any increased risks due to disturbance of contaminated soil would be mitigated through the implementation of a site- specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Operation of the system should not result in any increased risk of exposure. It would take approximately 1 year to implement stage 1 of this alternative. There would be no increased risk to the public, since contaminated soil would have already been remediated during stage 1 of this alternative. The construction of the groundwater recovery/treatment system (stage 2) could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Alternative 5 includes the most intensive construction activities, including excavation and off-Site transportation of contaminated soil. Workers and the nearby community would be subject to an increase in the risk of exposure to contaminants due to disturbance of contaminated soil during excavation and transporation of contaminated materials for off-Site treatment (if necessary) and disposal. These risks would be mitigated by implementation of a site-specific health and safety plan, a site-specific traffic control plan and appropriate engineering controls (e.g., dust suppression). This alternative could be completed in approximately 1 year. If it is determined that stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional site disturbances during construction of this system, resulting in additional risks of exposures to contaminated groundwater for workers; however, there would be no increased risk to the public, since contaminated soil would have already been remediated during stage 1 of this alternative. The groundwater pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions; these risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. The construction of the groundwater recovery/treatment system (stage 2) could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Long-term Effectiveness

Alternative 1 does not remove or contain the source of contamination. Therefore, the current risks from exposure to contaminated groundwater and soil would remain, and future risk may even be greater as the source area continues to release contaminants to the groundwater. Long-term monitoring and assessment would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future.

Alternative 2 also does not remove or contain the source of contamination, but does provide some reduction in the risk of exposure to contaminated soil and groundwater via access and use restrictions, provide these restrictions are adequately maintained and enforced. Long-term monitoring would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it could be very difficult to maintain institutional controls in the long term.

Alternative 3 provides containment of the contaminated source area, which would reduce the risk of exposure to contaminated soil and reduce migration of contaminants from the source area to groundwater. Long-term monitoring and maintenance would be required under this alternative to ensure the integrity of the cap. Due to lateral movement of groundwater, it is possible that the cap may not adequately prevent migration of contamination from the source area to the groundwater, and that additional remedial activities could be necessary in the future.

Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Alternative 3A provides some containment of the source area by preventing migration of contamination, but would not be as protective as Alternative 3, which includes the cap and the pump-and-treat system (if necessary). Long-term monitoring and maintenance would be required to ensure proper and effective operation of the pump and treat system.

Alternative 4 provides treatment of both the source are and associated groundwater. This alternative provides a permanent remedy for the contaminated source area, including source areas below the water table, since contaminants are removed from the soil. During the operation of, and upon completion of, the VER treatment, monitoring would be required to assess the completeness of the remediation and to monitor improvements in the quality of the City Aquifer; however, no further remediation of the source area should be required. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells stage 2 may be implemented. Implementation of the stage 2 pump-and-treat system would proved and additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source. Long-term monitoring and maintenance would be required to ensure proper and effective operation of the pump-and-treat system.

Alternative 5 provides removal of the source areas. This alternative provides a permanent remedy, in the contaminated soils removed from the Site would not pose any future risk and would not be subject to any further remedial action in the future. No long-term monitoring or maintenance would be required for the source area; however, long-term monitoring would be required under this alternative to monitor improvements in the quality of the City Aquifer. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Reduction of Toxicity, Mobility or Volume through Treatment

Alternatives 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

The cap that would be installed in stage 1 of Alternative 3, if properly maintained, should reduce the mobility of contaminants without treatment, thereby minimizing additional contamination of the groundwater from this source area. If the stage 2 pump-and-treat system is implemented, this system would further reduce the toxicity, mobility and volume of contamination by extracting toxicity, mobility and volume of contamination by extraction contaminated groundwater, treating it and preventing off-Site migration. The reduction in toxicity, mobility and volume for Alternative 3A is identical to stage 2 of Alternative 3.

Stage 1 of Alternative 4 provides treatment of contaminated soil and capture and treatment of contaminated groundwater using VER. This system would reduce the mobility of contaminants by capture, and upon completion of the remediation, would significantly reduce the volume of contaminated soil at this source area. Reduction of the contaminant levels in the groundwater within the influence of the system might also be achieved under this alternative. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the toxicity, mobility and volume of remaining contamination by extracting contaminated groundwater, treating it and preventing off-site migration.

Stage 1 of Alternative 5 provides a reduction in mobility and volume of contaminated soil by excavation and off-Site treatment and disposal of contaminated media. Contaminated soil removed from the Site would no longer pose any risk of further contamination of the groundwater. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the toxicity, mobility and volume of remaining contamination by extracting contaminated groundwater and preventing off-Site migration.

implement, since it requires cooperation from individual property owners, which is difficult to enforce. Minor construction activities (e.g., fence) included in this alternative would be easy to implement, and would not require a significant administrative effort. Long-term maintenance would be required for Alternative 2.

Alternative 3 would involve on-Site construction. However, capping is a readily available and well-developed technology that could be completed using conventional construction techniques. Long-term maintenance of the cap would be required. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system. The implementability of Alternative 3A is identical to the implementability of stage 2 of Alternative 3.

For Alternative 4, on-Site construction activities would be minor, consisting of well installation and construction or mobilization of a small treatment system. However, in situ treatment technologies are still considered innovative, and there are only a small number of vendors offering these services. In addition, effective operation requires intensive monitoring and assessment. Administratively, coordination with local authorities and other agencies may be required for the discharge of treated water and vapor; however, this alternative does not involve and off-Site transportation of hazardous materials. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at sites with contaminated groundwater. Administratively, the requirements would be similar to the VER system requirements.

Alternative 5 would require excavation to depths of approximately 6 feet in close proximity to on-site structures. Dewatering and shoring would be required; however, this alternative could be implemented using conventional construction techniques. Given the shallow depth of contamination, technical implementation of this alternative would not be difficult. Off-Site RCRA storage, treatment and disposal facilities are available for treatment and disposal of VOC contaminated soil. Administratively, this alternative would be moderately difficult to implement, since it would require coordination with the local authorities and other agencies for transportation, treatment and disposal of hazardous materials. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system.

Cost

The 30-year net present worth (NPW) of the remedial alternatives for the AVX source area range from $0 to $1,747,533 based on a discount rate of 7%. Alternatives 1 and 2 are the least expensive to implement, with

NPWs of $0 and $165,295, respectively. Alternative 3 (stage 1) is slightly more expensive, with a NPW of $187,113. If stage 2 of Alternative 3 is implemented, the overall cost of this alternative is approximately $821,117, but treatment of contaminated groundwater is provided. Alternative 3A, which includes pump-and-treat for longer period of time, but no capping, has a cost of $1,070,610. Alternative 4 (stage 1) is significantly more expensive than Alternative 3 (stage 1), with a NPW of $2,223,529. If stage 2 of Alternative 4 is implemented, the cost increases to $1,747,533, and additional groundwater treatment is provided. Alternative 5 (stage 1) is significantly less costly than Alternative 4 (stage 1), with a NPW of $376,295. If stage 2 of Alternative 5 is implemented, groundwater treatment is provided, and the NPW is $1,010,299. Cost estimates are summarized in Table 9.

McGRAW-EDISON SOURCE AREA

This subsection presents the comparative analysis of alternatives for the McGraw-Edsion source area. Available data indicate that there is no contaminated soil source in this area. Therefore, Alternatives 3, 4 and 5, which all specify some kind of soil remediation, are not applicable. Alternative 3A, which specifies groundwater pump-and-treat, is applicable and was evaluated for this area.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This alternative would not meet the RAOs for the Site.

Alternative 2 (Institutional Controls) provides some level of protection of human health, since groundwater use restrictions would be implemented to reduce exposures to contaminated groundwater. However, since no remediation of contamination takes place under this alternative, it is not protective of the environment. After implementation of the alternative, risks of exposure would be reduced as long as the administrative restrictions were maintained. This alternative would meet only some of the RAOs for the Site, since it prevents exposure to contaminants, but does not provide any treatment to expedite cleanup of the City Aquifer.

Alternative 3A would be implemented immediately at the McGraw-Edison site, since there is no soil source area to be remediated. Proper operation and maintenance of the groundwater pump-and-treat system would ensure that the RAOs for groundwater would be achieved. Extraction of contaminated groundwater will protect human health and the environment by removing contamination from the aquifer and preventing migration of contaminants from this area to the municipal well field.

Compliance with ARARs

Chemical-, location- and action-specific ARARs were evaluated for the McGraw-Edison source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water and federal and state air emission limits (chemical-specific ARARs); historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirements (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed these levels for an extended period of time. Alternative 1 involves no remedial activities, and therefore does not trigger any location- or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location- and action-specific ARARs.

Alternative 3A would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by treating the groundwater beneath the McGraw-Edison site, further contamination migration to the municipal supply wells would be eliminated, eventually resulting in compliance with chemical-specific ARARs. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved. The soil RAOs do no apply to the McGraw-Edison site, since there are no identified areas of soil contamination.

Short-term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase in short-term risks to workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes only administrative actions, since no access restrictions are required at the McGraw-Edison site. Therefore, there would be no change in the risks to workers or the nearby community during implementation of this alternative. Implementation of this alternative could be completed in approximately 3 months.

Alternative 3A includes installation of a groundwater pump-and-treat system. As there is already a well and an air stripper on site, only minimal construction activities would be required to upgrade the treatment system and install one or more wells in the shallow aquifer. Workers would be subject to a slightly increased risk of exposure to contaminated groundwater and exposure to noise during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan (e.g., use of personal protective equipment). Operation of the groundwater pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions; these risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of the groundwater pump and treat system could be complete in approximately 3 to 6 months; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Long-term Effectiveness

Alternative 1 does not remove or contain the contaminated groundwater. Therefore, the current risks from exposure to contaminated groundwater persist, and future rusk may even be greater as the contaminated groundwater beneath the site continues to migrate. Long-term monitoring and assessment would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future.

Alternative 2 also does not remove or contain the contaminated groundwater but does provide some reduction in the risk of exposure to contaminated groundwater via access and use restrictions, provided these restrictions are adequately maintained and enforced. Long-term monitoring would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it could be difficult to maintain institutional controls in the long term.

Alternative 3A provides for removal and treatment of groundwater contaminants beneath the site, thereby reducing the risk of exposure to contaminated groundwater and migration of contaminated groundwater off site. Long-term monitoring would be required under this alternative to confirm the effectiveness of the system. Aside from operation and maintenance of the groundwater pump-and-treat system, no further remedial actions would be required in the future.

Reduction of Toxicity, Mobility or Volume through Treatment

Alternatives 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

Alternative 3A would reduce the mobility and volume of contaminants in the groundwater via extraction and treatment of contaminated groundwater beneath the site.

Implementability

Alternative 1 would be easily implemented, as it does not include any remedial activities. Alternative 2 may be difficult to implement, since ie deals with individual property rights and could be difficult to enforce. There are minimal construction activities in this alternative as it applies to the McGraw-Edsion site. Long-term maintenance of administrative actions would be required for Alternative 2.

Alternative 3A would be easily implemented, since it would require only well installation and possibly upgrades to an existing groundwater treatment system (i.e., air stripper). As mentioned previously, McGraw-Edison installed the air stripper in the early 1980's to treat groundwater for industrial use on-site. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system after these modifications are made.

Cost

The 30-year present worth (NPW) of the remedial alternatives for the McGraw-Edison site range from $0 to $935,610 based on a discount rate of 7%. Alternative 1 and 2 are the least expensive to implement, with NPWs of $0 and $138,295, respectively. Alternative 3A has a NPW of $935,610. The costs for implementation of Alterantive 3A include the expenses for operation and maintenance of an existing air stripper system, which is currently treating groundwater form the lower aquifer at McGraw-Edison, and the necessary upgrades to the system to treat groundwater from the upper aquifer. Cost estimates are summarized in Table 9.

LOOHN'S DRY CLEANERS AND LAUNDERERS

This subsection presents the comparative analysis of alternatives for the Loohn's Dry Cleaners source area. Available data indicate that both groundwater and soil are contaminated and are amenable to remediation. Therefore, the evaluation presented in this subsection considers all stages of each of the alternatives.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This alternative would not meet the RAOs for the Site.

Alternative 2 (Institutional Controls) provides some level of protection of human health, since groundwater and land use restrictions would be implemented to reduce exposures to contaminated soil and groundwater; however, since no remediation of contamination takes place under this alternative, it is not protective of the environment. After implementation of the alternative, risks would be slightly reduced as long as the administrative and physical restrictions were maintained. This alternative would meet only some of the RAOs for the Site, since it prevents exposure to contaminants, but does not provide treatment of the source area to expedite cleanup of the City Aquifer.

Alternative 3 (Capping) would reduce the risk of exposure to contaminated soils and potentially reduce the migration of contaminants from this source area to the groundwater. After implementation of the alternative, the risk of exposure to contaminated soils would be reduced. Groundwater and land use restrictions would be implemented to further reduce the risk of exposures and to ensure cap intergrity. This alternative would prevent exposure to soil contaminants, and should meet the RAOs for groundwater by reducing migration of contaminants from the source area to the groundwater, thereby expediting cleanup of the City Aquifer. The groundwater will be monitored and the effectiveness of the remediation will be reevaluated at four-year intervals. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved.

Alternative 3A (Groundwater pump and treat) is identical to the pump-and-treat portion (i.e., stage 2) of Alternative 3, the difference being that the groundwater treatment system would be installed immediately upon selection of this alternative. The evaluation is identical to stage 2 of Alternative 3.

Alternatives 4 (Vacuum Enhanced Recovery (VER) or Soil Vapor Extraction with Air Sparging (SVE/AS)) and 5 (Excavation, Treatment and Disposal), all of which include reduction or elimination of the source area by removal and treatment, would be protective of human health and the environment. Alternative 4 would reduce the level of contaminants in the source area using VER or SVE/AS, while Alternative 5 would completely eliminate the identified source area by excavation and off-Site treatment and disposal. Upon completion of either of these alternatives, the RAOs for the Site should be achieved. The groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four-year intervals. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved.

Compliance with ARARs

Chemical-, location- and action-specific ARARs were evaluated for the Loohn's source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water and federal and state air emission limits (chemical-specific ARARs); historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirements (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed these levels, with a potential increase in contaminant levels, since the Loohn's source area would continue to contribute contamination to the aquifer. Alternative 1 involves no remedial activities, and therefore does not trigger any location- or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location- and action-specific ARARs. Neither of these alternatives would comply with the soil RAOs.

Alternative 3 would not initially comply with chemical-specific ARARs for the groundwater, since the contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by reducing the migration of contaminants from the soil it is expected that this alternative could result in compliance with the chemical-specific ARARs. This alternative may not fully comply with groundwater RAOs since it may not be adequate in reducing the migration of contaminants from the soil.

Compliance with location- and action-specific ARARs would be achieved through proper implementation of this alternative. Stage 2, if required, would supplement stage 1 of bring this area into compliance with ARARs. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved.

It' would take longer to come into compliance with chemical-specific ARARs with Alternative 3A for groundwater than those alternatives that include source area remediation (i.e., Alternatives 3, 4 and 5), since contamination could continue to migrate from the contaminated soil source area, which is not remediated under this alternative. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved. This alternative would not comply with the soil RAOs, since it does not include removal or treatment of contaminated soil.

Alternative 4 would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, significant quantities of contaminants in both the soil and groundwater would be removed by VER or SVE/AS, thereby eliminating additional contributions of contamination to the City Aquifer and eventually resulting in compliance with chemical-specific ARARs. It is expected that compliance with chemical-specific ARARs would be achieved over time. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper design and implementation of the VER or SVE/AS system and the groundwater pump-and-treat system (if necessary) would ensure that the implementation both stages of this alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of VER or SVE/AS treatment (stage 1), would also be in compliance with the soil RAOs.

Alternative 5 would provide most rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations would be rapidly reduced by implementation of this alternative. Contaminated soil that is acting as a source of contamination to the groundwater would be removed in this alternative, thereby eliminating additional contributions of contamination to the City Aquifer and resulting in compliance with chemical-specific ARARs. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Proper design and implementation of the excavation, transportation and disposal of the contaminated soil and proper operation of the pump-and-treat system (if necessary) would ensure that the implementation of both stages of this alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of soil excavation and disposal (stage 1), would also be in compliance with the soil RAOs.

Short-term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase in short-term risks to workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes administrative actions and minimal construction activities (e.g., fence construction). Workers and the nearby community would be subject to a slightly increased risk of exposure to contaminants due to disturbance of contaminated soil during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Implementation of this alternative could be completed in approximately 6 months.

Alternative 3 includes construction activities for placement of a cap over the source area. Workers and the nearby community would be subject to an increased risk of exposure to contaminants due to disturbance of contaminated soil (e.g., grading) during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan (e.g., use personal protective equipment) and appropriate engineering controls (e.g., dust suppression). Implantation of stage 1 of this alternative could be completed in approximately 1 year. If it is determined that stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional Site disturbances during construction of this system, resulting in additional risks of exposures to contaminated groundwater for workers. Workers may also be exposed to excessive noise during construction activities. These risks would be minimized through the implementation of a site-specific health and safety plan. There would be no increased risk to the public during construction of the pump-and-treat system, since contaminated soil would be contained beneath the cap; however operation of the pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions. These risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of stage 2 could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years). The short-term effectiveness of Alternative 3A is identical to the short-term effectiveness of stage 2 of Alternative 3.

Alternative 4 includes construction activities; however, as this alternative involves in situ treatment, the disturbance of contaminated soils during construction activities would be limited. Any increased risks due to disturbance of contaminated soil would be mitigated through the implementation of a site- specific health and safety plan and appropriate engineering controls (e.g., dust suppression). It would take approximately 1 year to implement stage 1 of this alternative. Operation of the system should not result in any increased risk of exposure. There would be no increased risk to the public, since contaminated soil would have already been remediated during stage 1 of this alternative. Implementation of stage could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Alternative 5 includes the most intensive construction activities, including excavation and off-site transportation of contaminated soil. Workers and the nearby community would be subject to an increase in the risk of exposure to contaminants due to disturbance of contaminated soil during excavation and transportation of contaminated materials for off-Site treatment (if necessary) and disposal. These risks would be mitigated by implementation of a site-specific health and safety plan, a site-specific traffic control plan appropriate engineering controls (e.g., dust suppression). This alternative could be completed in approximately 1 year. If it is determined that stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional Site disturbances during construction of this system, resulting in additional risks of exposures to contaminated groundwater for workers; however, there would be no increased risk to the public, since contaminated soil would have already been remediated during stage 1 of this alternative. The groundwater pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions; these risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of stage 2 could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Long-term Effectiveness

Alternative 1 does not remove or contain the source of contamination. Therefore, the current risks from exposure to contaminated groundwater and soil would remain, and future risk may even be greater as the source area continues to release contaminants to the groundwater. Long-term monitoring and assessment would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future.

Alternative 2 also does not remove or contain the source of contamination, but does provide some reduction in the risk of exposure to contaminated soil and groundwater via access and use restrictions, provided these restrictions are adequately maintained and enforced. Long-term monitoring would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it would be difficult to maintain institutional controls in the long term.

Alternative 3 provides containment of the contaminated source area which would reduce the risk of exposure to contaminated soil and reduce migration of contaminants from the source area to groundwater. Long-term monitoring and maintenance would be required under this alternative to ensure the intergrity of the cap. It is possible that the cap may not prevent migration of contamination from the source area to the groundwater, and that additional remedial activities could be necessary in the future.

Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Alternative 3A provides some containment of the source area by preventing migration of contamination, but would not be as protective as Alternative 3, which includes the cap and the pump-and-treat system.

Alternative 4 provides treatment of both the source area and associated groundwater. This alternative provides a permanent remedy for the contaminated source area, including source areas below the water table, since contaminants are removed from the soil. During the operation of, and upon completion, of the VER or SVE/AS treatment, long-term monitoring would be required to assess the completeness of the remediation and to monitor improvements in the quality of the City Aquifer; however, no further remediation of the source area should be required. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Alternative 5 provides removal of the source areas. This alternative provides a permanent remedy, in that contaminated soils removed from the Site would not pose and future risk and would not be subject to any further remedial action in the future. No long-term monitoring or maintenance would be required for the source area; however, long-term monitoring would be required under this alternative to monitor improvements in the quality of the City Aquifer. If it is determined that stage 1 of this alternative has not adequately improved the quality of the City Aquifer and it is determined that this source area continues to affect the groundwater entering the municipal wells, stage 2 may be implemented. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Reduction of Toxicity, Mobility or Volume through Treatment

Alternatives 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

The cap that would be installed in stage 1 of Alternative 3, if properly maintained, should reduce the mobility of contaminants, without treatment, thereby minimizing additional contamination of the groundwater from this source area. Stage 1 of this alternative does not provide any reduction in toxicity or volume of contaminated material. If the stage 2 pump-and-treat system is implemented, this system would further reduce the mobility of contamination by preventing off-Site migration. The reduction in toxicity, mobility and volume for Alternative 3A is identical to stage of Alternative 3.

Stage 1 of Alternative 4 provides treatment of contaminated soil and capture and treatment of contaminated groundwater using VER or SVE/AS. This system would reduce the mobility of contaminants by capture, and upon completion of the remediation, would significantly reduce the volume of contaminated soil at this source area. Reduction of the contaminant levels in the groundwater within the influence of the system might also be achieved under this alternative. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the mobility of remaining contamination by preventing off-Site migration.

Stage 1 of Alternative 5 provides a reduction in mobility and volume of contaminated soil by excavation and off-Site treatment and disposal of contaminated media. Contaminated soil removed from the Site would no longer pose any risk of further contamination of the groundwater. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the mobility of remaining contamination by preventing off-Site migration.

Implementability

Alternative 1 would be easily implemented, as it does not include any remedial activities. Alternative 2 may be difficult to implement, since it requires cooperation from individual property owners and difficult to enforce. Minor construction activities (e.g., fence) included in this alternative would be easy to implement, and would not require a significant administrative effort. Long-term maintenance would be required for Alternative 2.

Alternative 3 would involve on-Site construction. However, capping is a readily available and well-developed technology that could be completed using conventional construction techniques. Long-term maintenance of the cap would be required. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat system consist of readily available technologies and are routinely installed at Sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system. The implementability of Alternative 3A is identical to the implementability of stage 2 of Alternative 3.

For Alternative 4, on-Site construction activities would be minor, consisting of well installation and construction or mobilization of a small treatment system. A pilot test will be necessary at the Loohn's source area in order to determine whether VER or SVE/AS would be the more effective means of treatment and to design the treatment system. However, in situ treatment technologies are still considered innovative, and there are only a small number of vendors offering these services. In addition, effective operation requires intensive monitoring and assessment. Administratively, coordination with local authorities and other agencies may be required for the discharge of treated water and vapor; however, this alternative does not involve any off-Site transporation of hazardous materials. If stage 2 of this alternative were required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at sites with contaminated groundwater. Administratively, the requirements would be similar to the requirements for a VER or SVE/AS system.

Alternative 5 would require excavation ot depths of approximately 22 feet with approximately 14 feet below the water table. Dewatering and shoring would be required; however, this alternative could be implemented using conventional construction techniques. Off-Site RCRA storage, treatment and disposal facilities are available for treatment and disposal of VOC-contaminated soil. Administratively, this alternative would be moderately difficult to implement, since it would require coordination with the local authorities and other agencies for transportation, treatment and disposal of hazardous materials. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available to technologies and are routinely installed at Sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system.

Cost

The 30-year net present worth (NPW) of the remedial alternative for the Loohns source area range from $0 to $4,186,299, based on a discount rate of 7%. Alternatives 1 and 2 are the least expensive to implement, with NPWs of $0 and $153,295, respectively. Alternative 3 (stage 1) is slightly more expensive, with a NPW of $256,340. If stage 2 of Alternative 3 is implemented, the overall cost of this alternative is approximately $890,344, but treatment of contaminated groundwater is provided. Alternative 3A, which includes a pump-and-treat for longer period of time, but no capping, has a NPW of $1,070,610. Alternative 4 (stage 1) is significantly more expensive than Alternative 3 (stage 1), with a NPW of $1,011,024. If stage 2 of Alternative 4 is implemented, the cost increases to $1,645,028, and additional groundwater treatment is provided. Alternative 5 (stage 1) is significantly more expensive than Alternative 4 (stage 1), with a NPW of $3,552,295. If stage 2 of Alternative 5 is implemented, groundwater treatment is provided, and the NPW is $4,186,299. Cost estimates are summarized in Table 9.

STATE ACCEPTANCE

The State of New York concurs with the selected remedies for the identified source areas. Their letter of concurrence is attached as Appendix IV.

COMMUNITY ACCEPTANCE

Community acceptance of the preferred remedies has been assessed in the Responsiveness Summary portion of this ROD, following review of all public comments received on the supplemental RI/FS report and the Proposed Plan. All comments received during the public comment period were evaluated and are addressed in the attached Responsiveness Summary.

Comments on EPA's Proposed Plan were received from the public and the Potentially Responsible Parties. No specific objection were raised by the public on implementation of the remedies stated in the Proposed Plan. EPA's specific responses to the comments received on the Proposed Plan and all other comments received during the public comment period can be found in Appendix V.

SELECTED REMEDIES

The following is a discussion of the selected remedial alternatives for the four source areas. The alternatives 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).

ALCAS

Based on the treatability tests, Vacuum Enhanced Recovery (VER), Alternative 4, is selected for the Alcas source area. This alternative is the most effective in protecting human health and the environment, while being the most cost-effective. Approximately 28,800 cubic feet of contaminated soil needs to be remediated at Alcas.

A VER system, which will be installed at Alcas, uses negative air pressure which is applied to a series of recovery wells. The negative pressure, which is generated by high vacuum pump, causes the movement of soil vapor and groundwater towards the recovery wells. The vapor recovery causes desorption (removal of contaminants, which are adsorbed onto soil particles) and volatilization of VOCs by continuously removing contaminated vapors and forcing clean air into the contaminated areas. An off-gas treatment system will remove contaminants which are above federal and New York State air emission levels using granulated activated carbon (GAC). Groundwater, which will be recovered with the soil vapor, will also be treated with GAC prior to discharge to the City sewer system.

The VER system will be operated until contaminant levels in the soil vapor and water effluents cease to decline and remain constant at a negligible rate, at which time, the systems will be shut off. After the VER system is shut off, soil samples will be collected to confirm the effectiveness of the alternative.

Finally, the remedy selected for the Alcas property will include deed restrictions which will prevent the installation of drinking water wells on the property.

The present worth for Alternative 4 is $837,721 for the Alcas source area. Table 9 provides the costs for each remedial alternative by source area.

LOOHN'S DRY CLEANERS AND LAUNDERERS

Alternative 4 is selected for the Loohn's Dry Cleaners source area. This Alterative is the most effective in protecting human health and the environment, while being the most cost-effective. EPA is also selecting Alternative 5 as a contingency for remediating the Loohns source area. Alternative 5 would be implemented if the pilot testing, which is planned for the Loohn's property, indicates either that a VER or SVE/AS system would be ineffective or, if running either system would be infeasible due to the effects of the Allegheny River. While not quite as cost-effective as Alternative 4, Alternative 5 will be just as effective in protecting human health and the environment. Approximately 132,000 cubic feet of contaminated soil needs to be remediated at Loohn's Dry Cleaners.

Alternative 4 will involve using either one of two different types of in-situ treatment systems: SVE with Air Sparging (SVE/AS) or Vacuum Enhanced Recovery (VER), based on the results of pilot tests which will be conducted as part of the remedial design.

An SVE/AS system would use a soil vapor recovery process combined with air injection wells, which would extend below the water table. Air, which is injected under pressure into the wells, would enter water below the water table. The air bubbles, which are formed, traverse horizontally and vertically through the water column. Volatile compounds, which are exposed to the sparged air, volatilize into the gas phase and are carried into the vadose zone where they are captured by a vapor recover system. An off-gas treatment system would use GAC to remove contaminants which are above federal and New York State air emission levels. Groundwater, which is recovered with the soil vapor, would also be treated with GAC prior to discharge to the City sewer system.

A VER system uses negative air pressure, which is applied to a series of recovery wells. The negative pressure, which is generated by high vacuum pump, causes the movement of soil vapor and groundwater towards the recovery wells. The vapor recovery causes desorption (removal of contaminants, which are adsorbed onto soil particles) and volatilization of VOCs by continuously removing contaminated vapors and forcing clean air into the contaminated areas. An off-gas treatment system would remove contaminants which are above federal and New York State air emission levels using granulated activated carbon (GAC). Groundwater, which is recovered with the soil vapor, would also be treated with GAC prior to discharge to the City sewer system.

The system will be operated until contaminant levels in the soil vapor and water effluents cease to decline and remain constant at a negligible rate, at which time, the systems will be shut off. Thereafter, soil samples will be collected to confirm the effectiveness of the alternative.

Any contamination which is not removed by implementation of a VER or SVE/AS system, will be addressed, if necessary, by the installation of a groundwater pump-and-treat system. The need for groundwater treatment will be assessed every four years and will be based on a review of sample data for the influences to the city Municipal wells 18M and 37/38M and upgradient and downgradient groundwater samples from the Loohn's source area.

Finally, the remedy selected for the Loohn's property will include deed restrictions, which will prevent the installation of drinking water wells on the property.

The costs for implementing Alternative 4 and 5 is $1,654,028 and $4,186,299, respectively, for the Loohn's source area. Table 9 provides the costs for each remedial alternative by source area.

AVX

Alternative 5, excavation, is selected for the AVX source area. This alternative is the most effective in protecting human health and the environment, while being cost-effective. The area of contaminated soil is very shallow (approximately 6 feet below the surface), which can be easily excavated. The soil to be excavated is located in and around soil borings SBO4 and SBO7 and is estimated to be 10,000 cubic feet.

Contaminated soil at AVX will be excavated and tested to determine if it is a RCRA hazardous waste material. If hazardous, the soils will be transported to an off-Site facility for low temperature desorption of soil contaminants. If not hazardous, the soils will be disposed of at a local landfill. Clean fill material will be brought in to restore the excavated area to grade. Confirmatory soil sampling and analyses will be conducted to ensure that all soils with contaminant levels higher that the levels provided in Table 1 of this ROD are removed.

Until restoration of the excavated areas is complete, land use/access restrictions will be placed on the source area to restrict its use. Deed restrictions will be imposed to prevent the installation of drinking water wells on the property. Finally, during all phases of the soil removal, it will be necessary to implement dust and volatile emission control, soil erosion and sediment control measures.

Alternative 5 proved to be more cost-effective than Alternative 4, which was also found to be protective of human health and the environment. The estimated present worth for Alternative 5 was $1,010,299 verses $1,747,533 for Alternative 4.

Any contamination which is not removed from the AVX source area, will be addressed, if necessary, by the installation of a groundwater pump-and-treat system. The need for groundwater treatment will be assessed every four years and will be based on a review of sample data for the influences to the city municipal wells 18M and 37/38M and upgradient and downgradient groundwater samples from the AVX source area.

Also, if groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluate the impact of a groundwater pump-and-treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially adverse affect on the wetlands area.

McGRAW-EDISON

Alternative 3A is selected for the McGraw-Edison source area as the most effective in protecting human health and the environment, while being the most cost-effective. An extensive investigation of the McGraw-Edison property was conducted during the SRI, but no soil contamination was found, which could act as a source of contamination to the groundwater. However, groundwater contamination was detected at the facility, which EPA believes is the result of previous disposal activities. By capturing and treating the groundwater rather than letting it be treated by the municipal wells, cleanup of the aquifer can be expedited. Contaminated groundwater from the upper aquifer will be pumped and treated by an existing air stripping system, which is currently treating groundwater from the lower aquifer. The existing air stripper has enough excess capacity to treat additional groundwater from the upper aquifer. Groundwater monitoring will also be institued upgradient and downgradient of the source area in order to determine the continued effectiveness of the remedy.

The remedy selected for the McGraw-Edison property will also include deed restrictions which will prevent the installation of drinking water wells on the property.

The present worth of Alternative 3A is $935,610.

SITE MONITORING

Based on information collected during the SRI/FS, EPA has also decided to expand the list of chemical compounds, which are currently being tested for under the current groundwater Site monitoring plan (SMP). The PRPs were required to develop and implement the plan, as a requirement of the EPA Administrative Order issued on February 7, 1986. The plan was required in order assess the condition of the groundwater in the upper and lower aquifers as the remedies, which were specified in EPA's 1985 ROD, were implemented.

Currently, the SMP specifies that 13 groundwater monitoring wells be sampled every three months for the presence of trichloroethene, 1,1,1-trichloroethene, 1,1-dichlorethane, 1,1-dichloroethene, 1,2-dichloroethene and tetrachloroethane.

During the supplemental RI/FS, other VOCs, which were not tested for as part of the SMP, and chromium were detected in the groundwater. Chromium was also detected in recent samples taken from the influent groundwater to Municipal wells 18M and 37/38M. Therefore, EPA is proposing that the SMP be revised to include analyses for a full scan of volatile organic compounds and chromium.

EPA will use the expanded SMP data along with the groundwater monitoring data, which will be collected to determine whether or not groundwater pump and treat is needed for the AVX and Loohn's source area properties, to assess the overall improvement of the groundwater as the source control remedies are implemented.

The chromium sample data will be collected to determine if there are unacceptable concentrations of chromium in the groundwater, which flow to the municipal wells.

STATUTORY DETERMINATIONS

As previously noted, CERCLA §121(b)(1), 42 §U.S.C. §0621(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 which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the 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 federal and state ARARs, unless a wavier can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

For the reasons discussed below, EPA has determined that the selected remedy for each source area property meet the requirements of CERCLA §121, 42 U.S.C. §9621:

ALCAS

Protection of Human Health and the Environment

Alternative 4 (Vacuum Enhanced Recovery) will reduce or eliminate the Alcas source area by removal and treatment. Elimination of soil and groundwater contamination is protective of human health and the environment, since it will lead to restoration of the aquifer, which is a source of drinking water and eliminate unacceptable risks due to ingestion and dermal contact with untreated groundwater.

Any short-term risks due to the construction of a VER system will be mitigated through a site-specific health and safety plan appropriate engineering controls. Engineering controls would also address cross-media impacts. This would involve air emissions from the operation of a VER system.

The remedy selected for the Alcas property will also include deed restrictions which will contribute to the protection of human health by preventing the installation of drinking water wells on the property.

Compliance with ARARs

Significant quantities of contaminants in both the soil and groundwater would be removed by VER, thereby eliminating additional contributions of contamination to the City Aquifer and eventually resulting in compliance with chemical-specific ARARs.

Proper design and implementation of the VER or SVE/AS system and treatment of the extracted groundwater and vapor will ensure that the implementation of this alternative will be in compliance with location- and action-specific ARARs.

Specific ARARs include:

1. Federal hazardous waste management requirements: Regulations for Organic Air Emission Standards, 40 CFR Part 26 Subparts AA and BB, and the monitoring and detection requirements for Solid Waste Management Units under 40 CFR part 264 Subpart F, are applicable. Also, groundwater monitoring regulations under 40 CFR Part 264, Subpart F standards are applicable to long-time monitoring of the site. These standards provide guidance for well construction and placement, sample collection and analysis procedures applicable to the remedial action.

2. NYSDEC's hazardous waste management requirements may be found at 6 NYCRR Parts 370-372.

3. NYSDEC's Technical and Administrative Guidance Memorandum (TAGM), number HWR-94-4046, for determining soil cleanup objectives.

4. State and federal air requirements: 6 NYCRR Parts 200-257, 6 NYCRR Parts 360-373 and 40 CFR Parts 50 and 61 and the NYSDEC's Air Guide-1

5. State and federal water requirements: federal requirements at 40 CFR Part 141, Section 404 of the Clean Water Act, and Executive Order 11988 (Floodplain Management); New York State requirements at 6 NYCRR Parts 701-703 and the NYSDOH requirements at 10 NYCRR, Subpart 5-1; Water Supplies.

6. Applicable requirements of the National Historic Preservation Act of 1966, as amended.

This alternative, upon completion of VER treatment, should also be in compliance with the soil RAOs.

Cost-Effectiveness

Alternative 4 is the most cost-effective alterative for the Alcas source area which is protective of human health and the environment and which complies with ARARs. Only Alternatives 4 and 5 met these criteria. The present worth of Alternative 4 is $837,721, while the present worth for Alternative 5 is $1,013,495.

Utilize Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

Alternative 4 will permanently remove contamination in the soil and groundwater and therefore will meet the statutory requirement for utilization of treatment as a permanent solution for eliminating contamination. The alternative is also the most balanced selection when considering all the NCP criteria.

Preference for Treatment as a Principal Element

Alternative 4 involves treatment of contaminated soil and groundwater and therefore satisfies the statutory requirement for selecting an alternative which has treatment as its primary element.

LOOHN'S DRY CLEANERS AND LAUNDERERS

Protection of Human Health and the Environment Alternative 4 (Vacuum Enhanced Recover (VER) or Soil Vapor Extraction with Air Sparging (SVE/AS)) or Alternative 5 (Excavation) will reduce or eliminate the Loohn's source area by removal and treatment. Upon completion of the remediation of soil contamination at all of the source areas, groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four-year intervals. If it is determined that the City Aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed.

Elimination of soil and groundwater contamination is protective of human health and the environment, since it will lead to restoration of the aquifer, which is a source of drinking water. The risk assessment revealed unacceptable risks due to ingestion and dermal contact with untreated groundwater.

Any short-term risks due to the construction of a VER of SVE/AS system or due to excavation will be mitigated through a site-specific health and safety plan and appropriate engineering controls. Engineering controls would also address cross-media impacts. This would involve air emissions from operation of a soil treatment system or a groundwater extraction and treatment system.

The remedy selected for the Loohn's property will also include deed restrictions which will contribute to the protection of human health by preventing the installation of drinking water wells on the property.

Compliance with ARARs

Significant quantities of contaminants in both the soil and groundwater will be removed by VER or SVE/AS, thereby eliminating additional contributions of contamination to the City Aquifer and eventually resulting in compliance with chemical-specific ARARs. It is expected that compliance with chemical-specific ARARs would be achieved over time. If selected as the contingency alternative, Alternative 5 would provide rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations would be rapidly reduced by implementation of this alternative. Contaminated soil that is acting as a source of contamination to the groundwater would be removed in this alternative, thereby eliminating additional contributions of contamination to the City Aquifer and resulting in compliance with chemical-specific ARARs. If it is determined that chemical-specific ARARs in the groundwater have not been achieved, a groundwater pump-and-treat system may be installed to ensure compliance with groundwater ARARs.

Specific ARARs include:

1. Federal hazardous waste management requirements: Regulations for Organic Air Emission Standards, 40 CFR Subparts AA and BB, and the monitoring and detection requirements for Solid Waste Management Units under 40 CFR Subpart F, are applicable. Also, groundwater monitoring regulations under 40 CFR Part 264, Subpart F standards are applicable to long-term monitoring of the site. These standards provide guidance for well construction and placement, sample collection and analysis procedures applicable to the remedial action.

The following federal requirements may also apply if Alternative 5, is implemented: 40 CFR Part 262, as a generator, and 40 CFR Part 263 as a transporter. In addition, the RCRA land disposal restrictions of 40 CFR Part 268 are applicable. As with Alternative 4, 40 CFR 264 Subparts F, AA, and BB are applicable to the groundwater treatment system.

2. NYSDEC's hazardous waste management requirements may be found at 6 NYCRR Parts 370-372.

3. NYSDEC's Technical and Administrative Guidance Memorandum (TAGM), number HWR-94-4046, for determining soil clean up objectives.

4. State and federal air requirements: 6 NYCRR Parts 200-257, 6 NYCRR Parts 360-373 and 40 CFR Parts 50 and 61 and the NYSDEC's Air Guide-1

5. Applicable requirements of the National Historic Preservation Act of 1966, as amended.

6. State and federal water requirements: federal requirements at 40 CFR. Part 141, Section 404 of the Clean Water Act, and Executive Order 11988 (Floodplain Management); New York State requirements at 6 NYCRR Parts 701-703 and the NYSDOH requirements at 10 NYCRR, Subpart 5-1; Water Supplies.

Cost-Effectiveness

Of the alternatives evaluated for the Loohn's source area, Alternatives 3, 3A, 4 and 5 were protective of human health and the environment and could achieve ARARs. Alternative 4 was less costly than Alternatives 3A and 5, but slightly more costly (about 13.5%) than Alternative 3. This additional cost is justified since Alternative 4 will permanently remove the contaminated soil while Alternative 3 will only contain it.

Utilize Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

Alternative 4 and contingency Alternative 5 will permanently remove contamination in the soil and groundwater and therefore will meet the statutory requirement for utilizing a permanent solution for eliminating contamination. The alternative is also the most balanced selection when considering all the NCP criteria.

Preference for Treatment as a Principal Element

Alternative 4 is EPA's preferred alternative for Loohn's and involves treatment of contaminated soil and groundwater. This selection satisfies the statutory requirement for selecting an alternative which has treatment as its primary element.

AVX

Protection of Human Health and the Environment

Alternative 5 will completely eliminate the identified source area by excavation and off-Site treatment and disposal. Upon completion of the remediation of soil contamination at all of the source areas, the groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four-year intervals. If it determined that the City Aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed.

Elimination of soil and groundwater contamination is protective of human health and the environment, since it will lead to restoration of the aquifer, which is a source of drinking water and will eliminate unacceptable risks due to ingestion and dermal contact with untreated groundwater.

Any short-term risks due to excavation will be mitigated through a site-specific health and safety plan and appropriate engineering controls. Engineering controls would also address cross-media impacts. This would involve air emissions from operation of a groundwater extraction and treatment system.

The remedy selected for the AVX property will also include deed restrictions which will contribute to the protection of human health by preventing the installation of drinking water wells on the property.

Compliance with ARARs

Alternative 5 will provide the most rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations will be rapidly reduced by implementation of this alternative. Contaminated soil that is acting as a source of contamination to the groundwater will be removed in this alternative, thereby eliminating additional contributions of contamination to the City Aquifer and resulting in compliance with chemical-specific ARARs. If it is determined that chemical-specific ARARs in the groundwater are not achieved, a groundwater pump-and-treat system may be installed to ensure compliance with groundwater ARARs.

Specific ARARs include:

1.   Federal hazardous waste management requirements: The following regulations may apply: 40 CFR Part 262, as a generator, and 40 CFR Part 263 as a transporter. In addition, the RCRA land disposal restrictions of 40 CFR Part 268 are applicable. Also, 40 CFR 264 Subparts F, AA, and BB are applicable to the groundwater treatment system.

2.   NYSDEC's hazardous waste management requirements may be found at 6 NYCRR Parts 370-372.

3.   NYDEC's Technical and Administrative Guidance Memorandum (TAGM), number HWR-94-4046, for determining soil clean up objectives.

4.   State and federal air requirements: 6 NYCRR Parts 200-257, 6 NYCRR Parts 360-373 and 40 CFR Parts 50 and 61 and the NYSDEC's Air Guide-1.

5.   State and federal water requirements: federal requirements at 40 CFR. Part 141, Section 404 of the

Clean Water Act, and Executive Order 11988 (Floodplain Management); New York State requirements at 6 NYCRR Parts 701-703 and the NYSDOH requirements at 10 NYCRR, Subpart 5-1; Water Supplies.

6. Federal Management Practices, which can be found in the Federal Register at Vol. 51, No. 219, Part 330.6, will be followed in order to minimize the spread of contamination and habitat impacts to the wetlands from the selected remedial activities. In addition, Executive Order 11990 on Protection of Wetlands and EPA's Statement of Policy on Wetlands and Floodplain applies.

Cost-Effectiveness

Of the alternatives evaluated for the AVX source area, Alternatives 3, 3A, 4 and 5 are protective of human health and the environment and could achieve ARARs. Alternative 5 is less costly than Alternatives 4 and 3A, but slightly more costly (about 23%) than Alternative 3. This additional cost is justified since Alternative 5 will permanently remove the contaminated soil while Alternative 3 will only contain it.

Utilize Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

Alternative 5, excavation, meets the statutory requirement for utilizing treatment as a permanent solution for eliminating the contamination. The alternative is also the most balanced selection when considering all the NCP criteria.

Preference for Treatment as a Principal Element

Although treatment is not a principal element of Alternative 5, the excavated soil will be treated, if necessary, in order to dispose of it properly. Also, if excavation does not result in adequate improvement of the groundwater, the groundwater will be treated, which will satisfy the statutory requirement for selecting an alternative which has treatment as its primary element.

McGRAW-EDISON

Protection of Human Health and the Environment

Alternative 3A will be implemented immediately at the McGraw-Edison site, since there is no soil source area to be remediated. Proper operation and maintenance of the groundwater pump-and-treat system will ensure that the RAOs for groundwater will be achieved. Extraction of contaminated groundwater will protect human health and the environment by removing contamination from the aquifer and preventing migration of contaminants from this area to the municipal well field.

Elimination of groundwater contamination is protective of human health and the environment, since it will lead to restoration of the aquifer, which is a source of drinking water. In addition, the risk assessment revealed unacceptable risks due to ingestion and dermal contact with untreated groundwater.

Any short-term risks due to modification of the existing groundwater extraction and treatment system will be mitigated through a site-specific health and safety plan. Engineering controls would also address cross-media impacts. This would involve air emissions from operation of the groundwater extraction and treatment system.

The remedy selected for the McGraw-Edison property will also include deed restrictions which will contribute to the protection of human health by preventing the installation of drinking water wells on the property.

Compliance with ARARs

By treating the groundwater beneath McGraw-Edison site, further contamination migration to the municipal supply wells will be eliminated, eventually resulting in compliance with chemical-specific ARARs.

Specific ARARs include:

1. Federal hazardous waste management requirements: Regulations for Organic Air Emission Standards, 40 CFR Part 264 Subparts AA and BB, and the monitoring and detection requirements for Solid Waste Management Units under 40 CFR Part 264 Subpart F, are applicable.

2. NYSDEC's hazardous waste management requirements may be found at 6 NYCRR Parts 370-372.

3. State and federal air requirements include: 6 NYCRR Parts 200-257, 6 NYCRR Parts 360-373 and 40 CFR Parts 50 and 61 and the NYSDEC's Air Guide-1.

4. State and federal water requirements include: federal requirements at 40 CFR. Part 141, Section 404 of the Clean Water Act, and Executive Order 11988 (Floodplain Management); New York State requirements at 6 NYCRR Parts 701-703 and the NYSDOH requirements at 10 NYCRR, Subpart 5-1; Water Supplies.

Cost-Effectiveness

Alternative 3A is the most cost-effective alterative for the McGraw-Edison source area, is protective of human health and the environment and complies with ARARs. Alternatives 1 and 2 were determined not to be protective of human health and the environment. Alternatives 4 and 5 were not evaluated since there was no soil contamination. The present worth of Alternative 3A is $935,610.

Utilize Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

Alternative 3A meets the statutory requirement for selecting a remedy which utilizes treatment as a permanent solution for eliminating the contamination. The alternative is also the most balanced selection when considering all the NCP criteria.

Preference for Treatment as a Principal Element

Alternative 3A involves treatment of contaminated groundwater and therefore satisfies the statutory requirement for selecting an alternative which has treatment as its primary element.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternative presented in the Proposed Plan.

APPENDIX I

FIGURES

<IMG SRC 0296281A>.
<IMG SRC 0296281A1>

APPENDIX II

TABLES

Table 1

Contaminant	Soil Clean up Objective	Federal Ground water MCL	New York State Water Quality Standard-1
Benzene	60 ppb	5 ppb	0.7 ppb
2-Butanone	300 ppb	--	50 ppb
Cis 1,2- Dicloro-ethene	300 ppb	70 ppb	5 ppb
Ethylbenzene	5,500 ppb	700 ppb	5 ppb
Tetrachloro ehtene	1,400 ppb	5 ppb	5 ppb
1,1,1-Trichloro-ethane	800 ppb	200 ppb	5 ppb
Trichloroethene	700 ppb	5 ppb	5 ppb
Toluene	1,500 ppb	1,000 ppb	5 ppb
Vinyl Chloride	200 ppb	2 ppb	2 ppb
Xylene	1,200 ppb	10,000 ppb	5 ppb

1 - The values listed are the more stringent of New York States drinking water and groundwater standards.

TABLE 2

CHEMICALS OF CONCERN
GROUNDWATER EXPOSURE PATHWAY
OLEAN WELLFIELD SITE

CHEMICAL NAME	CHEMICALS OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON FOR EXCLUSION	MAXIMUM	MINIMUM	
ORGANICS (ug/L)					
1,1,1-Trichloroethane	Y		3.60E + 05	4.00E + 00	8.12E + 02
1,1,2-Trichloroethane	Y		6.00E-01	6.00E-01	*
1,1-Dichloroethane	Y		2.60E + 04	9.00E-01	3.90E + 01
1,1-Dichloroethene	Y		1.60E + 04	9.00E-01	3.22E + 01
1,2-Dichlorobenzene	Y		2.60E + 01	2.60E + 01	1.20E + 00
1,2-Dichloroethane	Y		1.00E + 00	1.00E + 00	*
cis-1,2-Dichloroethene	Y		3.20E + 03	2.00E + 00	6.53E + 01
trans-1,2-Dichlorethene	Y		3.00E + 00	1.00E + 00	2.57E + 00
1,2-Dichloroethene (total)	Y		7.30E + 04	2.00E + 00	2.03E + 03
Acetone	Y		1.80E + 05	3.70E + 03	3.64E + 04
Benzene	Y		6.00E + 00	4.00E + 00	3.01E + 00
Butyl benzyl phthalate	Y		6.00E-01	6.00E-01	*
Carbon disulfide	Y		5.00E + 00	5.00E-01	2.32E + 00
Chlorobenzene	Y		1.00E + 00	1.00E + 00	*
Chloroform	Y		1.00E + 00	6.00E-01	*
Ethylbenzene	Y		2.10E + 01	2.10E + 01	3.31E + 00
Methylene chloride	Y		5.50E + 03	7.30E + 02	2.27E + 02
Tetrachloroethene	Y		1.40E + 04	7.00E-01	3.40E + 01
Toluene	Y		9.60E + 01	7.00E-01	8.21E + 00
Trichloroethene	Y		1.10E + 05	5.00E-01	*
Vinyl chloride	Y		2.50E + 01	1.00E + 00	3.04E + 00
Xylenes (Total)	Y		3.90E + 03	9.00E-01	3.29E + 01

INORGANICS (mg/L)						
Aluminum	Y		2.87E + 04	1.42E + 02	-	
Arsenic	Y		1.10E + 01	1.30E + 00	-	
Barium	Y		3.77E + 02	3.67E + 01	-	
Beryllium	Y		1.70E + 00	1.40E + 00	-	
Cadmium	Y		2.20E + 00	2.20E + 00	-	
Chromium	Y		7.10E + 01	7.80E + 00	-	
Cobalt	Y			3.94E + 01	7.90E + 00	-
Copper	N	1	7.51E + 01	1.68E + 01	-	
Lead	N	1		4.39E + 01	1.30E + 00	-
Manganese	Y		2.20E + 03	4.26E + 01	-	
Nickel	Y		6.80E + 01	6.70E + 01	-	
Potassium	N	1,3		7.05E + 03	1.55E + 03	-
Selenium	Y		2.10E + 00	2.10E + 00	-	
Thallium	Y		1.00E + 00	1.00E + 00	-	
Vanadium	Y		3.35E + 01	2.89E + 01	-	
Zinc	Y		4.40E + 01	1.27E + 01	-	

TABLE 2

CHEMICALS OF CONCERN
GROUNDWATER EXPOSURE PATHWAY
OLEAN WELLFIELD SITE

CHEMICAL NAME	CHEMICALS OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON FOR EXCLUSION	MAXIMUM	MINIMUM	

Note:
Y: Yes
N: NO

1: No available SF and RfDs.
2: It is not carcinogenic compound and the detection frequency is lower then 5 %.
3: Essential nutrient
*: UCL greater than maximum concentration
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-ALCAS

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA(ug/kg)					
Vinyl chloride	Y		1.00E + 02	1.00E + 02	3.98E + 02
Methylene chloride	Y		6.00E + 00	2.00E + 00	3.06E + 02
Acetone	Y		1.00E + 04	1.10E + 01	8.50E + 04
Carbon disulfide	Y		3.20E + 01	2.90E + 01	3.86E + 02
1,2-Dichloroethene	Y		1.00E + 03	1.00E + 00	1.68E + 03
Chloroform	Y		1.60E + 02	1.60E + 02	1.71E + 02
Butanone	Y		4.00E + 00	2.00E + 00	2.97E + 02
Trichloroethene	Y		1.20E + 04	8.00E + 00	1.70E + 04
Tetrachloroethene	Y		2.00E + 02	2.00E + 02	1.86E + 02
Toluene	Y		9.70E + 01	5.00E-01	3.93E + 02
Xylene (Total)	Y		1.00E + 02	1.00E + 00	1.72E + 02

BNA (ug/kg)					
2-Methylphenol	Y		5.90E + 01	5.90E + 01	-
4-Methylphenol	Y		1.90E + 02	1.90E + 02	-
2,4-Dimethylphenol	Y		8.20E + 01	8.20E + 01	-
1,2,4-Trichlorobenzene	Y		3.00E + 01	2.80E + 01	-
Naphthalene	Y		2.50E + 03	3.20E + 01	-
2-Methylnaphthalene	N	1	1.50E + 03	9.00E + 00	-
Acenaphthylene	N	1	7.60E + 02	5.00E + 00	-
Acenaphthene	Y		2.60E + 03	7.00E + 00	-
Dibenzofuran	N	1	3.00E + 03	6.00E + 00	-
Fluorene	Y		5.00E + 03	8.00E + 00	-
Phenanthrene	N	1	2.20E + 04	7.20E + 01	-
Anthracene	Y		6.40E + 03	1.20E + 01	-
Carbazole	Y		1.50E + 03	7.00E + 00	-
Fluoranthene	Y		2.20E + 04	9.70E + 01	-
Pyrene	Y		1.80E + 04	8.60E + 01	-
Benzo(a)anthracene	Y		1.00E + 04	2.80E + 01	-
Chrysene	Y		1.00E + 04	3.70E + 01	-
Benzo(b)fluoranthene	Y		5.70E + 03	3.60E + 01	-
Benzo(k)fluoranthene	Y		6.80E + 03	1.00E + 01	-
Benzo(a)pyrene	Y		8.80E + 03	5.00E + 01	-
Indenol(1,2,3-cd)pyrene	Y		4.10E + 03	1.20E + 01	-
Dibenz(a,h)anthracene	Y		7.20E + 02	7.20E + 01	-
Benzo(g,h,i)perylene	N	1	2.30E + 03	3.00E + 01	-
INORGANIC (mg/kg)					
Aluminum	N	1	3.01E + 04	4.81E + 03	1.62E + 04
Antimony	Y		1.89E + 01	1.89E + 01	6.28E + 00
Arsenic	Y		1.49E + 01	7.80E + 00	4.38E + 01
Barium	Y		1.49E + 03	8.16E + 01	5.16E + 02
Beryllium	Y		4.80E + 00	2.80E-01	1.66E + 00
Cadmium	Y		7.90E-01	4.70E-01	6.99E-01
Calcium	N	1	1.67E + 05	4.62E + 02	8.59E + 04
Chromium	Y		9.44E + 02	1.24E + 01	3.53E + 02

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-ALCAS

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
Cobalt	N	1	1.16E + 01	1.90E + 00	1.24E + 01
Copper	N	1	9.36E + 01	1.33E + 01	6.31E + 01
Iron	N	1	3.05E + 04	8.04E + 03	3.10E + 04
Lead	N	1	1.07E + 02	1.17E + 01	8.98E + 01
Magnesium	N	1	2.22E + 04	1.44E + 03	6.34E + 03
Manganese	Y		4.68E + 03	2.95E + 02	1.73E + 03
Mercury	Y		3.60E-01	9.00E-02	1.94E-01
Nickel	Y		6.31E + 01	4.60E +00	3.10E + 01
Potassium	N	1	2.09E + 03	4.82E + 02	1.71E + 03
Selenium	Y		2.09E + 03	4.82E + 02	1.00E + 00
Silver	Y		1.70E + 00	1.70E + 00	6.90E-01
Sodium	N	1	6.70E + 02	6.14E + 01	4.63E + 02
Thallium	Y		9.60E-01	4.20E-01	5.28E-01
Vanadium	Y		3.11E + 01	1.08E + 01	2.31E + 01
Zinc	Y		1.20E + 02	2.94E + 01	1.01E + 02

Note:
Y: Yes
N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLSFIELD SITE-AVX

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Methylene chloride	Y		1.70E + 04	2.00E + 00	2.56E + 03
Acetone	Y		1.70E + 04	2.00E + 00	2.57E + 08
1,1-Dichloroethene	Y		3.70E + 03	3.70E + 03	5.58E + 01
1,1-Dichloroethane	Y		2.20E + 03	5.00E + 00	7.51E + 02
1,2-Dichloroethene (total)	Y		4.50E + 04	1.00E + 00	2.22E + 05
Chloroform	Y		8.20E + 01	8.20E + 01	8.99E + 00
1,2-Dichloroethane	Y		4.70E + 01	2.00E + 00	7.78E + 00
2-Butanone	Y		4.70E + 01	2.00E + 00	1.24E + 01
1,1,1-Trichloroethane	Y		1.30E + 06	5.40E + 01	2.26E + 10
Trichloroethene	Y		5.00E + 05	3.00E + 00	4.90E + 08
1,1,2-Trichloroethane	Y		5.50E + 02	3.40E + 01	3.98E + 01
Benzene	Y		1.20E + 01	1.00E + 00	6.18E + 00
4-Methyl-2-pentanone	Y		8.90E + 02	4.00E + 00	1.09E + 02
Tetrachloroethene	Y		2.70E + 05	3.00E + 00	1.12E + 08
1,1,2,2-Tetrachloroethane	Y		1.70E + 01	1.70E + 01	6.00E + 00
Toluene	N	2	1.60E + 04	3.00E + 00	1.06E + 04
Ethyl benzene	Y		4.00E + 03	1.20E + 01	8.57E + 02
Xylene (total)	Y		4.00E + 03	1.20E + 01	4.86E + 06

BNA (ug/kg)					
2-Chlorophenol	Y		1.00E + 01	1.00E + 01	-
1,2,4-Trichlorobenzene	Y		3.70E + 01	1.20E + 01	-
Naphthalene	Y		8.10E + 01	2.80E + 01	-
2-Methylnaphthalene	N	1	5.70E + 01	7.00E + 00	-
Acenaphthylene	N	1	4.10E + 01	5.00E + 00	-
Acenaphthene	Y		2.10E + 02	1.40E + 01	-
Dibenzofuran	N	1	1.20E + 02	1.50E + 01	-
Fluorene	Y		2.80E + 02	2.70E + 01	-
Phenanthrene	N	1	2.70E + 03	8.80E + 01	-
Anthracene	Y		5.30E + 02	1.30E + 01	-
Carbazole	Y		3.10E + 02	8.00E + 00	-
Fluoranthene	Y		4.00E + 03	2.10E + 02	-
Pyrene	Y		4.10E + 03	1.50E + 02	-
Benzo(a)anthracene	Y		2.30E + 03	6.00E + 01	-
Chrysene	Y		2.40E + 03	8.00E + 01	-
Di-n-octylphthalate	Y		2.00E + 00	2.00E + 00	-
Benzo(b)fluoranthene	Y		2.60E + 03	7.50E + 01	-
Benzo(k)fluoranthene	Y		4.00E + 02	2.60E + 01	-
Benzo(a)pyrene	Y		1.90E + 03	6.40E + 01	-
Indeno(1,2,3-cd)pyrene	Y		9.30E + 02	5.00E + 01	-
Dibenza(a,h)anthracene	Y		1.80E + 02	1.10E + 01	-
Benzo(g,h,i)perylene	N	1	3.60E + 02	3.00E + 01	-
INORGANIC (mg/kg)					
Aluminum	N	1	1.70E + 04	1.02E + 04	-
Arsenic	Y		1.46E + 01	1.17E + 01	-
Barium	Y		1.28E + 03	9.89E + 01	-
Beryllium	Y		5.70E-01	2.70E-01	-
Cadmium	Y		7.70E-01	5.50E-01	-

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-AVX

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
Calcium	N	1	2.09E + 04	1.21E + 03	-
Chromium	Y		2.12E + 01	1.11E + 01	-
Cobalt	N	1	1.44E + 01	7.80E + 00	-
Copper	N	1	2.77E + 01	1.63E + 01	-
Iron	N	1	3.33E + 04	2.27E + 04	-
Lead	N	1	3.52E + 01	1.60E + 01	-
Magnesium	N	1	4.79E + 03	1.55E + 03	-
Manganese	Y		1.30E + 03	5.56E + 02	-
Mercury	Y		1.10E-01	1.10E-01	-
Nickel	Y		2.94E + 01	1.32E + 01	-
Potassium	N	1	2.88E + 03	7.91E + 02	-
Selenium	Y		5.10E-01	5.10E-01	-
Silver	Y		3.20E + 00	1.00E + 00	-
Sodium	N	1	1.16E + 02	7.40E + 01	-
Vanadium	Y		2.86E + 01	1.51E + 01	-
Zinc	Y		9.79E + 01	6.19E + 01	-

Note:
Y: Yes
N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-BORROW PIT

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL	
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM		
VOA (ug/kg)						
Methylene chloride	Y		1.20E + 01	9.00E + 00	-	
Tetrachloroethene	Y		1.00E + 01	1.00E + 01	-	
BNA (ug/kg)						
Bis(2-Ethlhexyl)phthalate	Y		9.10E + 01	6.60E + 01	-	
INORGANIC (mg/kg)						
Aluminum	N	1	9.26E + 03	6.12E + 03		
Antimony	Y		5.40E + 00	5.40E + 00	-	
Arsenic	Y		1.56E + 01	1.02E + 01	-	
Barium	Y		1.52E + 02	8.25E + 01	-	
Beryllium	Y		5.00E-01	2.30E-01	-	
Cadmium	Y		2.40E-01	2.40E-01	-	
Calcium	N	1	7.82E + 02	5.06E + 02	-	
Chromium	Y		1.03E + 01	7.50E + 00	-	
Cobalt	N	1	1.59E + 01	8.20E + 00	-	
Copper	N	1	1.85E + 01	1.17E + 01	-	
Iron	N	1	4.86E + 04	2.05E + 04	-	
Lead	N	1	2.70E + 01	1.08E + 01	-	
Magnesium	N	1	2.17E + 03	1.44E + 03	-	-
Manganese	Y		1.53E + 03	3.87E + 02	-	
Nickel	Y		1.91E + 01	1.48E + 01	-	
Potassium	N	1	1.08E + 03	7.12E + 02	-	
Sodium	N	1	7.13E + 01	3.80E + 01	-	
Vanadium	Y		1.48E + 01	8.50E + 00	-	
Zinc	Y		5.32E + 01	4.53E + 01	-	

Note:
Y: Yes
N: NO
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-Loohn's Dry Cleaners and Launderers

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
1,2-Dichloroethene (total)	Y		6.90E + 03	1.50E + 01	6.79E + 05
2-Butanone	Y		3.30E + 03	8.00E + 00	5.03E + 07
Trichloroethene	Y		2.40E + 04	7.00E + 00	1.20E + 07
Tetrachloroethene	Y		2.40E + 04	7.00E + 00	8.07E + 11
BNA (ug/kg)					
Naphthalene	Y		7.90E + 01	3.30E + 01	-
2-Methynaphthalene	N	1	7.90E + 01	3.00E + 01	-
Acenaphthylene	N	1	5.90E + 01	2.20E + 01	-
Acenaphthene	Y		1.10E + 02	8.50E + 01	-
Dibenzofuran	N	1	1.30E + 02	4.10E + 01	-
Fluorene	Y		1.00E + 02	9.30E + 01	-
Phenanthrene	N	1	1.40E + 03	1.10E + 03	-
Anthracene	Y		2.00E + O2	1.50E + 02	-
Carbazole	Y		1.40E + 02	1.10E + 02	-
Di-n-butylphthalate	Y		3.30E + 01	3.30E + 01	-
Fluoranthene	Y		1.90E + 03	1.30E + 03	-
Pyrene	Y		1.80E + 03	1.20E + 03	-
Benzo(a)anthracene	Y		1.20E + 03	5.90E + 02	-
Chrysene	Y		1.00E + 03	6.50E + 02	-
Bis(2-Ethylhexyl)phthalate	Y		1.00E + 03	1.00E + 02	-
Benzo(b)fluoranthene	Y		1.80E + 03	7.90E + 02	-
Benzo(k)fluoranthene	Y		8.30E + 02	8.30E + 02	-
Benzo(a)pyrene	Y		9.00E + 02	3.80E + 02	-
Indeno(1,2,3-cd)pyrene	Y		4.00E + 02	4.00E + 02	-
Dibenz(a,h)anthracene	Y		1.90E + 02	1.90E + 02	-
Benzo(g,h,i)perylene	N	1	3.00E + 02	2.50E + 02	-

INORGANIC (mg/kg					
Aluminum	N	1	1.43E + 04	3.71E + 03	-
Arsenic	Y		1.68E + 01	7.50E + 00	-
Barium	Y		1.34E + 02	8.24E + 01	-
Beryllium	Y		6.70E-01	2.20E-01	-
Calcium	N	1	7.45E + 03	2.55E + 03	-
Chromium	Y		3.09E + 01	1.45E + 01	-
Cobalt	N	1	1.44E + 01	9.70E + 00	-
Copper	N	1	2.51E + 01	2.06E + 01	-
Iron	N	1	7.12E + 04	2.55E + 04	-
Lead	N	1	2.10E + 02	1.26E + 01	-
Magnesium	N	1	5.22E + 03	6.49E + 02	-
Manganese	Y		9.12E + 02	5.70E + 02	-
Mercury	Y		1.20E-01	1.20E-01	-
Nickel	Y		2.99E + 01	1.64E + 01	-
Potassium	N	1	2.11E + 03	3.02E + 02	-
Sodium	N	1	1.86E + 02	9.02e + 01	-

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-Loohn's Dry Cleaners and Launderers

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF NO	MAXIMUM	MINIMUM	
Thallium	Y		3.20E-01	3.20E-01	-
Vanadium	Y		2.00E + 01	1.55E + 01	-
Zinc	Y		2.16E + 02	6.37E + 01	-

Note:
Y: Yes
N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-PRIVATE DUMP

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
PRIVATE DUMP					
VOA (ug/kg)					
2-Butanone	Y		6.00E + 01	6.00E + 01	-
Toluene	Y		6.00E + 00	6.00E + 00	-
BNA (ug/kg)					
2-Methylphenol	Y		2.80E + 01	2.80E + 01	-
4-Methylphenol	Y		7.30E + 01	7.30E + 01	-
Acenaphthene	Y		6.50E + 01	6.50E + 01	-
Dibenzofuran	N	1	4.90E + 01	4.90E + 01	-
Diethylphthalate	Y		2.10E + 01	2.00E + 01	-
Fluorene	Y		8.70E + 01	8.70E + 01	-
Phenanthrene	N	1	9.20E + 01	2.10E + 01	-
Anthracene	Y		1.10E + 02	1.10e + 02	-
Carbazole	Y		1.40E + 02	1.40E + 02	-
Fluoranthene	Y		1.10E + 03	2.60E + 01	-
Pyrene	Y		1.10E + 03	1.10E + 03	-
Benzo(a)anthracene	Y		6.00E + 02	6.00E + 02	-
Chrysene	Y		5.90E + 02	5.90E + 02	-
Bis(2-Ethylehexyl)phthalate	Y		7.50E + 02	4.40E + 01	-
Benzo(b)fluoranthene	Y		1.40E + 03	1.40E + 03	-
Benzo(a)pyrene	Y		4.80E + 02	4.80E + 02	-

INORGANIC (Mg/kg)					
Aluminum	N	1	1.58E + 04	6.90E + 03	-
Arsenic	Y		1.40E + 01	5.10E + 00	-
Barium	Y		4.13E + 02	5.41E + 01	-
Beryllium	Y		8.70E-01	2.50E-01	-
Calcium	N	1	2.76E + 04	2.07E + 02	-
Chromium	Y		1.54E + 01	7.70E + 00	-
Cobalt	N	1	1.47E + 01	5.60E + 00	-
Copper	N	1	1.09E + 02	1.10E + 01	-
Iron	N	1	3.28E + 04	1.61E + 04	-
Lead	N	1	6.60E + 01	1.54E + 01	-
Magnesium	N	1	6.34E + 03	1.41E + 03	-
Manganese	Y		6.22E + 03	1.82E + 02	-
Mercury	Y		1.70E-01	1.20E-01	-
Nickel	Y		2.86E + 01	1.02E + 01	-
Potassium	N	1	1.61E + 03	4.95E + 02	-
Sodium	N	1	1.07E + 02	5.93E + 01	-
Vanadium	Y		2.19E + 01	1.63E + 01	-
Zinc	Y		1.80E + 02	4.88E + 01	-

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-PRIVATE DUMP

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	

Note:
Y: Yes
N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. N0 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-McGRAW-EDISON

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Methylene chloride	Y		1.20E + 02	2.00E + 00	7.29E + 00
Acetone	Y		1.30E + 04	1.00E + 01	6.38E + 03
1,2-Dichloroethene (total)	Y		5.00E + 00	3.00E + 00	5.02E + 00
Chloroform	Y		2.00E + 00	2.00E + 00	5.75E + 00
2-Butanone	Y		1.40E + 01	2.00E + 00	5.48E + 00
1,1,1-Trichloroethane	Y		7.00E + 00	4.00E + 00	5.10E + 00
Trichloroethene	Y		8.60E + 02	2.00E + 00	2.59E + 01
Benzene	Y		8.00E + 00	2.00E + 00	5.15E + 00
Tetrachloroethene	Y		4.00E + 00	1.00E + 00	5.15E + 00
Toluene	Y		8.00E + 00	4.00E-01	5.86E + 00
Chlorobenzene	Y		7.00E + 00	6.00E-01	5.42E + 00
BNA (ug/kg)					
Phenol	Y		2.60E + 01	2.60E + 01	-
1,2,4-Trichlorobenzene	Y		3.80E + 01	2.30E + 01	-
Naphthalene	Y		4.00E + 00	4.00E + 00	-
Phenanthrene	N	1	2.00E + 01	1.00E + 01	-
Fluoranthene	Y		1.90E + 01	6.00E + 00	-
Pyrene	Y		1.30E + 01	4.00E + 00	-
Bis(2-Ethylhexyl)phthalate	Y		4.50E + 02	4.50E + 02	-

INORGANIC (mg/kg)					
Aluminum	N	1	1.46E + 04	1.15E + 04	-
Antimony	Y		4.60E + 00	4.40E + 00	-
Arsenic	Y		6.38E + 01	1.46E + 01	-
Barium	Y		1.71E + 02	8.64E + 01	-
Beryllium	Y		3.70E-01	2.30E-01	-
Calcium	N	1	1.55E + 03	1.31E + 03	-
Chromium	Y		1.74E + 01	1.38E + 01	-
Cobalt	N	1	1.30E + 01	1.09E + 01	-
Copper	N	1	3.52E + 01	2.30E + 01	-
Iron	N	1	3.51E + 04	2.75E + 04	-
Lead	N	1	3.57E + 01	1.89E + 01	-
Magnesium	N	1	3.67E + 03	3.21E + 03	-
Manganese	Y		1.23E + 03	7.60E + 02	-
Nickel	Y		2.36E + 01	1.94E + 01	-
Potassium	N	1	1.68E + 03	1.48E + 03	-
Sodium	N	1	8.14E + 01	6.18E + 01	-
Vanadium	Y		1.97E + 01	1.46E + 01	-
Zinc	Y		8.29E + 01	5.96E + 01	-

None:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. N0 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-MASTELFORD

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Acetone	Y		4.10E + 02	2.00E + 01	1.64E + 02
1,2-Dichloroethene (total)	Y		1.10E + 01	6.00E + 00	5.80E + 00
Chloroform	Y		2.00E + 00	2.00E + 00	4.89E + 00
2-Butanone	Y		8.80E + 01	8.80E + 01	1.18E + 01
Trichloroethene	Y		3.00E + 00	3.00E + 00	4.70E + 00
Benzene	Y		2.10E + 01	2.10E + 01	6.58E + 00
Tetrachloroethene	Y		4.00E + 00	2.00E + 00	4.95E + 00
Toluene	Y		1.30E + 02	2.30E + 01	2.38E + 01
Chlorobenzene	Y		0.00E + 00	2.00E + 00	4.89E + 00
Ethyl benzene	Y		8.70E + 01	2.00E + 00	2.21E + 01
Xylenes (total)	Y		8.40E + 02	2.20E + 01	3.79E + 02
BNA (ug/kg)					
Naphthalene	Y		9.00E + 01	9.00E + 01	-
2-Methylnaphthalene	N	1	2.00E + 01	2.00E + 01	-
Acenaphthylene	N	1	1.60E + 01	1.60E + 01	-
Acenaphthene	Y		5.20E + 01	5.20E + 01	-
Dibenzofuran	N	1	3.70E + 01	3.70E + 01	-
Fluorene	Y		7.90E + 01	7.90E + 01	-
Phenanthrene	N	1	6.00E + 02	3.00E + 01	-
Anthracene	Y		1.00E + 02	6.00E + 00	-
Carbazole	Y		6.20E + 01	6.20E + 01	-
Fluoranthene	Y		7.90E + 02	6.50E + 01	-
Pyrene	Y		2.00E + 03	4.30E + 01	-
Benzo(a)anthracene	Y		8.20E + 01	8.20E + 01	-
Chrysene	Y		1.00E + 03	2.00E + 01	-
Bis(2-Ethylhexyl)phthalate	Y		2.10E + 04	2.10E + 04	-
Benzo(b)fluoranthene	Y		6.50E + 02	6.50E + 02	-
Benzo(k)fluoranthene	Y		3.00E + 02	1.70E + 02	-
Benzo(a)pyrene	Y		3.10E + 02	6.10E + 01	-
Indeno(1,2,3-cd)pyrene	Y		2.00E + 02	2.00E + 02	-
Benzo(g,h,i)perylene	N	1	1.80E + 02	1.80E + 02	-

INORGANIC (mg/kg)					
Aluminum	N	1	1.50E + 04	8.61E + 03	-
Arsenic	Y		2.55E + 01	8.90E + 00	-
Barium	Y		2.27E + 02	6.54E + 01	-
Beryllium	Y		9.40E-01	9.20E-01	-
Calcium	N	1	9.56E + 03	7.27E + 02	-
Chromium	Y		1.79E + 01	9.50E + 00	-
Cobalt	N	1	2.88E + 01	6.80E + 00	-
Copper	N	1	1.67E + 01	8.30E + 00	-
Iron	N	1	3.32E + 04	1.67E + 04	-
Magnesium	N	1	4.03E + 03	1.95E + 03	-
Manganese	Y		6.81E + 02	2.14E + 02	-
Mercury	Y		1.90E-01	1.90E-01	-
Nickel	Y		3.01E + 01	1.35E + 01	-
Potassium	N	1	1.05E + 03	4.26E + 02	-
Sodium	N	1	8.31E + 02	6.43E + 01	-

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-MASTEL FORD

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
Vanadium	Y		3.36E + 01	1.53E + 01	-
Zinc	Y		7.10E + 01	5.78E + 01	-

Note:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %
-: Sample number is less than 10. No 95 % UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-GRIFITH OIL

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Methylene chloride	Y		6.50E + 01	6.50E + 01	8.61E + 00
Acetone	Y		6.30E + 01	6.00E + 00	2.10E + 01
Carbon disulfide	Y		3.00E + 00	3.00E + 00	2.60E + 00
2-Butanone	Y		6.00E + 00	6.00E + 00	5.19E + 00
1,1,1-Trichloroethane	Y		1.60E + 01	1.60E + 01	4.30E + 00
Trichloroethene	Y		3.00E + 00	3.00E + 00	2.60E + 00
Benzene	Y		1.20E + 01	1.00E + 00	4.43E + 00
Toluene	Y		4.00E + 01	2.00E + 00	6.60E + 00
Xylenes (total)	Y		5.00E + 00	5.00E + 00	2.93E + 00
BNA (ug/kg)					
Naphthalene	Y		4.10E + 01	4.10E + 01	-
2-Methylnaphthalene	N	1	7.60E + 03	9.70E + 01	-
Phenanthrene	N	1	1.10E + 03	9.40E + 01	-
Di-n-butylphthalate	Y		2.70E + 01	2.70E + 01	-
Fluoranthene	Y		1.30E + 02	5.50E + 01	-
Pyrene	Y		1.50E + 02	5.00E + 01	-
Benzo(a)anthracene	Y		7.40E + 01	2.60E + 01	-
Chrysene	Y		9.00E + 01	2.90E + 01	-
Benzo(b)fluoranthene	Y		1.80E + 02	8.70E + 01	-
Benzo(a)pyrene	Y		9.20E + 01	4.60E + 01	-
Indeno(1,2,3-cd)pyrene	Y		1.30E + 02	1.30E + 02	-
Benzo(g,h,i)perylene	N	1	1.50E + 02	1.50E + 02	-

INORGANIC (mg/kg)					
Aluminum	N	1	1.44E + 04	6.55E + 03	-
Antimony	Y		7.50E + 00	5.90E + 00	-
Arsenic	Y		2.73E + 01	7.80E + 00	-
Barium	Y		1.52E + 02	6.86E + 01	-
Beryllium	Y		5.80E-01	3.30E-01	-
Cadmium	Y		4.30E + 00	7.50E-01	-
Calcium	N	1	4.22E + 03	1.19E + 03	-
Chromium	Y		1.58E + 01	1.58E + 01	-
Cobalt	N	1	2.16E + 01	5.40E + 00	-
Copper	N	1	1.19E + 03	1.97E + 01	-
Iron	N	1	3.50E + 04	1.87E + 04	-
Lead	N	1	3.45E + 01	3.45E + 01	-
Magnesium	N	1	3.38E + 03	1.80E + 03	-
Manganese	Y		8.64E + 02	1.18E + 02	-
Nickel	Y		2.19E + 01	9.40E + 00	-
Potassium	N	1	1.36E + 03	1.36E + 03	-
Sodium	N	1	9.27E + 01	5.15E + 01	-
Thallium	Y		3.80E-01	3.80E-01	-
Vanadium	Y		2.32E + 01	1.12E + 01	-
Zinc	Y		1.43E + 03	4.60E + 01	-

Note:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-FAV & SCHAFFER

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Carbon disulfide	Y		2.40E + 01	2.40E + 01	-
1,1,1-Trichloroethane	Y		1.00E + 01	5.00E + 00	-
Trichloroethene	Y		6.00E + 00	3.00E + 00	-
Benzene	Y		5.00E + 00	4.00E + 00	-
Toluene	Y		8.00E + 00	4.00E + 00	-
Xylenes (total)	Y		1.00E + 00	1.00E + 00	-
BNA (ug/kg)					
Naphthalene	Y		5.90E + 01	5.90E + 01	-
Acenaphthylene	N	1	4.40E + 02	4.40E + 02	-
Acenaphthene	Y		8.00E + 01	8.00E + 01	-
Dibenzofuran	N	1	1.70E + 02	1.70E + 02	-
Fluorene	Y		3.10E + 02	3.10E + 02	-
Phenanthrene	N	1	4.50E + 03	4.50E + 03	-
Anthracene	Y		4.50E + 02	4.50E + 02	-
Carbazole	Y		5.40E + 02	5.40E + 02	-
Di-n-butylphthalate	Y		2.20E + 03	2.20E + 03	-
Fluoranthene	Y		6.30E + 03	6.30E + 03	-
Pyrene	Y		6.30E + 03	6.30E + 03	-
Benzo(a)anthracene	Y		4.40E + 03	4.40E + 03	-
Chrysene	Y		4.30E + 03	4.30E + 03	-
Bis(2-Ethyhexyl)phthalate	Y		7.10E + 03	8.40E + 01	-
Benzo(b)fluoranthene	Y		5.70E + 03	5.70E + 03	-
Benzo(a)pyrene	Y		3.60E + 03	3.60E + 03	-
Indeno(1,2,3-cd)pyrene	Y		3.50E + 02	3.50E + 02	-

INORGANIC (mg/kg)					
Aluminum	N	1	2.11E + 04	8.43E + 03	-
Arsenic	Y		1.46E + 01	5.10E + 00	-
Barium	Y		1.74E + 02	6.32E + 01	-
Beryllium	Y		2.90E-01	2.70E-01	-
Calcium	N	1	2.59E + 03	8.01E + 02	-
Chromium	Y		1.87E + 01	1.31E + 01	-
Cobalt	N	1	8.70E + 00	6.00E + 00	-
Copper	N	1	3.40E + 01	1.19E + 01	-
Iron	N	1	3.24E + 04	1.58E + 04	-
Lead	N	1	3.05E + 02	1.29E + 01	-
Magnesium	N	1	2.82E + 03	1.83E + 03	-
Manganese	Y		2.49E + 02	1.06E + 02	-
Mercury	Y		1.90E-01	1.40E-01	-
Nickel	Y		1.89E + 01	1.32E + 01	-
Potassium	N	1	1.56E + 03	8.66E + 02	-
Sodium	N	1	1.42E + 02	7.72E + 01	-
Thallium	Y		3.10E-01	3.10E-01	-
Vanadium	Y		2.17E + 01	1.58E + 01	
Zinc	Y		1.79E + 02	5.66E + 01	-

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-FAV & SCHAFFER

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	

Note:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-SANDBURG OIL

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Methylene chloride	Y		6.00E + 00	6.00E + 00	-
Acetone	Y		4.00E + 03	3.30E + 01	-
Benzene	Y		9.00E + 00	9.00E + 00	-
Toluene	Y		3.00E + 00	3.00E + 00	-
Chlorobenzene	Y		4.80E + 01	4.80E + 01	-
Ethyl benzene	Y		2.00E + 00	2.00E + 00	-
Xylenes (total)	Y		4.50E + 03	8.10E + 01	-
BNA (ug/kg)					
Naphthalene	Y		7.50E + 02	3.90E + 02	-
2-Methlnaphthalene	N	1	2.20E + 03	2.20E + 02	-
Phenanthrene	N	1	2.00E + 02	1.70E + 02	-
Anthracene	Y		3.90E + 01	3.90E + 01	-
Fluoranthene	Y		1.80E + 02	1.80E + 02	-
Pyrene	Y		2.30E + 02	2.30E + 02	-
Benzo(a)anthracene	Y		1.20E + 02	1.20E + 02	-
Chrysene	Y		1.40E + 02	1.40E + 02	-
Benzo(b)fluoranthene	Y		1.30E + 02	1.30E + 02	-
Benzo(k)fluoranthene	Y		1.20E + 02	1.20E + 02	-
Benzo(a)pyrene	Y		1.20E + 02	1.20E + 02	-

INORGANIC (mg/kg)					
Aluminum	N	1	1.34E + 04	6.66E + 03	-
Antimony	Y		5.60E + 00	5.60E + 00	-
Arsenic	Y		1.14E + 01	4.00E + 00	-
Barium	Y		1.28E + 02	9.78E + 01	-
Beryllium	Y		8.50E-01	4.20E-01	-
Cadmium	Y		1.30E + 00	2.60E-01	-
Calcium	N	1	2.24E + 03	9.19E + 02	-
Chromium	Y		1.64E + 01	1.64E + 01	-
Cobalt	N	1	9.80E + 00	7.40E + 00	-
Copper	N	1	5.03E + 01	1.20E + 01	-
Iron	N	1	2.32E + 04	1.26E + 04	-
Lead	N	1	1.82E + 01	1.82E + 01	-
Magnesium	N	1	2.83E + 03	1.47E + 03	-
Manganese	Y		5.76E + 02	1.68E + 02	-
Nickel	N	1	1.87E + 01	1.02E + 01	-
Potassium	N	1	9.88E + 02	6.63E + 02	-
Sodium	N	1	9.80E + 01	8.10E + 01	-
Vanadium	Y		2.18E + 01	1.24E + 01	-
Zinc	Y		2.20E + 02	4.41E + 01	-

Note:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-OLEAN STEEL

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Methylene chloride	Y		1.50E + 01	2.00E + 00	5.11E + 00
Acetone	Y		1.30E + 02	8.00E + 00	1.27E + 01
1,2-Dichloroethene (total)	N	2	9.00E + 00	9.00E + 00	3.01E + 00
2-Butanone	Y		2.80E + 01	1.00E + 00	7.67E + 00
Trichloroethene	Y		7.00E + 00	1.00E + 00	3.12E + 00
Benzene	Y		1.20E + 01	1.00E + 00	3.20E + 00
Tetrachloroethene	Y		1.20E + 01	1.00E + 00	3.18E + 00
Toluene	Y		1.60E + 01	8.00E + 00	5.83E + 00
Chlorobenzene	Y		2.00E + 01	2.00E + 01	3.53E + 00
Ethyl benzene	Y		2.30E + 01	2.00E + 00	3.63E + 00
Styrene	N	2	2.00E + 00	2.00E + 00	2.52E + 00
Xylenes (total)	Y		8.30E + 01	1.00E + 00	8.05E + 00
BNA (ug/kg)					
Bis(2-Chloroethoxy) methane	N	1	7.80E + 02	2.00E + 00	-
Naphthalene	Y		2.40E + 02	2.40E + 02	-
2-Methylnaphthalene	N	1	6.20E + 01	6.20E + 01	-
Dibenzofuran	N	1	8.90E + 01	8.90E + 01	-
Fluorene	Y		1.60E + 02	1.60E + 02	-
Phenanthrene	N	1	3.60E + 02	3.60E + 02	-
Carbazole	Y		4.30E + 01	4.30E + 01	-
Fluroanthene	Y		2.20E + 02	3.40E + 01	-
Pyrene	Y		1.60E + 02	2.80E + 01	-
Benzo(a)anthracene	Y		7.60E + 01	7.60E + 01	-
Chrysene	Y		7.00E + 01	7.00E + 01	-
Bis(2-Ethylhexyl)phthalate	Y		8.30E + 02	6.60E + 01	-

INORGANIC (mg/kg)					
Aluminum	N	1	9.43E + 03	9.28E + 03	-
Antimony	Y		2.96E + 01	1.46E + 01	-
Arsenic	Y		1.48E + 01	5.20E + 00	-
Barium	Y		1.50E + 02	4.51E + 01	-
Beryllium	Y		6.30E-01	3.50E-01	-
Cadmium	Y		0.00E + 00	0.00E + 00	-
Calcium	N	1	1.62E + 03	1.86E + 02	-
Chromium	Y		1.36E + 01	9.00E + 00	-
Cobalt	N	1	1.25E + 01	9.30E + 00	-
Copper	N	1	4.70E + 01	2.39E + 01	-
Iron	N	1	3.47E + 04	1.58E + 04	-
Lead	N	1	2.48E + 01	2.40E + 00	-
Magnesium	N	1	3.49E + 03	1.43E + 03	-
Manganese	Y		1.42E + 03	4.66E + 02	-
Mercury	Y		1.80E-01	1.00E-01	-
Nickel	Y		2.44E + 01	1.14E + 01	-
Potassium	N	1	1.54E + 03	4.70E + 02	-
Selenium	Y		4.80E-01	4.80E-01	-
Silver	Y		0.00E + 00	0.00E + 00	-

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-OLEAN STEEL

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
Sodium	N	1	5.90E + 01	4.08E + 01	-
Thallium	Y		2.50E-01	2.10E-01	-
Vanadium	Y		1.75E + 01	1.00E + 01	-
Zinc	Y		9.18E + 01	4.36E + 01	-

Note:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-OLEAN TILE

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Methylene chloride	Y		9.00E + 00	6.00E + 00	5.82E + 00
Acetone	Y		9.00E + 00	6.00E + 00	7.20E + 00
Butanone	Y		1.40E + 01	6.00E + 00	5.90E + 00
Trichloroethene	Y		1.00E + 00	1.00E + 00	5.92E + 00
Toluene	Y		2.80E + 04	1.20E + 01	1.87E + 03
Ethyl benzene	Y		3.00E + 00	3.00E + 00	4.62E + 00
Xylenes	Y		5.50E + 01	1.00E + 00	1.10E + 01
BNA (ug/kg)					
2,4-Dinitrotluene	N	1	3.90E + 01	3.90E + 01	-
Diethylphthalate	Y		1.00E + 02	1.00E + 02	-
Phenanthrene	N	1	5.70E + 01	5.70E + 01	-
Fluoranthene	Y		6.00E + 01	6.00E + 01	-
Pyrene	Y		4.90E + 01	4.90E + 01	-
Benzo(a)anthracene	Y		2.60E + 01	2.60E + 01	-
Chrysene	Y		3.00E + 01	3.00E + 01	-
INORGANIC (mg/kg)					
Aluminum	N	1	1.15E + 04	9.04E + 03	-
Arsenic	Y		1.03E + 01	7.50E + 00	-
Barium	Y		1.26E + 02	5.87E + 01	-
Beryllium	Y		5.00E-01	4.60E-01	-
Calcium	N	1	2.23E + 03	5.98E + 02	-
Chromium	Y		1.38E + 01	1.14E + 01	-
Cobalt	N	1	1.34E + 01	8.70E + 00	-
Copper	N	1	1.22E + 01	6.80E + 00	-
Iron	N	1	2.54E + 04	2.09E + 04	-
Lead	N	1	1.78E + 01	1.789E + 01	-
Magnesium	N	1	2.55E + 03	1.93E + 03	-
Manganese	Y		6.12E + 02	2.05E + 02	-
Nickel	Y		2.07E + 01	1.42E + 01	-
Potassium	N	1	9.14E + 02	5.64E + 02	-
Vanadium	Y		2.11E + 01	1.77E + 01	-
Zinc	Y		5.44E + 01	4.75E + 01	-

Note:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 3
CHEMICAL OF CONCERN
SOIL EXPOSURE PATHWAY
OLEAN WELLFIELD SITE-OLEAN WHOLESALE

CHEMICAL NAME	CHEMICAL OF CONCERN		DETECTED RANGE		95% UCL
	INDICATOR	REASON OF EXCLUSION	MAXIMUM	MINIMUM	
VOA (ug/kg)					
Methylene chloride	Y		1.00E + 00	1.00E + 00	2.64E + 00
Tetrachloroethene	Y		1.30E + 01	6.00E + 00	3.88E + 00
Toluene	N	2	1.00E + 00	1.00E + 00	2.64E + 00
Xylenes	N	2	2.00E + 00	2.00E + 00	2.52E + 00
BNA (ug/kg)					
Bis(2-Chloroethoxy) methane	N	1	7.80E + 02	2.00E + 00	6.57E + 02
Naphthalene	Y		2.40E + 02	2.40E + 02	1.75E + 02
2-Methylnaphthalene	N	1	6.20E + 01	6.20E + 01	1.77E + 02
Dibenzofuran	N	1	8.90E + 01	8.90E + 01	1.71E + 02
Fluorene	Y		1.60E + 02	1.60E + 02	1.65E + 02
Phenanthrene	N	1	3.60E + 02	3.60E + 02	1.88E + 02
Carbazole	Y		4.30E + 01	4.30E + 01	1.84E + 02
Fluoranthene	Y		2.20E + 02	2.20E + 02	1.72E + 02
Pryene	Y		1.60E + 02	1.60E + 02	1.65E + 02
Benzo(a)anthracene	Y		7.60E + 01	7.60E + 01	1.73E + 02
Chrysene	Y		7.00E + 01	7.00E + 01	1.75E + 02
Bis(2-Ethylhexyl)phthalate	Y		8.30E + 02	4.00E + 00	5.02E + 02

INORGANIC (mg/kg)					
Aluminum	N	1	1.22E + 04	9.06E + 03	-
Antimony	Y		3.05E + 01	2.93E + 01	-
Arsenic	Y		7.03E + 01	1.28E + 01	-
Barium		Y	2.45E + 02	8.37E + 01	-
Beryllium	Y		6.50E-01	4.30E-01	-
Calcium	N	1	2.40E + 03	1.42E + 03	-
Chromium	Y		1.38E + 01	1.22E + 01	-
Cobalt	N	1	1.80E + 01	1.19E + 01	-
Copper	N	1	2.18E + 01	1.46E + 01	-
Iron	N	1	3.27E + 04	2.59E + 04	-
Lead	N	1	6.40E + 01	1.60E + 01	-
Magnesium	N	1	3.70E + 03	3.24E + 03	-
Maganese	Y		1.34E + 03	4.03E + 02	-
Mercury	Y		1.70E-01	1.62E-01	-
Nickel	Y		2.78E + 01	2.22E + 01	-
Potassium	N	1	1.37E + 03	1.03E + 03	-
Sodium	N	1	5.17E + 01	4.36E + 01	-
Thallium	Y		6.60E-01	2.10E-01	-
Vanadium	Y		2.33E + 01	1.33E + 01	-
Zinc	Y		1.37E + 02	6.42E + 01	-

Note:
Y: Yes

N: No
1: No available SF and RfDs.
2: It is not carcinogenic compounds and the detection frequency is lower then 5 %.
-: Sample number is less than 10. No 95% UCL was calculated.

TABLE 4

GROUNDWATER
EXPOSURE SCENARIOS

EXPOSURE GROUP	EXPOSURE PATHWAY
Resident Adults	Inhalation
	Ingestion
	Dermal Contact
Resident Young Children	
	Inhalation
	Ingestion
	Dermal Contact
Resident Older Children	
	Inhalation
	Ingestion
	Dermal Contact

TABLE 5
SUMMARY RISKS LEVELS AND HAZARD INDEX VALUES
DUE THE EXPOSURE TO UNTREATED GROUNDWATER
PRESENT AND FUTURE USE EXPOSURE SCENARIOS

	CARCINOGENIC RISK LEVELS	NONCARCINOGENIC
EXPOSURE GROUP/ PATHWAY	REASONABLE MAXIMUM EXPOSURE VALUES	REASONABLE MAXIMUM EXPOSURE VALUES
Resident Adults		
1. Inhalation	6.38 x 10-5	1.62 x 10-3
2. Ingestion	1.49 x 10-2	3.36
3. Dermal Contact	2.35 x 10-3	1.4 x 10-1
Cumulative Risk	1.73 x 10-2	3.5
Resident Young Children		
1. Inhalation	5.98 x 10-5	7.55 x 10-3
2. Ingestion	1.3 x 10-2	14.7
3. Dermal Contact	9.21 x 10-4	2.73 x 10-1
Cumulative Risk	1.39 x 10-2	14.98
Resident Older Children		
1. Inhalation	2.73 x 10-5	3.45 x 10-3
2. Ingestion	5.94 x 10-3	6.73
3. Dermal Contact	6.68 x 10-4	1.98 x 10-1
Cumulative Risk	6.64 x 10-3	6.93

Table 6
SUMMARY OF THE NONCARCINOGENIC HAZARD INDEX CALCULATION RESULTS
TO CONSTRUCTION WORKERS IN FUTURE USE SCENARIO
OLEAN WELLFIELD SITE

Risk Location	Noncarcinogenic Hazard Index from Ingestion Reasonable Maximum Exposure	Noncarcinogenic Hazard Index from Inhalation Reasonable Maximum Exposure	Combined Hazard Index
ALCAS	5.02E-01	5.12E-03	5.07E-01
AVX	4.53E-01	3.85E-03	4.57E-01
BORROW PIT	4.06E-01	7.59E-06	4.06E-01
OLEAN CLEAN ALL	3.70E-01	2.70E-03	3.73E-01
PRIVATE DUMP	5.64E-01	1.84E-02	5.82E-01
McGRAW-EDISON	1.14E+00	3.64E-03	1.14E+00
MASTEL FORD	4.86E-01	2.02E-03	4.88E-01
GRIFFITH OIL	6.47E-01	2.56E-03	6.50E-01
FAY&SCHAFFER	3.01E-01	7.38E-04	3.02E-01
SANDBURG OIL	3.05E-01	1.70E-03	3.07E-01
OLEAN STEEL	6.96E-01	4.20E-03	7.00E-01
OLEAN TILE	2.19E-01	1.81E-03	2.21E-01
OLEAN WHOLESALE	1.61E+00	3.96E-03	1.61E+00

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Table 6
SUMMARY OF THE CARCINOGENIC RISK CALCULATION RESULTS
TO CONSTRUCTION WORKERS IN FUTURE USE SCENARIO
OLEAN WELLFIELD SITE

Risk Location	Carcinogenic Risk Levels from Ingestion Reasonable Maximum Exposure	Carcinogenic Risk Levels from Inhalation Reasonable Maximum Exposure	Combined Risk
ALCAS	4.97E-05	2.32E-08	4.97E-05
AVX	1.76E-05	4.18E-09	1.76E-05
BORROW PIT	3.95E-06	3.00E-09	3.95E-06
OLEAN CLEAN ALL	1.07E-05	4.43E-09	1.07E-05
PRIVATE DUMP	6.80E-06	3.30E-09	6.80E-06
McGRAW-EDISON	1.52E-05	1.04E-08	1.52E-05
MASTEL FORD	9.06E-06	5.08E-09	9.07E-06
GRIFFITH OIL	7.30E-06	5.29E-09	7.31E-06
FAY&SCHAFFER	2.16E-05	3.59E-09	2.16E-05
SANDBURG OIL	3.78E-06	2.83E-09	3.78E-06
OLEAN STEEL	4.00E-06	3.10E-09	4.00E-06
OLEAN TILE	2.76E-06	2.41E-09	2.76E-06
OLEAN WHOLESALE	1.70E-05	1.12E-08	1.70E-05

EXHB-N-5.XLS

Table 7
OLEAN WELLFIELD SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

Chemical Name	Noncarcinogen Reference Dose			Subchronic Noncarcinogen Reference Dose (1)			Carcinogen Slope Factor				
	RfD (oral) (mg/Kg-day)	RfC (inhalation) (mg/Cu.m)	RfD (inhalation) (mg/Kg-day)	RfD (oral sub) (mg/Kg-day)	RfC (inhalation, sub (mg/Cu.m)	RfD inhalation, sub) (mg/Kg-day)	SF (Oral) (mg/Kg-day)-1	Weight	Unit Risk (Inhalation) (ug/Cu.m)-1	SF (Inhalation) (mg/Kg-day)-1	Weight
Volatiles:											
1,1-Dichloroethene	9.00E-03	ND	ND	9.00E-03	ND	ND	6.00E-01	C	5.00E-05	1.75E-01	C
Cis-1,2-Dichloroethene	1.00E-02*	ND	ND	1.00E-01	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	1.70E-02	ND	ND	2.00E-01	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	6.00E-02	3.00E+00*	8.57E-01	6.00E-02	3.00E+00	8.57E-01	7.50E-03	B2	4.70E-07	1.65E-03	B2
Tetrachloroethene	1.00E-02	ND	ND	1.00E-01	ND	ND	UN	ND	UN	ND	ND
Trichloroethene	UN	UN	UN	ND	ND	ND	NA	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	1.90E+00*	A	8.40E-05*	2.94E-01	A
Carbon Disulfide	1.00E-01	1.00E-02*	2.86E-03*	1.00E-01	1.00E-02	2.86E-03	ND	ND	ND	ND	ND
Chlorobenzene	2.00E-02	UN	UN	2.00E-01	ND	ND	ND	ND	ND	ND	ND
Chloroform	1.00E-02	UN	UN	1.00E-02	ND	ND	6.10E-03	B2	2.30E-05	8.05E-02	B2
Acetone	1.00E-01	ND	ND	1.00E+00	ND	ND	ND	ND	ND	ND	A
Benzene	ND	ND	ND	ND	ND	ND	2.90E-02	A	8.30E-06	ND	A
Ethylbenzene	1.00E-01	1.00E+00	2.86E-01	1.00E+00	1.00E+00	2.86E-01	ND	ND	ND	ND	ND
Toluene	2.00E-01	4.00E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	2.00E+00	UN	UN	4.00E+00	NA	NA	ND	ND	ND	ND	ND
Semi-Volatiles:											
Butyl benzyl phthalate	2.00E-01	ND	ND	2.00E+00	ND	ND	ND		ND	ND	ND
Inorganics:											
Arsenic	3.00E-04	ND	ND	3.00E-04	ND	ND	1.75E+00	A	4.30E-03	1.50E+05	A
Barium	7.00E-02	UN	UN	7.00E-02	ND	ND	ND	ND	ND	ND	ND
Beryllium	5.00E-03	ND	ND	5.00E-02	ND	ND	4.30E+00	B2	2.40E-03	8.40E+00	B2
Cadmium	5.00E-04	UN	UN	NA	UN	UN	ND	ND	1.80E-03	6.30E+00	B1
Chromium III	1.00E+00	UN	UN	1.00E+00	UN	UN	ND	ND	ND	ND	ND
Chromium VI	5.00E-03	UN	UN	2.00E-02	UN	UN	ND	ND	1.20E-02	4.20E+01	A
Cobalt	UN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese	1.00E-01	4.00E-04*	1.14E-04*	1.00E-01*	4.00E-04	1.40E-04	ND	ND	ND	ND	ND
Nickel	2.00E-02	UN	UN	2.00E-02*	ND	ND	ND	ND	ND	ND	ND
Nickel (Refinery Dust)	ND	ND	ND	ND	ND	ND	ND	ND	2.40E-04	8.40E-01	A
Thallium	7.00E-05	ND	ND	7.00E-05	ND	ND	ND	ND	ND	ND	ND
Vanadium	7.00E-03*	ND	ND	7.00E-03	ND	ND	ND	ND	ND	ND	ND
Zinc	2.00E-01*	ND	ND	2.00E-01	ND	ND	ND	ND	ND	ND	ND

Table 7
OLEAN WELLFIELD SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

EPA Weight of Evidence classifications are as follows:

Group A: Human Carcinogen. Sufficient evidence from epidemiologic studies to support a casual association between exposure and cancer.
Group B1: Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.
Group B2: Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.
Group C: Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.
Group D: Not Classified. Inadequate evidence of carcinogenicity in animals

Note:
(1) All the Reference Dose for subcronic noncarcinogic compounds were derived from HEAST-FY 1992..
(2) The data was derived through personal contact with EPA Region II Risk Assessment group.
NA: Not available
ND: No data
UN: Under review by EPA risk group
*: The data was from Health Assessment Summary Tables (HEAST)-FY 1992.

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Table 8
OLEAN WELLFIELD SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

Chemical Name	Subchronic Noncarcinogen Reference Dose (1) RfD (oral sub) (mg/Kg-day)	RfC (inhalation, sub (mg/Cu.m)	RfD (inhalation, sub) (mg/Kg-day)	Carcinogen Slope Factor SF (Oral) (mg/Kg-day)-1	Weight	Unit Risk (Inhalation) (ug/Cu.m)-1	SF (Inhalation) (mg/Kg-day)-1	Weight
Volatiles:								
1,1-Dichloroethane	1.00E+00	5.00E+00	1.43E+00	ND	C	ND	ND	ND
1,1-Dichloroethene	9.00E-03	ND	ND	6.00E-01	C	5.00E-05	1.75E-01	C
1,1,2,2-Tetrachloroethane	ND	ND	ND	2.00E-01	C	5.80E-05	2.30E-01	C
1,1,1-Trichloroethane	9.00E-01	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	4.00E-02	ND	ND	5.70E-02	C	1.60E-05	5.60E-02	C
1,2-Dichloroethane	ND	ND	ND	9.10E-02	B2	2.60E-05	9.10E-02	B2
1,2-Dichloroethene	9.00E-03	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	2.00E-01	ND	ND	ND	ND	ND	ND	ND
Chloroform	1.00E-02	ND	ND	6.10E-03	B2	2.30E-05	8.05E-02	B2
Chloroethane	NA	NA	NA	ND	ND	ND	ND	ND
Methylene Chloride	6.00E-02	3.00E+00	8.57E-01	7.50E-03	B2	4.70E-07	1.65E-03	B2
Tetrachloroethene	1.00E-01	ND	ND	5.20E-02	B2	5.70E-07	2.00E-03	B2
Trichloroethene	ND	ND	ND	1.10E-02(2)	B2	1.70E-06(2)	5.95E-03(2)	B2
Vinyl Chloride	ND	ND	ND	1.90E+00*	A	8.40E-05*	2.94E-01	A
2-Butanone	5.00E-01	3.00E+00	8.57E-01	ND	ND	ND	ND	ND
Carbon Disulfide	1.00E-01	1.00E-02	2.86E-03	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	1.00E+00	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	2.90E-02	A	8.30E-06	2.91E-02	A
Ethylbenzene	1.00E+00	1.00E+00	2.86E-01	ND	ND	ND	ND	N
Styrene	2.00E+00	ND	ND	ND	ND	ND	ND	ND
Toluene	2.00E+00	2.00E+00	5.71E-01	ND	ND	ND	ND	ND
Total Xylenes	4.00E+00	NA	NA	ND	ND	ND	ND	ND

Table 8
OLEAN WELLFIELD SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

	Subchronic Noncarcinogen Reference Dose (1)			Carcinogen Slope Factor				
Chemical Name	RfD (oral sub) (mg/Kg-day)	RfC (inhalation, sub (mg/Cu.m)	RfD (inhalation, sub) (mg/Kg-day)	SF (Oral) (mg/Kg-day)-1	Weight	Unit Risk (Inhalation) (ug/Cu.m)-1	SF (Inhalation) (mg/Kg-day)-1	Weight
Semi-Volatiles:								
2,4-Dimethylphenol	2.00E-01	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	6.00E-01	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	3.00E+00	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	ND
Fluranthrene	4.00E-01	ND	ND	ND	ND	ND	ND	ND
Fluorene	4.00E-01	ND	ND	ND	ND	ND	ND	ND
Naphthalene	4.00E-02	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	3.00E-01	ND	ND	ND	ND	ND	ND	ND
Carcinogenic PAHs								
Benzo(a)pyrene	ND	ND	ND	7.30E+00	B2	1.70E-03	5.95E+00	B2
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd) pyrene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	1.00E-02	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	2.00E-02	ND	ND	1.40E-02	B2	ND	ND	ND
Di-n-butyl phthalate	1.00E+00	ND	ND	ND	ND	ND	ND	ND
Diethylphthalate	8.00E+00	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	5.00E-01	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	5.00E-01	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	2.00E-02	B2	5.70E-07	2.00E-03	B2
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	ND	ND	ND	ND	ND	ND	ND	ND

Table 8
OLEAN WELLFIELD SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

Chemical Name	Subchronic Noncarcinogen Reference Dose (1)			Carcinogen Slope Factor				
	RfD (oral sub) (mg/Kg-day)	RfC (inhalation, sub (mg/Cu.m)	RfD (inhalation, sub) (mg/Kg-day)	SF (Oral) (mg/Kg-day)-1	Weight	Unit Risk (Inhalation) (ug/Cu.m)-1	SF (Inhalation) (mg/Kg-day)-1	Weight
Inorganics:								
Aluminum	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	4.00E-04	ND	ND	ND	ND	ND	ND	ND
Arsenic	3.00E-04	ND	ND	1.75E+00	A	4.30E-03	1.51E+01	A
Barium	7.00E-02	ND	ND	ND	ND	ND	ND	ND
Beryllium	5.00E-02	ND	ND	4.30E+00	B2	2.40E-03	8.40E+00	B2
Cadmium	NA	UN	UN	ND	ND	1.80E-03	3.30E+00	B1
Calcium	ND	ND	ND	ND	ND	ND	ND	ND
Chromium III	1.00E+00	UN	UN	ND	ND	ND	ND	ND
Chromium VI	2.00E-02	UN	UN	ND	ND	1.20E-02	4.20E+01	A
Cobalt	ND	ND	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	2.00E-02	ND	ND	ND	ND	ND	ND	ND
Iron	ND	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	ND	ND	ND	ND	ND	ND	ND	ND
Manganese	1.00E-01	4.00E-04	1.40E-04	ND	ND	ND	ND	ND
Mercury	3.00E-04*	3.00E-04	8.57E-05	ND	ND	ND	ND	ND
Nickel	2.00E-02	ND	ND	ND	ND	ND	ND	ND
Nickel (Refinery Dust)	ND	ND	ND	ND	ND	2.40E-04	8.40E-01	A
Potassium	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	5.00E-03	ND	ND	ND	ND	ND	ND	ND
Silver	5.00E-03	ND	ND	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	7.00E-05	ND	ND	ND	ND	ND	ND	ND
Vanadium	7.00E-03	ND	ND	ND	ND	ND	ND	ND
Zinc	2.00E-01	ND	ND	ND	ND	ND	ND	ND

Table 8
OLEAN WELLFIELD SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

EPA Weight of Evidence classifications are as follows:

Group A	Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure.
Group B1	Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.
Group B2	Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogeni
Group C	Possible Human Carcinogen. Limited evidence of carcinogenicity in animal.
Group D	Not classified. Inadequate evidence of carcinogenicity in animals.

Note: All toxicity values unless otherwise noted are from Integrated Risk Information System (IRIS).
(1) All the Reference Dose for subcronic noncarcinogenic compounds were derived from HEAST-FY 1992.
(2) The data was derived through personal contact with EPA region II Risk Assessment group.
NA: Not available
ND: No data
UN: Under review by EPA risk group
*: The data was from Health Assessment Summary Tables (HEASYT)-FY 1992.

TABLE 9

PRESENT WORTH AND CAPITAL AND OPERATION AND MAINTENANCE COSTS BY SOURCE AREA

	Alternative 2 Institutional Controls	Alternative 3 Capping (Stage 1)	Alternative 3 Capping and Groundwater Treatment (Stages 1&2)	Alternative 3A Groundwater Treatment	Alternative 4 using VER or SVE/AS (Stage 1)	Alternative 4 In-Situ Treatment and Groundwater Treatment (Stages 1&2)	Alternative 5 Soil Excavation (Stage 1)	Alternative 5 Soil Excavation and Groundwater Treatment (Stage 1&2)
ALCAS1								
Capital Cost	$22,000	$81,000	-	-	$158,000	-	$883,200	-
O&M2 (1-5 yrs)	$10,500	$17,500	-	-	$144,500	-	$10,500	-
O&M (6-30 yrs)	$10,500	$17,500	-	-	$10,500	-	$10,500	-
PW1 of O&M	$130,295	$217,158	-	-	$679,721	-	$130,295	-
Total PW	$152,295	$298,158	-	-	$837,721	-	$1,013,495	-
AVX								
Capital Cost	$35,000	$32,000	$192,400	$233,000	$278,000	$438,400	$246,000	$406,400
O&M (1-5 yrs)	$10,500	$12,500	$12,500	$67,500	$182,500	$182,500	$10,500	$10,500
O&M (6-30 yrs)	$10,500	$12,500	$69,500	$67,500	$10,500	$67,500	$10,500	$67,500
PW of O&M	$130,295	$155,113	$628,717	$837,610	$835,529	$1,309,133	$130,295	$603,899
Total PW	$165,295	$187,113	$821,117	$1,070,610	$1,113,529	$1,747,533	$376,295	$1,010,299
McGraw-Edison4								
Capital Cost	$8,000	-	-	$98,000	-	-	-	-
O&M (1-5 yrs)	$10,500	-	-	$67,500	-	-	-	-
O&M (6-30 yrs)	$10,500	-	-	$67,500	-	-	-	-
PW of O&M	$130,295	-	-	$837,610	-	-	-	-
Total PW	$138,295	-	-	$935,610	-	-	-	-
Loohns Dry Cleaners								
Capital cost	$23,000	$64,000	$224,400	$233,000	$278,000	$438,400	$3,422,000	$3,582,400
O&M (1-5 yrs)	$10,500	$15,500	$15,500	$67,500	$157,500	$157,500	$10,500	$10,500
O&M (6-30 yrs)	$10,500	$15,500	$72,500	$67,500	$10,500	$67,500	$10,500	$67,500
PW of O&M	$130,295	$192,340	$665,944	$837,610	$733,024	$1,206,628	$130,295	$603,899
Total PW	$153,295	$256,340	$890,344	$1,070,610	$1,011,024	$1,645,028	$3,552,295	$4,186,299

1 - Present Worth and capital and operation and maintenance costs for groundwater treatment are not presented, since groundwater remediation will not be necessary at the Alcas source area.
2 - PW - Present Worth based on a 7 percent discount rate.
2 - O&M - Operation and maintenance costs.
4 - Capital, present worth and operation and maintenance costs were not calculated for Alternatives 3, 4 or 5, since soil remediation will not be necessary at the McGraw-Edison source area.
See page 60 of ROD for an explanation of the expenses which were included in the cost estimates for Alternative 3A.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

OLEAN WELL FIELD SITE
OPERABLE UNIT TWO
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

3.0 REMEDIAL INVESTIGATION

3.1 Sampling and Analysis Plans

P. 300001- Plan: Addendum to the June 1989 Field Operations
300272 Plan for the Olean Well Field Supplemental RI/FS Study, undated. (Attachment: Field Operations Plan (FOP) for Supplemental Remedial Investigation/Feasibility Study, Olean Well Field Site, Olean, New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated, June 1989).

3.3 Work Plans

P. 300723- Plan: Addendum to the May 1989 Supplemental RI/FS
300275 Workplan for the Olean Well Field Site, undated.

P. 300276- Plan: Final Supplemental Remedial
300377 Investigation/Feasibility Study Work Plan, Olean Well Field Site, Olean, New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated, May 1989.

P. 300378- Plan: Supplemental Work Plan, Olean Well Field
300399 Site, Olean, New York, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., December 1992.

3.4 Remedial Investigation Reports

P. 300400- Report: Preliminary Facilities Characterization
300494 Summary, Olean Well Field Supplemental RI/FS, Volume I, Text, Tables, Figures and Appendices, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., May 1992.

P. 300495- Report: Preliminary Facilities Characterization
300886 Summary, Olean Well Field Supplemental RI/FS, Volume II, USEPA Region 2, Organic Data Validation Checklists, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., May, 1992.

P. 300887- Report: Preliminary Facilities Characterization
301014 Summary, Olean Well Field Supplemental RI/FS, Volume III, USEPA Region 2, Inorganic Data Validation Checklists, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., May 1992.

P. 301015- Report: Draft Stage 1A Cultural Resources Survey,
301100 Olean Well Field Site, Olean, New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated, June 1992.

P. 301101- Report: Final Supplemental Risk Assessment, Olean
301199 Well Field Site, Olean, New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated, December 1993.

P. 301199A- Report: Final Risk Assessment, Olean Well Field,
301370 Olean, New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated,

December 1993.

P. 301371- Letter to Mr. Mark Mcese, Ebasco Environmental,
301379 from Mr. Adrian R. Tucker, Soil Gas Projects Manager, Ebasco Environmental, re: Attached Report: 1994 Soil Gas Results - Olean Well Field, March 18, 1994.

P. 301380- Report: Supplemental Remedial Investigation
301989 Report, Olean Well Field, Olean, New York, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., October 1994.

P. 301990- Report: Final Addendum to the Olean Well Field
302171 Supplemental Remedial Investigation Report, prepared for Mr. Thomas Taccone, Remedial Project Manager, for U.S. EPA, Region II, prepared by Mr. Mark D. Moese, Ph.D., Ebasco Services Incorporated, May 30, 1995.

P. 302172- Report: Final Wetland Delineation Report, Olean
302202 Well Field, Olean, New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated, August 1995.

3.5 Correspondence

P. 302203- Letter to Mr. Thomas Taccone, Remedial Project
302205 Manager, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environmental Health Engineering, Olean Cooperating Industries SRI/FS Project Coordinator, Nixon, Hargrave, Devans & Doyle, re: Olean SRI/FS Notification of Tentative Schedule for Boring and Well Drilling Program - Olean Cooperating Industries, November 7, 1991. (Attachment: Facsimile transmission to Ms. Libby Ford, Nixon, Hargrave, Devans & Doyle, from Mr. William J. Gray, Senior Scientist, Geraghty & Miller, Inc., re: Tentative Drilling Schedule dates for Olean Well Field Supplemental RI/FS, November 6, 1991.)

P. 302206- Letter to Ms. Libby Ford, Nixon, Hargrave, Devans
302207 & Doyle, from Mr. William J. Gray, Senior Scientist, Geraghty & Miller, Inc., re: December 4, 1991 Conference Call with USEPA Monitoring and Management Branch (Project No. AY08813), December 13, 1991.

P. 302208- Letter to Ms. Libby Ford, Senior Environmental
302209 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Geraghty & Miller's letter of April 20, 1992; Submission Date for the Remaining Ebasco RI Data, May 21, 1992.

P. 302210- Letter to Ms. Libby Ford, Senior Environmental
302213 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Preliminary Facilities Characterization Summary, August 20, 1992.

P. 302214- Letter to Ms. Libby Ford, Nixon, Hargrave, Devans
302219 & Doyle, from Mr. William J. Gray, Senior Scientist, Geraghty & Miller, Inc., re: Response to United States Environmental Protection Agency's August 20, 1992 Letter Regarding the Olean Well Field Preliminary Facilities Characterization Summary (Project No. AY08813), September 11, 1992.

P. 302220- Letter to Ms. Libby Ford, Senior Environmental
302222 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Comments on the Draft Supplement to the Supplemental RI/FS Workplan for the Olean Wellfield Superfund Site, October 19, 1992.

P. 302223- Letter to Ms. Libby Ford, Senior Environmental
302228 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; November 4, 1992 Supplemental RI/FS Workplan and FOP Supplement, November 27, 1992. (Attachment: Letter to Ms. Carole Petersen, Chief,

NY/Caribbean Superfund Branch II, U.S. EPA, Region II, from Ms. Libby Ford, Nixon, Hargrave, Devans & Doyle, re: Olean Wellfield Superfund Site; Requested Changed Pages to the November 4, 1992 Supplement to the SRI/FS Workplan and FOP Supplement, December 2, 1992.)

P. 302229- 302230 Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Supplemental RI/FS, July 2, 1993.

P. 302231- 302291 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environmental Health Engineer, Olean Cooperating Industries SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Olean Wellfield Supplemental RI/FS--Comments on Draft EBASCO Risk Assessment and Request For a Meeting, October 1, 1993. (Attachments: 1. Letter with attached data to Mr. Richard H. Uber, Manager, Field Operations and Environmental Affairs, Cooper Industries, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Well Field Superfund Site; Start-up of the Air Strippers, September 8, 1993, 2. Letter with attached data to Ms. Libby Ford, Nixon, Hargrave, Devans & Doyle, from Mr. Peter Marcus, Department of Public Works, City of Olean, re: attached inorganic test results at Wells 18 and 37-38, September 21, 1993, 3. Construction Permission and Right of Way Agreement, September 22, 1993, 4. Memorandum to AVX Olean SRI/FS File, from Ms. Libby Ford, Nixon, Hargrave, Devans & Doyle, re: Institutional Safeguards In Place to Insure that the Former Private Wells are not Reconnected, September 24, 1993.)

P. 302292- 302295 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Ms. Lani Rafferty, Program Research Specialist II, Bureau of Environmental Exposure Investigation, State of New York Department of Health, re: Olean Wellfield, Olean, Cattaraugus County, Site ID #905014, October 27, 1993. (Attachment: Olean Wellfield Site, Chemicals of Potential Concern, ARARs and Levels of Detection in Groundwater, undated.)

P. 302296- 302298 Letter to Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environmental Health Engineer, Olean Cooperating Industries SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Olean Supplemental RI/FS--Finalization of Risk Assessment, November 19, 1993.

P. 302299- 302300 Letter to Ms. Lani Rafferty, Program Research Specialist, Bureau of Environmental Exposure Investigation, New York Department of Health, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site, November 30, 1993.

P. 302301- 302305 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Ms. Lani Rafferty, Program Research Specialist, Bureau of Environmental Exposure Investigation, New York Department of Health, re: Olean Wellfield, Olean, Cattargaurus County, Site ID #905014, December 6, 1993. (Attachments: Figure 1: Fay Ave./Shafer Rd., Figure 2: Mastel Ford, Figure 3: Griffith Oil (North).)

P. 302306- 302311 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, re: Olean Wellfield Site (C&T), Cattaraugus County Site No. 9-05-014, December 13, 1993. (Attachment: Appendix A: Letter to Mr. Steven Scharf, Environmental Engineer, Bureau of Western Remedial Action, NYS Dept. of Environmental Conservation, from Ms. Lani Rafferty, Program Research Specialist II, Bureau of Environmental Exposure Investigation, New York State Department of Health, re: Olean Well Field. Olean, Cattaraugus County, Site ID #905014, November 26, 1993.)

P. 302312- 302313 Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Final Risk Assessment for the Olean Wellfield Superfund Site, December 17, 1993.

P. 302314- Letter to Mr. Thomas Taccone, Remedial Project
302315 Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State of Department of Environmental Conservation, re: Olean Wellfield Site, Olean City & Town, Cattaraugus County Site No. 9-05-014, December 27, 1993.

P. 302316- Letter to Ms. Libby Ford, Senior Environmental
302323 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Comments on the Draft Supplemental Remedial Investigation Report, January 10, 1994.

P. 302324- Letter to Mr. Steven M. Scharf, P.E., Project
302325 Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Letter of December 27, 1993, January 18, 1994.

P. 302326- Letter to Mr. Thomas Taccone, Remedial Project
302337 Manager, U.S. EPA, Region II, from Mr. illiam J. Gray, Senior Scientist/Project Manager, Geraghty & Miller, Inc., re: Response to USEPA Comments on Draft Olean Well Field Supplemental Remedial Investigation Report (Project No. AY0167.001), February 11, 1994.

P. 302338- Letter to Ms. Libby Ford, Senior Environmental
302343 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Proposed Revisions to the Draft Supplemental Remedial Investigation Report, March 30, 1994.

P. 302344- Letter to Mr. Thomas Taccone, Remedial Project
302357 Manager, U.S. EPA, Region II, from Mr. Wayne Westbrook, Principal Scientist, Pacific Environmental Services, Inc., re: Olean Wellfield Superfund Site; Soil Gas Data to Access Indoor Air Risks, April 8, 1994. (Attachments: Enclosure 1: "Model Used to Estimate Indoor Air Concentrations", Enclosure 2: "Indoor Air Risk Calculations", Report: Air/Superfund National Guidance Study Series, Assessing Potential Indoor Air Impacts for Superfund Sites, September 1992.)

P. 302358- Letter to Mr. Thomas Taccone, Remedial Project
302371 Manager, U.S. EPA, Region II, from Mr. William J. Gray, Senior Scientist/Project Manager, Geraghty & Miller, Inc., re: Response to USEPA Proposed Revisions to Draft Olean Well Field Supplemental Remedial Investigation Report (Project No. AY0167.001), April 15, 1994. (Attachment)

P. 302372- Letter to Ms. Carole Petersen, Chief, NY/Caribbean
302373 Superfund Branch II, U.S. EPA, Region II, from Mr. Allison C. Wakeman, Chief, Western/Niagara Section, Bureau of Environmental Exposure Investigation, State of New York Department of Health, re: Olean Wellfield, Olean, Cattaraugus County, Site ID #905014, June 7, 1994.

P. 302374- Letter to Ms. Libby Ford, Senior Environmental
302377 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Proposed Revisions to the Supplemental Draft SRI Report, June 9, 1994. (Attachment)

P. 302378- Letter to Mr. Thomas Taccone, Remedial Project
302390 Manager, U.S. EPA, Region II, from Messrs. William J. Gray, Senior Scientist/Project Manager and Andrew J. Barber, Senior Associate/Project Officer, Geraghty & Miller, Inc., re: Attached response to USEPA Comments on Draft Olean Well Field Supplemental Remedial Investigation Report (Project No. AY0167.001), July 7, 1994.

P. 302391- Letter to Mr. Allison C. Wakeman, Chief
302391 Western/Niagara Section, Bureau of Environmental Exposure Investigation, New York State

Department of Health, from Mr. Kevin Lynch, Chief, Western New York Section II, U.S. EPA, Region II, re: Second Round of Soil Gas Sampling at the Olean Wellfield Superfund Site, July 22, 1994.

P. 302392- 302393 Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Proposed Revisions to the Supplemental Draft SRI Report, September 23, 1994.

P. 302394- 302394 Letter to Ms. Lani Rafferty, Program Research Specialist II, Bureau of Environmental Investigation, New York State Department of Health, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site: Second Round of Soil Gas Sample Data, December 2, 1994.

P. 302395- 302397 Letter to Ms. Lani Rafferty, Environmental Health Specialist II, Bureau of Environmental Exposure Investigation, New York Department of Health, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Indoor Air Risk Analysis, February 27, 1995.

P. 302398- 302399 Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; SRI Addendum and Deadline Extension for the Draft SFS, March 17, 1995.

P. 302400- 302401 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Mr. William J. Gray, Senior Scientist/Project Manager, Geraghty & Miller, Inc., re: Attached Addendum to Olean Well Field SRI Report, March 30, 1995. (Attachment)

P. 302402- 302404 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Ms. Lani Rafferty, Environmental Health Specialist II, Bureau of Environmental Exposure Investigation, State of New York Department of Health, re: Olean Well Field, Olean, Cattaraugus County, ID #905014, June 16, 1995.

P. 302405- 302407 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, re: Olean Wellfield Site, City and Town of Olean, Cattaraugus County NYSDEC Site No. 9-05-014, June 27, 1995.

P. 302408- 302409 Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans and Doyle, from Ms. Carole Petersen, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Addendum to the SRI Report and Approval of the SRI Report, June 30, 1995.

P. 302410- 302411 Letter to Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Investigation, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; DEC Comments on EPA's Addendum to the SRI, July 13, 1995.

P. 302412- 302414 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Messrs. William J. Gray, Senior Scientist/Project Manager and Andrew J. Barber, Senior Associate/Project Officer, Geraghty & Miller, Inc., re: Attached Addendum to Olean SRI Report, July 20, 1995.

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400001- Letter to Mr. Thomas Taccone, U.S. EPA, Region
400055 II, from Messrs. William J. Gray, Senior Scientist, and Andrew J. Barber, Senior Associate, Geraghty & Miller, Inc., re: Attached report: Preliminary Screening of Assembled Remedial Alternatives, Olean Well Field Site, Olean, New York, prepared for Olean Cooperating Industries, prepared by GMCE of New York, P.C., Engineering Services, March 28, 1994.

P. 400056- Letter to Mr. Thomas Taccone, U.S. EPA, Region II,
400146 from Messrs. William J. Gray, Senior Scientist/Project Manager, and Andrew J. Barber, Senior Associate/Project Officer, re: Attached report: Vacuum Enhanced Recovery Pilot Test Report, Alcas Facility, Olean, New York, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., May 30, 1995.

P. 400147- Letter to Mr. Thomas Taccone, U.S. EPA, Region II,
400278 from Messrs. William J. Gray, Senior Scientist/Project Manager, and Andrew J. Barber, Senior Associate/Project Officer, re: Attached report: Vacuum Enhanced Recovery Pilot Test Report, AVX Facility, Olean, New York, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., June 1, 1995.

4.6 Correspondence

P. 400279- Letter to Ms. Libby Ford, Senior Environmental
400294 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site Supplemental Feasibility Study, January 10, 1994. (Attachments: 1. Memorandum to Regional Hazardous Waste Remediation Engineers, Bureau Divisions & Section Chiefs, from Mr. Michael J. O'Toole, Jr., Division of Hazardous Waste Remediation, re: Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, November 16, 1992, 2. Appendix A, Tables 1-4, "Recommended Soil Cleanup Objectives (mg/kg or ppm)", 3. "Conventional Sediment Variables, Total Organic Carbon (TOC)", March 1986.)

P. 400295- Letter to Mr. Thomas Taccone, Remedial Project
400304 Manager, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environmental Health Engineer, Olean Cooperating Industries SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Notification Triggering Dispute Resolution--Olean Supplemental Remedial Investigation/Feasibility Study Objectives and How These Objectives Are To Be Incorporated Into the Supplemental Feasibility Study, January 14, 1994.

P. 400305- Letter to Ms. Libby Ford, Senior Environmental
400306 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; January 14, 1994 Notification of Dispute Resolution, January 24, 1994.

P. 400307- Letter to Mr. Thomas Taccone, Remedial Project
400312 Manager, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environmental Health Engineer, Olean Cooperating Industries SRI/FS Coordinator, Nixon Hargrave, Devans & Doyle, re: Administrative Order II CERCLA-10202, Olean Wellfield Supplemental RI/FS - Memorandum on Remedial Action Objectives, January 31, 1994. (Attachment: Memorandum on Remedial Action Objectives, undated.)

P. 400313- Letter to Ms. Libby Ford, Senior Environmental
400319 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; January 14, 1994 Notification of Dispute Resolution, February 25, 1994.

P. 400320- Letter to Ms. Libby Ford, Senior Environmental
400321 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Comments on the Memorandum on Remedial Action Objectives and Subsequent FS Submittals, March 18, 1994.

P. 400322- Letter to Ms. Libby Ford, Senior Environmental

400322 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site Supplemental Feasibility Study, April 21, 1994.

P. 400323- Letter to Mr. Thomas Taccone, Remedial Project
400327 Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Waste Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, re: Olean Wellfield Site, Olean C&T, Cattaraugus County Site No. 9-05-014, April 28, 1994. (Attachments: Attachment A: Facsimile to Mr. Steven Sharf, Environmental Engineer 2, NYS Department of Environmental Conservation, Bureau of Western Remedial Action, from Ms. Lani Rafferty, Environmental Health Specialist II, Bureau of Environmental Exposure Investigation, re: Olean Wellfield, Olean, Cattaraugus County, Site ID #905014, April 27, 1994, Attachment B: Site map, Olean Steel Corp., Tax No. 94.020-01-023.)

P. 400328- Letter to Ms. Carole Petersen, Chief, NY/Caribbean
400424 Superfund Branch II, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environmental Health Engineer, Olean Cooperating Industries SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Submittal of various Olean SRI/FS documents, May 6, 1994. (Attachments: 1) Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, from Mr. William J. Gray, Senior Scientist/Project Manager, Geraghty & Miller, Inc., re: Enclosed Memorandum of Remedial Action Objectives, Olean Well Field, Olean New York, May 6, 1994, 2) Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Messrs. William J. Gray, Senior Scientist/Project Manager and Andrew J. Barber, Senior Associate/Project Officer, Geraghty & Miller, Inc., re: Olean Well Field Supplemental Feasibility Study, May 6, 1994, (Attachment: "Proposed Schedule of Activities for the Supplemental Feasibility Study at the Olean Well Field, Olean, New York"), 3) Report: Comparative Analysis of Remedial Alternatives, Olean Well Field, Olean, New York, prepared for Olean Cooperating Industries, prepared by GMCE of New York, P.C., Engineering Services, May 1994.)

P. 400425- Letter to Mr. Steven M Scharf, P.E., Project
400425 Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Comparative Analysis of Remedial Alternatives, Treatability Workplan, Other SRI/FS Submissions, May 12, 1994.

P. 400426- Letter to Mr. Steven M. Scharf, P.E., Project
400427 Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Letter of April 28, 1994, May 17, 1994.

P. 400428- Letter to Mr. Thomas Taccone, Remedial Project
400430 Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, re: Olean Wellfield Site; Olean C&T, Cattaraugus County Site No. 9-05-014, June 15, 1994.

P. 400431- Letter to Ms. Libby Ford, Senior Environmental
400439 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Comments on the Preliminary Screening and Comparative Analysis of Remedial Alternative SFS Submittals, July 1, 1994.

P. 400440- Letter to Mr. Thomas Taccone, Remedial Project
400447 Manager, U.S. EPA, Region II, from Messrs. William J. Gray, Senior Scientist and Andrew J. Barber, Senior Associate, Geraghty & Miller, Inc., re: Response to USEPA Comments on the Preliminary Screening of Remedial Alternatives and the Comparative Analysis of Remedial Alternatives, Olean Well Field Supplemental Feasibility Study, Olean, New York, July 21, 1994.

P. 400448- Letter to Ms. Libby Ford, Senior Environmental
400448 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Response to

Comments on the Preliminary Screening and Comparative Analysis of Remedial Alternatives, August 25, 1994.

P. 400449- Letter to Mr. Thomas Taccone, Remedial Project
400455 Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State, Department of Environmental Conservation, re: Olean Wellfield Site, Olean C&T, Cattaraugus County, Site No. 9-05-014, October 19, 1994.

P. 400456- Letter to Mr. Thomas Taccone, Remedial Project
400457 Manager, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environment Health Engineer, Olean CI SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Olean Wellfield Supplement RI/FS Administrative Consent Order No. II-CERCLA-10202 -- Advance Request for Extension of the 14 Day Comment Period to Respond to EPA's Comments on the Comparative Analysis of Remedial Alternatives Report, December 15, 1994.

P. 400458- Letter to Ms. Libby Ford, Senior Environmental
400468 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Draft Preliminary Screening of Remedial Alternatives and Comparative Analysis of Remedial Alternatives, January 23, 1995.

P. 400469- Letter to Ms. Carole Petersen, Chief, NY/Caribbean
400485 Superfund Branch II, and Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Ms. Libby Ford, Senior Environmental Health Engineer, Olean Cooperating Industries SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Olean Wellfield Supplemental RI/FS Working Draft Supplemental Feasibility Study, Administrative Consent Order No. II-CERCLA-10202, March 24, 1995. (Attachment: Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Well Field Superfund Site; Draft Preliminary Screening of Remedial Alternatives, January 23, 1995.)

P. 400486- Letter to Mr. Thomas Taccone, Remedial Project
400493 Manager, U.S. EPA, Region II, from Messrs. Brent C. O'Dell, P.E., Project Engineer/Project Manager and Arnold S. Vernick, P.E., Associate/Project Advisor, re: Olean Well Field Draft Supplemental Feasibility Study Insert To Appendix D. Table 1 Table 2., March 31, 1995. (Attachments: Table 1: "Hydraulic Parameters Used in Capture Zone Analysis Olean Well Field, Olean, New York", Table 2: "Capture Zone Analysis Results, Olean Well Field, Olean, New York".)

P. 400494- Letter to Mr. Thomas Taccone, Remedial Project
400508 Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, re: Olean Wellfield Site, Olean C&T, Cattaraugus County, New York, Site No. 9-05-014, May 1, 1995. (Attachments: fact sheets, data, correspondence)

P. 400509- Letter to Mr. Steven Scharf, P.E., Project
400510 Engineer, New York State Department of Environmental Conservation, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; NYSDEC and NYSDOH Comments on the Draft Supplemental FS, May 11, 1995.

P. 400511- Letter to Ms. Libby Ford, Senior Environmental
400518 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Draft Supplement FS Report and Pilot Test Reports for AVX and Alcas, May 12, 1995.

P. 400519- Letter to Mr. Thomas Taccone, Remedial Project
400535 Manager, U.S. EPA, Region II, from Messrs. Brent C. O'Dell, P.E., Engineering Task Manager and Arnold S. Vernick, P.E., Project Advisor, Geraghty & Miller, Inc., re: Response to Comments, Olean Draft Feasibility Study Review, May 30, 1995.

P. 400536- Letter to Ms. Libby Ford, Senior Environmental

400540 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Draft Supplemental FS Report, June 29, 1995. (Attachment: "Sample Text for the Comparative Analysis of Alternatives by Source Area", undated)

P. 400541- Letter to Mr. Thomas Taccone, Remedial Project
400542 Manager, U.S. EPA, Region II, from Ms. Lani Rafferty, Environmental Health Specialist II, Bureau of Environmental Exposure Investigation, State of New York Department of Health, re: Olean Well Field, Olean, Cattaraugus County, Site ID #905014, July 19, 1995.

P. 400543- Letter to Mr. Thomas Taccone, Remedial Project
400579 Manager, U.S. EPA, Region II, from Messrs. Brent C. O'Dell, P.E., Engineering Task Manager and Arnold S. Vernick, P.E., Project Advisor, re: Attached Response to Comments, Olean Draft Feasibility Study Review, July 19, 1995.

P. 400580- Letter to Mr. Thomas Taccone, Remedial Project
400613A Manager, U.S. EPA, Region II, from Messrs. Brent C. O'Dell, P.E., Engineering Task Manager and Arnold S. Vernick, Project Advisor, re: Attached Response to Comments, Olean Draft Feasibility Study Review - Second Submittal, July 31, 1995.

P. 400314- Letter to Mr. Thomas Taccone, Remedial Project
400646 Manager, U.S. EPA, Region II, from Messrs. Brent C. O'Dell, P.E., Engineering Task Manager and Arnold S. Vernick, P.E., Project Advisor, re: Attached Response to Comments, Olean Draft Feasibility Study Review - Third Submittal, August 2, 1995.

P. 400647- Letter to Ms. Lani Rafferty, Environmental Health
400648 Specialist II, Bureau of Environmental Exposure Investigation, State of New York Department of Health, from Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; NYSDOH Comments on the PRP's SFS Comments Dated May 30, 1995, October 11, 1995.

P. 400649- Letter to Mr. Thomas Taccone, Remedial Project
400654 Manager, U.S. EPA, Region II, from Mr. Steven M. Scharf, P.E., Project Engineer, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, New York State Department of Environmental Conservation, re: Olean Wellfield Site, Olean City & Town, Cattaraugus County Site No. 9-05-014, October 17, 1995. (Attachment: 1. Letter to Mr. Steven M. Scharf, Bureau of Western Remedial Action, Division of Hazardous Waste Remediation, NYS Department of Environmental Conservation from Ms. Lani Rafferty, Environmental Health Specialist II, Bureau of Environmental Exposure Investigation, State of New York Department of Health re: Olean Wellfield, Olean, Cattaraugus County, Site ID #905014, October 6, 1995, 2. Facsimile transmission entitled "Trigger Level Discussion for Insertion", prepared by Geraghty & Miller, Inc., September 22, 1995.)

P. 400655- Letter to Ms. Libby Ford, Senior Environmental
400661 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Draft Supplemental FS Report, October 19, 1995. (Attachment: "Soil and Groundwater Treatment by Source Area", undated.)

7.0 ENFORCEMENT

7.3 Administrative Orders

P. 700001- Administrative Order on Consent for Supplement
700301 Remedial Investigation/Feasibility Study, Operable Unit, No. 2, In the Matter of the Olean Well Field Site, Alcas Cutlery Corporation, Aluminum Company of America, AVX Corporation, Cooper Industries Inc., McGraw-Edison Company, Respondents, Index No. II CERCLA-10202, June 25, 1991. (Attachments: Appendix 1. Report: Final Supplemental Remedial Investigation/Feasibility Study Work Plan, Olean Well Field Site, Olean, New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated, May 1989,

Appendix 2. Report: Draft Field Operations plan (FOP) for Supplemental Remedial Investigation/Feasibility Study, Olean Well Field Site, Olean New York, prepared for U.S. EPA, Region II, prepared by Ebasco Services Incorporated, June 1989.)

7.7 Notice Letters and Responses - 104e's

P. 700302- Letter to Mr. Earl D. Coleman, President, Loohn's
700311 Cleaners & Launderers, Inc., from Ms. Kathleen C. Callahan, Director, Emergency and Remedial Response Division, U.S.EPA, Region II, re: Supplemental Request for Information Pursuant to Section 104(e) of CERCLA, 42 U.S.C. section 9604(e), Olean Wellfield Superfund Site, Olean, New York, Notice of Potential Liability under 42 U.S.C. sections 9601-9675, November 14, 1995. (Attachments: Request for Information Instructions and Certification.)

8.0 HEALTH ASSESSMENTS

8.1 ATSDR Health Assessments

P. 800001- Letter to Ms. Nicki Di Forte, SCB, U.S. EPA,
800013 Region II, from Mr. William Nelson, and Ms. Denise Johnson, ATSDR Regional Representatives, Department of Health & Human Services, re: Attached report: Health Assessment for Olean Well Field National Priorities List (NPL) Site, Olean Cattaraugus County, New York, November 21, 1988, November 29, 1988.

P. 800014- Report: Revised Site Review and Update for Olean
800028 Well Field, Olean, Cattaraugus County, New York, Cerclis No. NYD980528657, prepared by New York State Department of Health Under a Cooperative Agreement With U.S. Department of Health & Human Services, Public Health Service, and Agency for Toxic Substances and Disease Registry, April 21, 1994.

P. 800029- Letter to Mr. Tom Taccone, Remedial Project
800041 Manager, U.S. EPA, Region II, from Mr. Arthur Block, Senior Regional Representative, Department of Health and Human Services, re: Attached report: Site Review and Update (SRU) for Olean Well Field, Olean, Cattaraugus County, NY, September 3, 1993, October 7, 1993.

8.3 Correspondence

P. 800042- Memorandum to Mr. Arthur Block, Senior Regional
800042 Representative, Department of Health and Human Services, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: ATSDR Site Update for the Olean Well Field Superfund Site, November 19, 1993.

P. 800043- Letter to Mr. Arthur Block, Senior Regional
800043 Representative, Department of Health and Human Services, from Mr. Steven M. Scharf, P.E., Project Engineer, New York State Department of Environmental Conservation, re: Olean Wellfield Site, Olean C&T, Cattaraugus County, NYSDEC Site No. 9-05-014, December 29, 1993.

P. 800044- Memorandum to Mr. Arthur Block, Senior
800045 Representative, Department of Health and Human Services, from Mr. Thomas Taccone, Project Manager, U.S. EPA, Region II, re: Olean Wellfield Superfund; Comments on ATSDR's Revised Site Update, March 23, 1994.

P. 800046- Letter to "Interested Party", from Ms. Meaghan
800046 Boice-Green, Health Liaison Program, New York State Department of Health, re: Site Review and Update (SRU) dated April 21, 1994 for the Olean Wellfield Site, September 23, 1994.

P. 800047- Memorandum to Mr. Arthur Block, Senior
800048 Representative, Department of Health and Human Services, from Mr. Kevin Lynch, Chief, Western/NY Section II, U.S. EPA. Region II, re: Agency Review Draft Health Consultation for the Olean Wellfield Superfund Site, July 24, 1995.

10.0 PUBLIC PARTICIPATION

10.3 Public Notices

P. 1000001- Public Notice announcing Public Meeting to discuss
1000013 U.S. EPA's plans to direct a Supplemental Remedial Investigation/Feasibility Study (RI/FS) at the Olean Well Field Superfund Site, September 19, 1991. (Attachment: "Mailing List for Olean Public Notices".)

10.6 Fact Sheets and Press Releases

P. 1000014- Fact Sheet for the Olean Well Field Site,
1000016 Cattaraugus County, New York, prepared by U.S. EPA, Region II, September 1991.

OLEAN WELLFIELD SITE
OPERABLE UNIT TWO
ADMINISTRATIVE RECORD FILE UPDATE
INDEX OF DOCUMENTS

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400661A- Report: Olean Well Field Superfund Site
400909 Feasibility Study Report, United States Environmental Protection Agency's Preface, prepared by U.S. EPA, undated. NOTE: see section 4.6, letter dated July 3, 1996 for details. (Attachment: Report: Draft - Final, Supplemental Feasibility Study, Olean Wellfield Site, Olean, New York, prepared for Olean Cooperating Industries, prepared by Geraghty & Miller, Inc., and GM Consulting Engineers, P.C., June 1996.)

4.6 Correspondence

P. 400910- Letter to Ms. Libby ford, Senior Environmental
400918 Health Engineer, Nixon, Hargrave, Devans and Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Well Field Superfund Site; Finalization of the Supplemental FS, July 3, 1996. (Attachment: Olean Well Field Superfund Site Feasibility Study Report, United States Environmental Protection Agency's Preface, prepared by U.S. EPA, undated.)

10.0 PUBLIC PARTICIPATION

10.9 Proposed Plan

P. 1000005- Superfund Proposed Plan, Olean Well Field, City of
1000038 Olean, Cattaraugus County, New York, prepared by U.S. EPA, Region II, July 3, 1996.

OLEAN WELL FIELD SITE
OPERABLE UNIT TWO
ADMINISTRATIVE RECORD FILE UPDATE TWO
INDEX OF DOCUMENTS

4.0 FEASIBILITY STUDY

4.6 Correspondence

P. 400919- Letter to Ms. Libby Ford, Senior Environmental
400920 Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II re: Olean Wellfield Superfund Site, Supplemental

RI/FS; Progress Report for August 1993, October, 14, 1993.

P. 400921- 400944 Letter to Mr. Thomas Taccone, Olean Wellfield Site Project Coordinator, U.S. EPA, Region II, Emergency & Remedial Response Division, from Messrs. Steven T. Devernoe, Engineer, William J. Grey, Senior/Scientist/Project Manager, and Andrew J. Barber, Senior Associate/Project Officer, Geraghty & Miller, Inc., September 7, 1994. (Attachments: Figures, Appendix A and Appendix B)

P. 400945- 400966 Letter to Ms. Libby Ford, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, from Ms. Carole Petersen, Chief, NY/Caribbean Superfund Branch II, U.S. EPA, Region II, re: Olean Wellfield Superfund Site; Draft Supplemental FS Report, May 9, 1996. (Attachments: Attachments 1 and 2).

P. 400967- 401001 Letter to Mr. Thomas Taccone, Olean Wellfield Site Project Coordinator, U.S. EPA, Region II, Emergency & Remedial Response Division, from Ms. Libby Ford, QEP, Senior Environmental Health Engineer, Olean CI SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Olean Wellfield Supplemental RI/FS Administrative Consent Order No. II-CERCLA-10202 Comments on EPA Imposed revisions to SFS and Notice of Issue Submitted for Dispute Resolution, July 18, 1996. (Attachments: Appendix A through Appendix F).

P. 401002- 401005 Letter to Mr. Kevin Lynch, Chief, Western NY Remediation Section, U.S. EPA, Region II, Emergency and Remedial Response Division, from Ms. Libby Ford, QEP, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, re: July 18, 1996 Dispute Resolution Letter - Resolution of Issue Number One, July 30, 1996. (Attachment: Pages of Section 2.1 of the Supplemental Feasibility Study with revisions, undated.)

10.0 PUBLIC PARTICIPATION

10.1 Comments and Responses

P. 1000039- 1000329 Letter to Mr. Thomas Taccone, Olean Wellfield Site Project Coordinator, U.S. EPA, Region II, from Ms. Libby Ford, QEP, Olean CI Coordinator, Senior Environmental Health Engineer, Nixon, Hargrave, Devans & Doyle, re: Comments on "Superfund Proposed Plan - Olean Wellfield", August 5, 1996. (Attachments: Appendix A, which contains 41 documents appended to this letter, undated.)

P. 1000330- 1000332 Letter to Mr. Thomas Taccone, Olean Wellfield Site Project Coordinator, U.S. EPA, Region II, from Ms. Libby Ford, QEP, Senior Environmental Health Engineer, Olean CI SRI/FS Coordinator, Nixon, Hargrave, Devans & Doyle, re: Additional Comments on "Superfund Proposed Plan - Olean Wellfield", August 7, 1996.

P. 1000333- 1000333 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Mr. John Mitchell, Supervisor, Town of Olean, re: Olean Wellfield Superfund Site, August 23, 1996.

P. 1000334- 1000335 Letter to Mr. Thomas Taccone, Remedial Project Manager, U.S. EPA, Region II, from Mr. Stewart C. Hill, re: Olean Wellfield, August 23, 1996.

P. 1000336- 1000337 Letter to Mr. Thomas E. Taccone, Remedial Project Manager, Emergency & Remedial Response Division, U.S. EPA, Region II, from Mr. Wayne D. Mizerak, Environmental Engineer I, Division of Environmental Remediation, New York State Department of Environmental Conservation, re: NYDECs response to comments 9 and 10 of the August 5, 1996 letter from Ms. Libby Ford, August 27, 1996.

10.4 Public Meeting Transcripts

P. 1000338- Transcripts: "Public Meeting Transcript for the
1000389 Olean Well Field Site, Proposed Remedial Action Plan", Olean, New York, July 16, 1996.

10.10 Correspondence

P. 1000390- List of Attendees at the Olean Well Field Public
1000393 Meeting, Olean Municipal Building, Olean, New York, held on July 16, 1996.

APPENDIX IV

STATE LETTER OF CONCURRENCE

<IMG
SRC 0296281A2>

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany, New York 12233-7010

Mr. Richard L. Caspe Sep 27 1996
Director
Emergency & Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway - 19th floor
New York, New York 10007

Dear Mr. Caspe:

Re: Olean Wellfield Site, Olean C&T, Cattaraugus County, New York, Site No. 9-05-014

The Operable Unit 2 (OU2) Record of Decision (ROD) for the Olean Wellfield site has been reviewed by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). The OU2 ROD concerns the Supplemental Source Study Remedial Investigation and Feasibility Study. Four source areas will require remediation under the U.S. Environmental Protection Agency's (USEPA) jurisdiction. These four areas are McGraw-Edison, Alcas Cutlery, AVX and Loohn's Dry Cleaners and Launderers.

The NYSDEC and the NYSDOH concur with the selected remedies listed in the Olean Wellfield OU2 ROD. This includes Vacuum Enhanced Recovery (VER) for Alcas Cutlery and Loohn's Dry Cleaners and Launderers, soil excavation at AVX and groundwater pump-and-treat at McGraw-Edison. In addition, AVX and Loohn's Dry Cleaners and Launderers contain a Stage 2 component for groundwater pump-and-treat if future evaluation proves this necessary.

If you have any questions, please contact Mr. Robert W. Schick, P.E., of my staff, at 518/457-4343.

Sincerely,

<IMG SRC 0296281A3>

cc: Commissioner Zagata
K. Lynch (USEPA)
T. Taccone (USEPA)
A. Carlson/L. Rafferty (NYSDOH)

APPENDIX V

RESPONSIVENESS SUMMARY

APPENDIX V
RESPONSIVENESS SUMMARY
OLEAN WELL FIELD SUPERFUND SITE

INTRODUCTION

A responsiveness summary is required by Superfund regulation. It provides a summary of citizens' comments and concerns received during the public comment period, and the United States Environmental Protection Agency's (EPA's) and the New York State Department of Environmental conservation's (NYSDEC's) responses to those comments and concerns. All comments summarized in this document have been considered in EPA's and the NYSDEC's final decision for selection of a remedial alternative for the Olean Well Field site.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

EPA's public meeting for the Record of Decision for the first operable unit was held on March 29, 1988. The major concern of the community then was on the potential economic impact of EPA's selected remedies on the companies, which were deemed responsible for the groundwater contamination at the Site. The local community were concerned that jobs could be lost; while the City was concerned with the loss of tax revenue, which would result from job loss.

The supplemental RI/FS report and the Proposed Plan for the second operable unit were made available to the public in the administrative record file at the EPA Docket Room in Region II, in New York City and the information repository at the Olean Public Library, located in the City of Olean, New York. The public comment period for these documents was held from July 9, 1996 to August 26, 1996.

On July 16, 1996, EPA conducted a public meeting at the Olean municipal building in order to present its Proposed Plan for the second operable unit for remediating four areas of Site contamination. Most of th questions and comments raised during the meeting and in written comments received by EPA during the public comment period focused on technical implementation of the remedy for the first operable unit and the remedies described in EPA's Proposed Plan for the second operable Unit. No objections were voiced at the meeting or in any of the written comments on the proposed remedies.

Attached to the Responsiveness Summary are the following
Appendices:
Appendix A - Proposed Plan
Appendix B - Public Notices
Appendix C - July 16, 1996 Public Meeting Attendance Sheets
Appendix D - July 16, 1996 Public Meeting Transcript
Appendix E - Letters Submitted During the Public Comment Period

SUMMARY OF COMMENTS AND RESPONSES

Comments expressed during the July 16, 1996, public meeting and written comments received during the public comment period, have been categorized as follows:

- Proposed Plan
- Other Potential Sources of Site Contamination
- EPA's July 3, 1996, Preface to the supplemental FS
- Content of the Administrative Record File Index
- Remedies Specified Under the September 24, 1985, Record of Decision

A summary of the comments and EPA's Responses to the comments is provided below.

Many of the comments which follow were submitted by Ms. Libby Ford, who represented the owners and operators of the AVX facility, Alcas Cutlery facility, and the McGraw Edison facility. This group of owners and operators is collectively referred to below as the potentially responsible parties or PRPs.

A. The Proposed Plan

PRP Comment #1: Page 2 - There is no mention of the inspection and repair of the McGraw Edison Sewer, which was an important part of the first operable unit remedy.

EPA's Response: Mention of repair and inspection of the McGraw Edison sewer which was an important part of the remedies selected for the first operable unit can be found on page 3 of the Proposed Plan.

PRP Comment #2: Page 3 - There is no mention of an upper aquifer at AVX.

EPA's Response: EPA has made this correction in the Record of Decision.

PRP Comment #3: Page 5 - The discussion of soil gas and analytical results of soil and groundwater sampling incorrectly indicated that 53 ppb of trichloroethene (TCE) was detected in the soil at soil boring 05. The correct concentration is 29 ppb.

EPA's Response: EPA has made this correction in the ROD.

PRP Comment #4: Page 7 - The forth paragraph of the section entitled "Faye Avenue/Schaefer Street" contains statements which relate to the investigatory work which was performed at the Griffith Oil property.

EPA's Response: EPA has removed these statements from the section on the Faye Avenue/Schaefer Street discussion in the ROD.

PRP Comments #5: Pages 9 and 29 - The PRPs disagreed with EPA's decision to expand the list of contaminants specified in the Site Monitoring Plan (SMP) to include a full volatile organic compound (VOC) scan and chromium. The additional compounds which are being requested for analysis were not detected at levels of concern. These additional compounds also have not been tied to any of the four identified source areas.

EPA's Response: EPA disagrees that none of the additional contaminants, which the Proposed Plan specified for inclusion in the SMP, were detected at levels which are above levels of concern. Other volatiles, which are not currently being tested for under SMP, but which would be included in a full VOC scan, have been detected in the soils at concentrations which are above the Site soil clean up objectives. At AVX, toluene, ethylbenzene and xylenes, were detected in the soils at 16,000 ppb, 4,000 ppb and 73,000 ppb, respectively. Xylene was also detected in the groundwater at 3,900 ppb. At Loohn's, 2-butanone was detected at 5,400 ppb and 43,000 in two separate soil borings.

The remedies selected for AVX and Loohn's Dry Cleaners will require groundwater monitoring to determine whether groundwater remediation will be necessary after the contamination soil has been remediated. It will be necessary to test the groundwater for each of the VOC contaminants which are present in the soil above the soil cleanup levels. Therefore, EPA believes that the SMP should be revised to specify a full VOC scan.

Chromium was detected in monitoring wells CW-12 and CW-12A at 22.5 ppm, and 1.75 ppm, respectively. These concentrations are above the MCL of 50 ppb and were detected in wells which are close to municipal wells 18M. Chromium at levels below MCLs has been detected in the recent samples of the influent groundwater to Municipal wells 18M and 37/38M collected by the City of Olean. Therefore, EPA believes that the SMP should be revised to include chromium.

PRP Comment #6: Page 9 - A Stage 1B Cultural Resource Survey (CRS), which would involve field investigation, is not necessary at the ALCAS property since the survey would have little substantial impact on the design of a VER system at Alcas.

EPA's Response: EPA is retaining the requirement for a Stage 1B CRS for both the Loohn's Dry Cleaners and

Alcas properties. EPA believes that further investigation is needed, since the properties are located close to the Allegheny River. This proximity makes the potential for encountering cultural artifacts high. Therefore, a Stage 1B CRS will need to be performed.

PRP Comment #7: Page 10 - The proposed Plan should specifically state that there are two separate exposure pathways. The section entitled "Human Health Risk Assessment" in the document did not recognize that safe water from the City public water supply line is available to the on-Site residents, and that those who are consuming untreated groundwater are doing so by their own free choice.

EPA's Response: EPA agrees that there are two separate exposure pathways. This clarification has been made in the ROD's discussion of risks.

PRP Comment #8: Page 11 - The Remedial Action Objectives (RAOs), as stated in the document, were not the final RAOs for the SRI/FS.

EPA's Response: In general, the RAOs in the Proposed Plan did reflect the RAOs as stated in the supplemental RI/FS. The discussion of RAOs in the ROD has been written to be more consistent with the Supplemental FS.

PRP Comment #9: Page 12, Table 1 - There is no New York State Technical and Administrative Guidance Memorandum (TAGM) soil cleanup number for cis-1,2 dichloroethene (1,2-DCE). The soil cleanup number, which is in the table for 1,2-DCE, is actually the number for trans-1,2 DCE. The fourth column of Table 1 should be corrected to indicate the values lists are State groundwater and drinking water standards. The basis and need for including 2-butanone, benzene, ethyl benzene, toluene and vinyl chloride should be stated, since they are not in included in Table 2-1 of the supplemental FS.

EPA's Response: The cleanup number for cis-1,2-DCE, which was provided in Table 1 of the Proposed Plan, is incorrect, and there is no specific soil cleanup number for cis-1,2 DCE in the NYSDEC's TAGM guidance. However, the guidance either provides a specific soil cleanup number or provides a method for calculating a number. Using the method, a soil cleanup number of 250 ppb has been established for cis-1,2-DCE. The number is referenced in Table 1 of the ROD.

Regarding the column heading for the fourth column of Table 1 in the Proposed Plan, EPA has clarified the table as it appears in the ROD. the heading now reads "New York Water Quality Standards." The heading also has a footnote, which states, "The values listed are the more stringent of New York State's drinking water and groundwater standards."

The compounds: 2-butanone, ethyl benzene, toluene and vinyl chloride all have been found in the soil on-Site at levels above the NYSDEC's soil cleanup objectives. These compounds are Site-related and therefore must be removed from the soil to the extent they are above the Site cleanup numbers.

PRP Comment #10: Page 12, Table 1 - The NYSDEC MCL for benzene should be 5 ppb, not 0.7 ppb. The fourth column of Table 1 should be re-titled, "New York State Groundwater Standards."

EPA's Response: The state MCL for benzene is 5 ppb. However, the New York State Groundwater standard for benzene is 0.7 ppb. Regarding the fourth column heading of Table 1 of the Proposed Plan, EPA revised the table, which was included in the ROD as Table 1. The revised heading now reads, "New York State Water Quality Standards." The table has also been footnoted to indicate that values listed are the more stringent of the State drinking water or groundwater standards.

PRP Comment #11: Page 13 - An evaluation of the effect of a groundwater pump and treat system on the wetlands areas, which is located south of the AVX facility, is unnecessary. The groundwater at AVX has been pumped for 40 years without any detrimental effects on the wetlands.

EPA's Response: While there have been no observable effects on the wetlands area, if a groundwater pump and treat system were installed at AVX, the location and pumping rate of the system would most likely be different than the location and pumping rate of the present system, which was designed to provide a source of water for the AVX plant operations. Therefore, some assessment of the potential impact of a groundwater pump and treat system on the wetlands areas is necessary.

PRP Comment #12: Page 13 - The 4-year review for determining whether a groundwater pump and treat is necessary at the AVX and Loohn's Dry Cleaners properties should be combined with the CERCLA 5-year review.

EPA's Response: Past EPA correspondence on this matter may be found in the EPA's Administrative Record for this Record of Decision (See Appendix III). Essentially, EPA believes that the 4-year review for the remedies and the CERCLA 5-year review should not be combined, since the objective of each review is different. The 4-year review is to determine if a specific portion of the remedial action, i.e., the source control action at AVX or Loohn's, has been effective and if there is a need for the groundwater pump-and-treat stage of the remedy. The four year period represents the amount of time for three volumes of groundwater to travel or flush from the properties to the municipal wells. On the other hand, the 5-year review is required by Section 121(c) of CERCLA whenever a remedial action results in contamination being left on site above health-based levels to determine whether all of the remedial actions implemented at the Site continue to be protective.

PRP Comment #13: Pages 16-28 - A previous draft of the Comparative Analysis of Remedial Alternatives section of the supplemental FS was adequate and the commentors objected to EPA's written comments on previous drafts of the Supplemental FS, which indicated that the section required further revisions.

EPA's Response: EPA's position on this matter is stated in its written comments on drafts of the supplemental FS. EPA's comments may be found in the Administrative Record (See Appendix III). In summary, EPA believed that the information provided in the draft Supplemental FS was not correctly organized and therefore could not be used to form a basis of decision for remedy selection.

PRP Comment #14: Page 14 - Granular activated carbon (GAC) may or may not be adequate to treat the VOC emissions from a Vacuum Enhanced Recovery (VER) or Soil Vapor Extraction System (SVE). A thermal oxidation system may be more appropriate for vapor streams which have VOC concentrations, which are too high to treat economically with GAC. Also, the groundwater which will be discharged from VER system may also be treated more economically with an air stripper than GAC.

EPA's Response: EPA agrees with these comments and has included these comments in the ROD's description of Alternative 4.

PRP comment #15: Page 17, paragraph 5 - The PRPs disagreed with the Proposed Plan's statement that Alternative 5 (excavation) can achieve ARARs faster that Alternative 4 (VER or SVE) for the Alcas source area.

EPA's Response: The Proposed Plan and the supplemental FS indicate that it would take approximately the same amount of time to completely excavate all of the contaminated soil as it would to construct a VER system. After this time period, complete remediation (excavation) of the soil under Alternative 5 would be accomplished and soil cleanup goals would be met. Alternative 4, however, would require another 3 to 5 years before the VOC's were removed to levels that would meet cleanup goals.

PRP Comment #16: Table 2 - The footnotes to Table 2 did not include all of the information which was included in the footnotes in Table 4-1 of the supplemental FS.

EPA's Response: EPA reviewed Table 2 and found that footnote 4 did not state that the cost for implementing Alternative 3A at McGraw Edison included the costs for operating and maintaining the existing air stripper, which is currently treating groundwater from the lower aquifer, and the additional costs necessary for pumping and treating water from the upper aquifer. EPA has made this correction in the ROD.

Comment #17: What happens to the vapors which would be generated by a vacuum enhanced recovery (VER) system?

EPA's Response: The vapors which would be emitted from a VER system would be treated to meet air emission standards before they are released to the ambient air. Treatment could consist of a thermal oxidation system, or, for lower concentrations, adsorption using granulated activated carbon.

Comment #18: Will the companies which signed the 1991 administrative consent order pay EPA's past and future supplemental RI/FS costs?

EPA's Response: Pursuant to a 1989 Consent Decree, the companies which signed the 1991 order paid th United States $1,175,000 (with a $145,000 credit) for past costs through August 1989. In a November 1992 settlement with the bankruptcy estate of W.R. Case, another for the Site, EPA received $650,000.00 for pat and future response costs and $50,000 as a civil penalty for noncompliance with a 1986 Administrative Order. The parties who signed the 1991 Order paid approximately $127,000 to reimburse EPA for costs incurred by the government to prepare the work plans for the supplemental RI/FS. Additionally, the parties who signed the 1991 Order agreed, in that Order, to pay EPA's costs in overseeing the supplemental RI/FS. EPA will prepare a bill in the near future, requesting payment of its oversight costs. EPA and the PRPs will negotiate the issue of EPA's future costs for the Site during negotiations regarding performance of the OU2 remedial design/remedial action (see also response to comment 20).

Comment #19: How much time it will take to implement the remedies at the source area properties.

EPA's Response: After the design work is completed, EPA expects that is will take approximately one construction season to excavate all of the soil at AVX, and approximately five years to complete the soil treatment at Alcas and Loohn's. EPA expects that it will take approximately four additional years for the groundwater underlying these properties to be below drinking water standards. The four-year period represents the amount of time for three volumes of groundwater to travel or flush from the properties to the municipal wells.

Regarding the groundwater remedies, EPA does not have a precise estimate for the time it will take to remediate groundwater from the upper aquifer. For cost-estimation purposes, EPA used an estimate of thirty years.

Comment #20: What is the time frame for negotiations with the PRPs before implementing the remedy?

EPA's Response: After the ROD is issued, EPA will send a "special notice letter" to the PRPs offering them the opportunity to either perform the remedy themselves or finance the remedy. EPA and the PRPs will have no less than 120 days to negotiate an agreement. If the parties have not reached an agreement by the conclusion of the 120 day period, EPA could either issue a unilateral administrative order requiring the PRPs to perform the work, or perform the work itself and seek reimbursement at a later date. Work on the remedial design will not begin until after the expiration of the 120 day negotiation period.

B. Other Potential Sources of Contamination on-Site

Comment #21: Why was not the Olean Municipal Landfill, which is located south of Seneca Avenue and north of the Conrail Railroad tracks, included in the supplemental RI/FS investigation.

EPA's Response: The Olean Municipal Landfill, also known as the Seneca Landfill, was not included in the supplemental RI/FS since during the previous RI/FS several wells down gradient from the landfill did not indicate the presence of contamination from the landfill.

Comment #22: Many of the private wells in the area had levels of TCE of approximately 2 ppb, which was "half-way to the maximum concentration allowable of 5 ppb." Will the wells which are located in the area of Seneca Avenue will be retested?

EPA's Response: EPA's September 24, 1985, Record of Decision for the Site stated that the private wells near Seneca Avenue should be monitored and that carbon adsorption units be placed on the wells as needed. Analyses of groundwater from selected private wells located in this area in 1994 and 1995 have not shown the presence of organic contaminants at or above state or federal maximum contaminant levels (MCLs) for drinking water. EPA has asked Cooper Industries, one of the PRPs, to continue to monitor three wells, which are spaced as widely as possible. However, since the this area is upgradient from the sources of contamination to the Olean Well Field, we would not expect to see Site contamination migrating to those wells.

Comment #23: The Town Supervisor of the Town of Olean stated that "In January 1996, after a flooding episode, "the basement walls of several homes near East River Road appeared to be "cleaned" by a "cleaning solvent."

EPA's Response: EPA does not consider this incident related to the contamination which has been detected at the Site. EPA contacted the Town Supervisor and was told that the subject homes were located on the south side of the Allegheny River across from the Alcas facility. No samples were collected during the incident. However, there were no solvent odors evident during the event. EPA has also reviewed the data collected for the Site Monitoring Plan and the Supplemental RI report. EPA believes that any contamination from the Alcas facility, which wold be the closest source to the subject homes would be captured by municipal well 18M and therefore could not travel to these homes. In addition, the influent groundwater from the lower aquifer to the municipal wells 37/38M, which are located close to the homes, did not indicate any increase in the concentration of contaminants during December 1995 and February 1996.

C. EPA's July 3, 1996 Preface to the supplemental FS

The Supplemental FS report submitted by the PRPs on June 17, 1996 did not accurately reflect the comments RPA made on previous drafts. Therefore, EPA amended the report with a Preface to provide the Agency's position on a number of issues.

The PRPs for the Site raised five major issues regarding EPA's July 3, 1996, Preface which finalized the supplemental FS (SFS). These issues and EPA's response to them are provided below. EPA agrees that some revision of EPA's Preface are appropriate.

PRP Comment 24: The Preface should not modify the Remedial Action Objectives which are contained in Section 2.1 of the SFS.

EPA's Response: The Supplemental FS submitted by the PRPs had added additional conditions to the Remedial Action Objectives to the 1989 Supplemental RI/FS workplan. EPA's SFS Preface deleted the last sentence and the quote from the SRI/FS report. However, EPA now believes that the statement and quote should include the following language which was originally included in the SRI/FS workplan.

The Amended SRI Work Plan (Ebasco Services, Inc. 1989) also sets forth the following decision criteria:

> "Thus, the Supplemental RI/FS Report will recommend that source control be performed at one or more locations if it is determine that an action, consistent with the National Contingency Plan (NCP), will expedite treatment of the well field aquifer or mitigate unacceptable risks" (Ebasco Services, Inc. 1989).

The third bullet on page 2-2 and the first bullet on page 2-3, which state two Remedial Action Objectives of the SFS, should be stated as follows:

! Page 2-2, third bullet - "Restore soils at one or more locations to meet New York State soil cleanup guidelines (NYSDEC TAGM HWR-94-4046) for concentrations of TCE, 1,1,1-TCA, cis-1,2-DCE, and other site-related contaminants if such restoration will expedite the treatment of the contaminated aquifer."

! Page 2-3, first bullet - "Provide additional localized groundwater treatment for TCE, 1,1,1-TCA, cis-1,2-DCE, and other site-related contaminants at one or more locations if it will expedite the treatment of the aquifer.

PRP Comment #25: The SFS should include a factual discussion of the past performance of the groundwater pumping well at the AVX property. A pumping well at AVX should be mentioned since it has, in effect, been treating the aquifer for the past 40 years.

EPA's Response: The well is a production well that was not designed for the purpose of treating the aquifer. Therefore, EPA believes the inclusion, in the supplemental FS, of a discussion regarding the success or failure of its ability to cleanup the aquifer can be confusing or misleading.

EPA is, however, agreeable to including the statements, which point out the uncertainties of achieving aquifer restoration through a groundwater pump and treat system. EPA does maintain its position that a pump and treat system, if necessary, would be an effective means of contaminant at AVX and therefore restorative of the groundwater which is downgradient from the system. The following phrases, which were deleted from the SFS by the Preface, should remain in the SFS:

- Section 3.4.3.3, Page 3-35, at the end of the second full paragraph - "While groundwater pumping from the City aquifer would be possible at the AVX property, the greater than 15 years of active pumping at the site in relatively close proximity to the identified source area has not caused significant concentration reduction in the groundwater. These observations are consistent with the nature of the dense till found in the source area."

PRP Comment #26: The criteria which will be used to determine whether or not groundwater pump-and-treat will be necessary for remedial alternatives 3, 4 and 5 must be tied to the completion of stage 1 (soil remediation) at the identified source areas.

EPA's Response: This issue relates to the criteria which EPA will use for determining whether groundwater pump and treat will be necessary at the Loohn's Dry Cleaners and AVX properties. The PRP's felt the statement in the preface could be interpreted differently than EPA intended, i.e., as stated in the Proposed Plan. EPA agrees that the following language should remain in the SFS:

- Page 4-17, The fifth and sixth sentences of the first full paragraph on page 4-17 "Four years after the completion of the soil remediation (Stage 1) at all the source areas, influent groundwater to Municipal Wells 18M and 37/38M will be analyzed to determine if groundwater treatment (Stage 2) will be necessary. In deciding whether to initiate the Stage 2 remedy, the general decision criteria set out in Section 3.4.1.3 would be applied."

- The bottom of page 4-17 and the top of page 4-18 "Four years after the completion of the soil remediation (Stage 1) at all the source areas, the first evaluation of the effectiveness of the Stage 1 remedy and the need for initiating the Stage 2 remedy would be evaluated. In deciding whether to initiate the Stage 2 remedy, the general decision criteria set out in Section 3.4.1.3 would be applied."

- Page 4-33, The fifth and sixth sentences of the first full paragraph on page 4-33 "Four years after the completion of the soil remediation (Stage 1) at all the source areas, influent groundwater to the Municipal Wells 18M and 37/38M will be analyzed to determine if groundwater treatment (Stage 2) will be necessary. In deciding whether to initiate the Stage 2 remedy, the general decision criteria set out in Section 3.4.1.3 would be applied."

- The first three full sentences on top of page 4-34 "Upon completion of either of these alternatives, the RAOs for the Site should be achieved. Four years after the completion of the soil remediation (Stage 1) at all the source areas, the evaluation of the effectiveness of the Stage 1 remedy and the need for initiating the Stage 2 remedy would be evaluated. In deciding whether to initiate the Stage 2 remedy, the general decision criteria set out in Section 3.4.1.3 would be applied."

PRP Comment 27: The meaning of the term "influent" in the SFS Preface needs to be clarified.

EPA's Response: This issue concerned EPA's interpretation of the term "influent groundwater" as it is used in Sections 3.2.3, 3.2.4, 3.2.5, 3.4.1.3, 3.4.1.5, and 3.4.1.6. These include sections of the SFS, which are entitled, "Summary of Remedial Action Alternatives for Soils," "Detailed Analysis of the Remedial Alternatives" and "Comparative Analysis of Remedial Alternatives." The commentors were concerned that EPA interpreted "influent groundwater" to mean some distance away from the municipal wells 18M and 37/38M. However, EPA interprets "influent groundwater" to mean the groundwater at the municipal wells.

PRP Comment #28: Correction of the total cost for implementing remedial alternative 3A as listed on Table C-1 in Appendix C of the SFS is necessary.

EPA's Response: The SFS Preface revised the total cost for operation and maintenance for remedial alternative 3A from $114,000 to $171,000. However, the SFS Preface did not also revise the grand total for alternative 3A.

The modified figure of $171,000 includes the funding necessary for operation and maintenance of groundwater pump and treat systems at AVX, Loohn's Dry Cleaners and McGraw-Edison. (The SFS assumed that $57,000 would be required for each system.) The $114,000 did not include the costs for a system at McGraw Edison. If the revised total O&M costs of $171,000 is added to the $42,000 for Site-wide monitoring, the grand total for implementing remedial alternative 3A is $213,000.

Despite the failure of the SFS Preface to adjust the final cost for alternative 3A, EPA did not cit the costs in Appendix C for its selection of Site remedies. Instead, EPA used Table 4-1 of the SFS. Table 4-1 was more appropriate for remedy selection costing, since it provided the costs for implementing the remedies by source area.

D. Content of the Administrative Record File Index

PRP Comment #29: In an August 5, 1996 letter, Ms. Libby requested that 41 additional documents be added to the Administrative Record for this ROD.

EPA's Response: Ms. Ford's letter has been included in Appendix E of this Responsiveness Summary. EPA has reviewed each of the documents and has determined that the documents were either not used in selecting the remedies, which are stated in this ROD, or were already included in the Administrative Record. EPA's determinations for the documents, which are numbered below as they are in Appendix A of Ms. Ford's letter, are as follows:

Documents Numbered 1-15, 17-21, 24, 25, 27-36 and 40: EPA did not rely on these documents in order to select the remedies, which are stated in this Record of Decision.

Documents Numbered 16, 22, 23, 26, 37, 38, 39 and 41: All of these documents have already been included in the Administrative Record.

E. Remedies Specified Under the September 24, 1985, Record of Decision

Comment #30: What effects have the air strippers, which were installed to treat the groundwater from the municipal wells 18M and M37/38M, had on the groundwater quality?

EPA's Response: Since the air strippers began treating the groundwater, the concentration of TCE in the untreated influent groundwater water to the municipal wells has declined from over 200 ppb to approximately 20 ppb. After treatment there has not been any TCE detected in the drinking water.

Comment #31: What is the average volume of water which is pumped from the municipal wells. Could the municipal wells "dry out" other nearby wells by lowering the water column below the well screens, if the well pumps were operated at their full potential?

EPA's Response: According to the supplemental RI report, the combined pumping rate for wells 18M and M37/38M is approximately 2150 gallons per minute (gpm) or 3.096 million gallons per day. EPA recently contacted the City of Olean Department of Works and was informed that the combined pumping rate for the wells is currently 2,900 g.p.m. or approximately 4.17 MGD.

The City of Olean's water supply consists of groundwater which is pumped from the municipal wells and surface water from Haskell Creek. As indicated above, the City has increased the pumping rate of the municipal wells almost 35 percent and has no evidence that this increase has had any effect on the nearby wells. The City has also indicated that it would meet any increase in water demand by increasing the amount of water it gets from Haskell Creek. EPA believes that it is highly unlikely that the nearby wells would "dry out" from the pumping of the municipal wells.

Comment #32: Were there any on-Site private well users who refused to be hooked up into the City water supply line and have there been any effects to encourage the users to hook up?

EPA's Response: Approximately eight private well users have declined to hook up into the Olean public water supply system. The users made this decision despite being contacted by the New York State Department of Health and several offers from the PRPs to finance the connection to the public water system.

Comment #33: Have the private wells, which are operated by the users who refused to hook up to the City water supply system, been tested to determine if there is any contamination?

EPA's Response: The New York State Department of Health indicated at the public meeting on July 16, 1996, that the wells were last tested in September 1995.

APPENDIX V

RESPONSIVENESS SUMMARY

APPENDIX A

PROPOSED PLAN

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PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for addressing contaminated soil and groundwater associated with the Olean Well Field Superfund Site and identifies the preferred remedial alternatives with the rationale for this preference. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) with support from the New York State Department of Environmental Conservation (NYSDEC). The EPA is issuing this Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C §§ 9601 - 9675, as amended, and 40 CFR 300.430(f) of the National Contingency Plan (NCP). The alternatives summarized here are described in the Supplemental Remedial Investigation and Feasibility Study (SRI/FS) report, which should be consulted for a more detailed description of all the alternatives. As part of the Administrative Record for the Site, the SRI/FS Report can be found in the public repositories listed on page 2.

This Proposed Plan is being provided as a supplement to the SRI/FS report to inform the public of EPA's and the NYSDEC's preferred remedies and to solicit public comments pertaining to all the remedial alternatives evaluated, as well as the preferred alternatives.

The remedies described in this Proposed Plan are the preferred remedies for the Site. Changes to the preferred remedies or a change from the preferred remedies to other remedies 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 remedies will be made after EPA has taken into consideration all public comments. We are soliciting public comment on all of the alternatives considered in the detailed analysis of the SRI/FS because EPA and the NYSDEC may select one or more remedies which are different than the preferred remedies.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and the NYSDEC rely 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 SRI/FS report Proposed Plan, and supporting documentation have been made available to the public comment period which begins on July 9, 1996 and concludes on August 8, 1996.

A public meeting will be held during the public comment period at the Olean Municipal Building on July 16, 1996 at 7:00 pm to present the conclusions of the SRI/FS, to elaborate further on the reasons for recommending the preferred remedial alternative, 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.

All written comments should be addressed to:

Thomas Taccone
Project Manager
Olean Well Field Superfund Site
NY/Caribbean Superfund Branch II

20th Floor
290 Broadway
New York, New York 10007-1866

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Copies of the SRI/FS report, Proposed Plan, and supporting documentation are available at the following repositories:

Olean Public Library, located at Second and Laurens Streets, Olean, N.Y. 14760; telephone (716) 372-0200; hours Mon.- Thurs. 9:00 am - 9:00 pm and Fri-Sat. 9:00 am - 5:00 pm.

-and-

U.S. Environmental Protection Agency, Superfund Records Center; located at 290 Broadway, New York, New York 10007-1866; telephone (212) 637-3261; hours: Mon. -Fri. 9:00 am-5:00 pm.

SCOPE AND ROLE OF ACTION

From 1991 to 1995, a supplemental remedial investigation/feasibility study (SRI/FS) of the Olean Well Field Superfund Site (the "Site") was conducted to identify sources of volatile organic compounds (VOCs) in the soil at 13 properties on Site and to determine the effect of the contamination on the groundwater. Information collected on soil and groundwater contamination at the properties was used to select: and recommend alternatives to clean up the identified sources of contamination.

The remedies discussed in this Proposed Plan will constitute the second of two operable units (or phases) for the Site. The first operable unit involved the construction of two air strippers which are treating VOCs contaminated groundwater and the extension of the City of Olean public water supply line into the Towns of Olean and Portville. The contaminated groundwater is pumped from two municipal wells. The treated groundwater is pumped into the City and Town of Olean public water supply system.

The second operable unit will address remediation of contaminant sources of VOCs in the soil and the groundwater. Contaminated groundwater is the principal threat posed by the Site.

SITE BACKGROUND

The Olean Well Field is located in the eastern portion of the City of Olean and east and south of the City in the Towns of Olean and Portville in Cattaraugus County, New York. The Site is roughly rectangular in shape and encompasses approximately 800 acres (see Figure 1). The Site is approximately 65 miles southeast of Buffalo, New York and 7 miles north of the New York/Pennsylvania border. State Routes 16 and 417 provide access to the area.

Three municipal water supply wells (18M, 37M and 38M) were constructed in the mid-to late 1970s to provide water for the City of Olean, New York. The supply wells draw water from the lower aquifer also known as the City Aquifer. Prior to the construction of these municipal wells, city water was supplied by a surface-water treatment facility, which draws water from the Olean Creek. In January 1981, trichloroethane (TCE) and other chlorinated organic solvents were detected in the Olean water supply. The municipal wells were shut down at this time as TCE levels exceeded acceptable drinking water standards set by the New York State Department of Health (NYSDOH). Surface-water treatment facility operations were reactivated.

On October 23, 1981, the EPA Region II Field Investigator Team ("FIT") evaluated the Site for inclusion of the Nations Priorities List. As a result of this evaluation, the Site was included in the National Interim Priorities List, published on October 23, 1981, and was included on the first official Superfund National Priorities List ("NPL"), published on September 9, 1983. In November 1981, an EPA consultant initiated a preliminary hydrogeologic investigation at the Site (also referred to as the "Remedial Action Master Plan" or "RAMP"). This investigation, completed in October 1982, included, among other things, the installation of monitoring wells and sampling of those wells, and an aquifer pump test utilizing municipal wells 18M and 37M.

Following the discovery by the Cattaraugus County Department of Health and the NYSDOH that a number of private wells in the City and Town of Olean, all of which received groundwater from the upper aquifer, were also contaminated with TCE, EPA performed an initial removal action in January 1982. This action involved the installation of carbon adsorption filters on 16 contaminated private wells in the City and Town of Olean and periodic monitoring of those wells. EPA ultimately conducted two additional removal actions at the Site. The first of these commenced in June 1984 and included the replacement of one of the carbon filters installed for the initial removal action, installation of carbon units on ten additional contaminated private wells, and monitoring. The second additional removal action was implemented in March 1985 and involved the installation of two additional carbon filter systems.

EPA conducted additional studies including a 1983 FIT study, which involved installation of two wells up-gradient of the McGraw-Edison facility, a potentially responsible party (PRP) for the Site, and a 1985 FIT study including an aquifer pump test and further sampling at the municipal wells.

A Remedial Investigation/Feasibility Study ("RI/FS") was performed in 1984-85 by a contractor to the New York State Department of Environmental Conservation ("NYSDEC"). During the course of the RI/FS, it became apparent that a plume of TCE was threatening a number of private wells in the City and Town of Olean before a permanent remedy for the Site could be implemented. A focused feasibility study was performed and an Initial Remedial Measure ("IRM") was conducted which included regular monitoring of private wells and installation of carbon adsorption units, as necessary, until the permanent remedy was in place.

In 1983-84, pursuant to an administrative order issued by EPA, McGraw Edison performed an investigation at its facility. This and subsequent investigations performed by the PRP revealed that soil and ground water in both aquifers at the facility were contaminated with TCE, 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethylene, 1,1-dichloroethane, trans-1,2-dichloroethane, tetrachloroethane (PCE) and methylene chloride. The studies further indicated that a pathway exists for migration of contaminants away from the McGraw Edison facility and toward the contaminated municipal wells.

AVX, another PRP at the Site, performed an investigation of its facility in 1984-85 pursuant to an administrative order issued by EPA. This investigation indicated that soils and groundwater in the upper, and lower aquifers were contaminated with TCE, 1,1,1-TCA, tetrachloroethylene and other VOCs. Data collected by AVX during this and subsequent investigations demonstrated that contamination is traveling downward from the surficial soils at the AVX facility through the till and then entering the lower aquifer.

Alcas Cutlery, another PRP, conducted an investigation at its facility pursuant to an administrative order issued by EPA in 1984. The investigation found that soil at the Alcas facility was contaminated with VOCs. Upper and lower aquifer ground water was also determined to be contaminated with TCE and trans-1,2-dichloroethylene. Subsequent EPA analyses showed elevated TCE concentrations of up to 12 parts per million ("ppm") in monitoring well B-2, which is screened in the lower aquifer at the facility and located approximately 100 yards away from municipal well 18M.

EPA issued a Record of Decision (ROD) on September 24, 1985, which required the following: 1) installation of one air stripper to treat the groundwater from municipal well M18, which is located on the north side of the Allegheny River, and a second air stripper to treat the groundwater from municipal wells M37 and M38, which are located south of the River (Because wells M37 and M38 are located next to one another, only one air stripper was needed.); 2) extension of the City of Olean public water supply line into the Town of Olean to connect approximately 93 residences served by private wells, including the private well users who received carbon filter installations pursuant to the EPA Removal Actions conducted in 1982, 1984 and 1985; 3) inspection of an industrial sewer at McGraw-Edison and performance of any necessary repairs on the sewer; 4) recommendation of any institutional controls to restrict the withdrawal of contaminated groundwater; 5) institution of a Site Monitoring Plan; and, 6) initiation of a supplemental RI/FS to evaluate source control measures at facilities that are contributing to the groundwater contamination.

On February 7, 1986, EPA issued a Unilateral Administrative Order, Index Number II CERCLA-60201, under Section 106(a) of CERCLA, 42 U.S.C. §9606, (the "106 Order") to AVX Corp., Alcas Cutlery Corp., McGraw Edison Co., Cooper Industries, Inc., Aluminum Company of America, and W.R. Case and Sons Cutlery Co. (the "PRPs"). The order required the PRPs to carry out the remedial actions selected in the ROD. All of the PRPs with the exception of W.R Case and Sons performed the actions pursuant to the 106 Order.

The extension of the City of Olean water line was completed in 1988. In 1989, the private well users were connected to the water line extension. Also in 1989, the industrial sewer at the McGraw Edison property was inspected and repaired. In February 1990, physical construction of the air strippers was completed and the municipal wells were put back on-line. Current pumping rates for Municipal wells M18, M37 and M38 are approximately 1.2 and 1.9 million gallons per day (MGD), respectively. Since the system began operating, treated water from the air strippers has met State and Federal drinking water standards.

On June 25, 1991, EPA issued an Administrative Order on Consent, Index Number II CERCLA-10202 (the "SRI/FS Order") to the Alcas, AVX, McGraw Edison and Cooper Industries PRPs which required that a supplemental RI/FS be undertaken at the Site. A portion of the supplemental RI/FS was performed by EPA.

In 1994, EPA oversaw the completion of a removal action at the Olean Steel property (see figure 1). Olean Steel, which was one the properties investigated as part of the supplemental RI, is a scrap metal recycling operation. EPA ordered the owner of the property to remove approximately 500 pales and drums and 120 cubic yards of contaminated debris and soil from the property. The debris and soil was contaminated with phenol, chromium, lead, bis(2-ethylhexyl)phthalate, copper and zinc. Also in 1984, a groundwater sample was collected from an upper aquifer well by EPA as a follow up to the Removal action. Analysis of the sample revealed arochlor-1254, a polychlorinated biphenyl compound, at a concentration of 5.4 ppb. EPA is, therefore, referring this matter to the NYSDEC for further action.

GEOGRAPHY

Olean is located in the Allegheny River Valley near the border of the maturely dissected northwestern Appalachian plateau. The Allegheny River, a principal tributary of the Ohio River, flows west-northwest through the southern portion of the Site. Olean and Haskell Creeks, tributaries of the Allegheny, are located to the west and east of the Site, respectively. Surface runoff, direct precipitation, and groundwater sustain the annual flow in these river/stream systems.

Site Geology and Hydrogeology

The Olean Well Field is underlaid by approximately 300 feet of unconsolidated sediments. Previous groundwater investigations in the Olean Well Field have shown that the upper 100 feet of sediment can be divided into five lithologic units based on color, texture, grain size, and mode of deposition. These lithologic units have been grouped into four hydrogeologic units referred to as the upper aquifer, upper aquitard, lower aquifer, and lower aquitard.

The upper aquifer is comprised of glaciofluvial coarse sands and sandy gravels, and recent fluvial deposits of fine sands and silts with some clay. The upper aquifer is not continuous across the Olean Well Field. The thickest portion of the aquifer (approximately 41 feet) is found along the Allegheny River. The aquifer thins to the north, pinching out south of the AVX facility.

The upper aquitard is located above the lower aquifer. This units is a low permeability lodgment till composed of greater than 50 percent silt and clay. The thickness of the upper aquitard in the study area ranges from as little as 6 feet in the south to over 30 feet in the north. In the northern portion of the Olean Well Field, this unit is present at the surface and consists of surficial till.

The lower aquifer, also referred to as the City Aquifer, consists of glacial outwash deposits of sand, silt, and gravel. The lower aquifer is approximately 70 feet thick in the northern portion of the Olean Well Field and thins to approximately 30 feet south of the Allegheny River. The lower aquifer is the main source of water for the City and Town of Olean. In addition, several industrial facilities (Olean Steel, McGraw-Edison, and AVX) utilize wells completed in the lower aquifer for process water.

The lower aquitard has been described as silt, clay, and fine to very fine sand deposited in a preglacial environment.

The upper aquifer is recharged by the infiltration of precipitation. Recharge to the lower aquifer is via leakage from the upper aquifer (or till where the upper aquifer is not present) through the upper aquitard. The magnitude of leakage over the study area is variable and is dependent on the thickness and permeability of the till (upper aquitard) and relative head differences between the upper aquifer (or till) and lower aquifer.

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY

Pursuant to the June 25, 1991, SRI/FS Order, EPA and five PRPs for the Site collected soil gas, soil and groundwater samples at 13 properties to determine if the properties are sources of contamination to the Olean Well Field Site. The PRPs were responsible for sampling the AVX, Alcas and McGraw-Edison properties. Ebasco, under contract to EPA, sampled 10 other properties, which are located throughout the Site. These properties included: Olean Steel; Olean Wholesale; the immediate vicinity of Fay Avenue and Shaefer Street; a Private Dump located at the end of Butler and Andrews Avenues; the "Borrow Pit," a common disposal area, located along Riverside Drive; Sandburg Oil; Mastel Ford; Griffith Oil; Loohns Cleaners and Launderers, Inc; and Olean Tile. Figure 1 shows the locations of the 13 properties investigated.

With the exception of Olean Steel, soil gas surveys were conducted on 100- by- 100 foot grid spacings across each property during September and October 1991. A grid could not be established at the Olean Steel property due to the presence of large amounts of scrap metal on the property. Two additional soil gas surveys were conducted in February 1993 and February 1995 at finer grid spacing of 25 feet. The results of the surveys assisted in locating the soil borings at each property. Soil samples were collected from each boring.

Each soil boring extended down to the water table to determine the vertical extent of contamination. In 1991, forty-six soil borings were located and drilled at the suspected source areas using the results of the soil gas surveys. In February 1993 and February 1995, a total of 25 additional soil borings were drilled to better determine the extent of contamination at the suspected source areas.

Sediment samples were taken at three locations in a wetlands area being the AVX facility. The samples were taken to determine the potential impact of the AVX property on the wetlands area.

Eight groundwater monitoring wells were installed to collect data on the extent of groundwater contamination in the upper and lower aquifers and to determine the impact of the source areas on the groundwater. The wells consisted of four upper and four lower aquifer wells. The upper aquifer wells were installed at Olean Wholesale, Olean Steel, McGraw-Edison, and the Loohns Dry Cleaners properties. The lower aquifer wells were installed at Olean Wholesale, Olean Steel, Loohns and Sandburg Oil.

Groundwater samples were collected from eight newly installed groundwater monitoring wells (4 upper aquifer and 4 lower aquifer wells) and from 24 existing wells (13 upper aquifer, 11 lower aquifer wells), which were installed during previous studies of the Site. In addition, groundwater grab samples were collected from the 25 soil borings, which were drilled at the properties being investigated, in 1993 and 1995.

A 72-hour pump test was conducted on the upper aquifer at McGraw-Edison in 1991. The results of the test assisted in determining the feasibility of pumping contaminated groundwater from the aquifer for treatment.

Finally, pilot tests were performed to determine whether vacuum enhanced recovery (VER) or soil vapor extraction with air sparging (SVE/AS) would be an effective means of in-situ treatment of VOCs contaminated soils at the AVX and Alcas properties. SVE/AS and VER are two treatment technologies possible under remedial Alternative 4 for the Site. See section below entitled "Summary of Remedial Alternative" for a description of the two technologies.

A summary of the soil, sediment and groundwater samples, which were collected during the SRI follows:

AVX

Soil gas, soil and groundwater samples were collected from the AVX property in 1991 and 1993.

VOCs were detected at significant concentrations in the southern portion of the property at soil boring SB06 (see Figure 1). Analysis of soil samples revealed 1,1,1-TCA (1,300,000 ppb), TCE (500,000 ppb); PCE (270,000 ppb), xylene (73,000 ppb) and cis-1,2 dichloroethane 1,2 DCE (45,000 ppb). Lower levels of PCE (610 ppb) and TCE (53 ppb) were detected in a sample from SB05.

Soil samples were collected from four other borings at the facility. VOCS contaminants were either not detected in samples from these borings or were detected at levels, which were below the Remedial Action Objectives (RAOs) for the Site. See the section on RAOs below.

Analysis of a groundwater grab sample taken from the bottom of SB06 revealed TCE (110,000 ppb); 1,1,1-TCA (360,000 ppb); 1,2-DCE (73,000 ppb); PCE (14,000 ppb); toluene (21,000 ppb); 1,1-DCE (16,000 ppb); 1,1-DCA (26,000 ppb), acetone (180,000 ppb); and xylene (3,900 ppb). Each compound exceeded a state or federal Maximum Contaminant Level (MCL) value (see Table 1 below).

The soil and groundwater sample result confirmed AVX as a source of VOCS contamination to the Olean Well Field Superfund Site groundwater.

ALCAS

Soil gas, soil and groundwater samples were collected from the Alcas property in 1991 and 1993.

Significant levels of VOCs were detected in the southern portion of the facility in soil samples from boring SB07 (see Figure 1). The following VOCs were detected: TCE (12,000 ppb) and PCE (200 ppb). 1,2-DCE (1,000 ppb), TCE (690 ppb) and vinyl chloride (100 ppb) were detected in a sample from SB04.

Soil samples were collected from five other borings at the facility. VOCS contaminants were either not detected in samples from these borings or were detected at levels, which were below the RAOs for the Site.

Analysis of a groundwater grab samples taken from the bottom of boring SB07 showed TCE (8,800 ppb); 1,1,1-TCA (500 ppb); 1,2-DCE (640 ppb); and vinyl chloride (25 ppb). Each compound exceeded a state or federal MCL value (see Table 1 below).

Chromium, copper and manganese were detected in the soil from boring SB05 at 944 ppm, 93.6 ppm, and 4,680 ppm, respectively. SB05 was located in the southern part of the facility.

The soil and groundwater sample results confirmed Alcas as a source of VOCS contamination to the Olean Well Field Superfund Site groundwater.

McGRAW-EDISON

Soil gas, soil and groundwater samples were collected at the McGraw-Edison property in 1991 and 1993.

Soil samples were collected from nine borings at the facility. VOCs were either not detected in soil samples from these borings or were detected at low levels, which were below the RAOs for the Site.

TCE was detected at 860 ppb in a saturated (below the water-table) soil sample, which was collected from 24 to 26 feet below the ground surface. The sample was collected during the installation of the upper aquifer well EW-3, which is located in the southeastern part of the property.

Analysis of the groundwater from EW-3 showed 2,100 ppb of TCE. A groundwater grab sample from boring SB08 revealed TCE and 1,2-DCE at 400 ppb and 51 ppb, respectively. Each compound exceeded a state or federal MCL value (see Table 1 below).

Groundwater samples were also collected in December 1991 from upper aquifer monitoring wells A-1, C-1, and EW-3. TCE was detected in samples from A-1, C-1, and EW-3 at concentrations of 40 ppb, 50 ppb, and 2,400 ppb, respectively.

The saturated soil and groundwater sample results confirmed McGraw-Edison as a source of VOCS contamination to Olean Well Field Superfund Site groundwater.

LOOHNS CLEANERS AND LAUNDERERS

Soil gas, soil and groundwater samples were collected from the Loohns property in 1991 and 1995.

Significant concentrations of VOCs were detected in the soil from borings SB09,SB12, SB47 and SB48. All four borings were located in the southern portion of the facility. The soil sampled from SB09 showed TCE (24,000 ppb), 1,2-DCE (59,000 ppb), PCE (91,000 ppb) and 2-butanone (5,400 ppb). Soil samples from SB12 revealed PCE (38,000 ppb) and TCE (18,000 ppb). Samples from SB47 revealed TCE (4,300 ppb), PCE (370,000 ppb), 2-butanone (200,000 ppb) and TCE (400, 000 ppb). Finally, a soil sample from SB48 showed 1,2-DCE (2,000 ppb), TCE (510 ppb) and PCE (18,000 ppb).

Soil samples were collected from two other borings at the facility. VOCS contaminants were either not detected in samples from these borings or were detected at levels which were below the RAOs for the Site.

In January 1995, grab samples of groundwater from borings SB47 and SB48 revealed TCE (29 ppb) in the grab from SB48 and cis-1,2-DCE (23 ppb) in the grab sample from SB47.

Two groundwater monitoring wells were also installed at soil borings SB47 and SB48. A lower aquifer well was installed at SB47 and an upper aquifer well was installed at SB48. Cis-1,2 DCE, TCE and PCE were detected at 6.3 ppb, 88 ppb and 1,800 ppb, respectively, in groundwater from the upper aquifer well. Each compound exceeded a state or federal MCL value (see Table 1 below).

The soil and groundwater sample results confirmed Loohns as a source of VOCS contamination to the Olean Well Field Superfund Site groundwater.

OLEAN STEEL

Soil gas, soil and groundwater samples were collected at Olean Steel in 1991, 1993, and 1995.

In 1991, four soil borings and two monitoring wells (MW03 and MW04) were drilled and sampled at the locations shown in Figures 1 and 2. VOCs were were not detected above RAOs concentrations for soil.

In 1993, two additional soil borings were drilled at the locations shown on Figure 1. Low concentrations of VOCs were detected.

Groundwater samples were collected in December 1991 from upper aquifer monitoring well MW04 and lower aquifer monitoring well MW03. Analysis of groundwater samples from these wells did not reveal VOCs above the groundwater RAOs for the Site.

In February 1995, one additional boring (SB44) was drilled down to the top of the upper aquifer. VOCs were were not detected above RAO concentrations for soil.

VOCS contaminants were either not detected in the soil and groundwater samples from the property or were detected at levels which were below the RAOs for the site. The soil and groundwater sample results indicate that Olean Steel is not a source of contamination to the Olean Well Field Superfund Site groundwater.

MASTEL FORD

Soil gas, soil and groundwater sample were collected at Mastel Ford in 1991, 1993 and 1995.

In 1991, three soil borings were drilled at the locations shown on Figure 1. Minimal concentrations of VOCs were detected.

In 1993, two additional soil borings were drilled at the Mastel Ford facility. Minimal concentrations of

VOCs were detected.

In February 1995, a sixth soil boring (SB45) was drilled down to the top of the upper aquifer. No significant contamination was found.

Two groundwater grab samples were collected in 1993 from soil borings SB31 and SB32 and one grab sample was collected in January 1995 from SB45. VOCs were not detected in the sample from SB31. Minimal levels of VOCs were detected in the grab samples from SB32 and SB45.

VOCS contaminants were either not detected in the soil and groundwater samples from the property or were detected at levels which were below the RAOs for the site. The soil and groundwater samples results indicate that Mastel Ford is not a source of contamination to the Olean Well Field Superfund Site groundwater.

SANDBURG OIL

Soil gas, soil and groundwater samples were collected at the Sandburg Oil property in 1991, 1993 and 1995.

In 1991, one soil boring (SB23) was drilled. Analysis of soil from the boring showed benzene (9 ppb) and xylene (4,500 ppb). These VOCs are associated with petroleum and petroleum product derivatives.

In February 1995, a third soil boring (SB46) was advanced down to the top of the upper aquifer. A groundwater grab sample collected from the boring revealed: ethylbenzene (540 ppb), xylene (157 ppb), naphthalene (110 ppb) and 2-methylnaphthalene (54 ppb). Again, these VOCs are associated with petroleum and petroleum product derivatives.

A lower aquifer monitoring well was installed in the borehole for SB46. Methylene chloride was the only VOCS detected (15 ppb) in the groundwater, which exceeded state and federal MCLs. However, the pressure of the compound in the groundwater was not attributed to Sandburg Oil, since it was not detected in the soil at concentrations above the RAOs for the Site.

The soil and groundwater sample results confirmed Sandburg Oil as a source of petroleum related contaminated to the Olean Well Field Superfund Site groundwater.

GRIFFITH OIL

Soil gas, soil and groundwater samples were collected at Griffith Oil in 1991, 1993 and 1995.

During 1991, three soil borings were drilled and sampled at the locations shown on Figure 1. SVOCs were detected from samples from soil boring SB24: 20-methyl naphthalene (7,600 ppd) and; phenanthrene (1,100 ppb).

Two groundwater grab samples were collected at soil borings SB41 and SB42 during 1993. Minimal concentrations of VOCs were detected.

In January 1995, soil boring SB49 was drilled down to the top of the upper aquifer. The location of SB-49 is shown in figure GI-6 of the SRI/FS report. Analysis of the soil revealed benzene (650 ppb), toluene (5,900 ppb) and xylene (23,000 ppb).

Analysis of groundwater from an upper aquifer well DW6R-01, located on the Griffith Oil property, revealed six VOCs: methyl chloride (14 ppb), 1,1-DCA (6.1 ppb), cis-1,2-DCE (79 ppb), TCE (78 ppb), benzene (220 ppb) and ethyl benzene (5.7 ppb).

Although non-petroleum VOCS contaminants were also detected (1,1-DCE, cis-1,2-DCE and TCE), they were not attributed to Griffith Oil, since the VOCs, which were detected in the soil, were below the soil RAOs for the Site and therefore could not be a source of the VOCS contamination.

The soil and groundwater sample results confirmed Griffith Oil as a source of petroleum related contamination to the Olean Well Field Superfund Site groundwater.

The NYSDEC is currently overseeing a spill response clean-up of fuel oil and gasoline spills at the Griffith Oil facility.

FAY AVENUE/SCHAEFER STREET

Soil gas, soil and groundwater samples were collected in the immediate vicinity of Fay Avenue and Schaefer Street in 1991 and 1993, in order to determine whether past alleged dumping activities may be a source of contamination to the groundwater.

In 1991 and 1993, three soil borings were drilled and sampled at the locations shown on Figure 1. VOCs were detected at minimal levels.

One groundwater grab sample was collected at soil boring SB40 during the 1993. Cis-1,2-DCE was detected at 2 ppb.

The soil and groundwater sample results indicate that the Fay Avenue/Shaefer area is not a source of contamination to the Olean Well Field Superfund Site groundwater. Although non-petroleum VOC contaminants were also detected (1,1-DCE, cis-1,2-DCE and TCE), they were not attributed to Griffith Oil, since the VOCs, which were detected in the soil, were below the soil RAOs for the Site and therefore could not be a source of the VOCS contamination. VOCS contaminants were either not detected in the soil and groundwater samples from the property or were detected at levels which were below the RAOs for the Site.

OLEAN TILE

Soil gas, soil and groundwater samples were collected at the Olean Tile property in 1991 and 1993.

In 1991, four soil borings were drilled at the locations shown on Figure 1. VOCs were not detected with one exception - acetone was detected (26 ppb) in sample SB13-0002. SVOCs were not detected.

In 1993, three additional soil borings were drilled at the locations shown on Figure 1. The following VOCs were detected in soil samples from boring SB34: toluene (28,000 ppb); xylene (10 ppb) and 2-butanone (14 ppb).

Two groundwater grab samples were collected at soil borings SB35 and SB36 during the 1993 soil boring program. VOCs were not detected in the samples.

Despite the significant concentration of toluene detected at SB34, EPA does not believe toluene is a source of contamination to the groundwater. The compound was detected from 4 to 10 feet below the surface. No organic contaminants were detected from 11 feet to 42 feet. The boring terminated at a depth of 42 feet with no observable quantity of groundwater. Therefore, EPA believes that the toluene contaminations is isolated and should not impact the groundwater.

In February 1995, a surface water sample was collected from the Allegheny River to determine if the Olean Tile property was contaminating the River. Analysis of the water sample, however, did not indicate the presence of VOCs, especially toluene.

The soil and groundwater and surface water sample results indicate that Olean Tile is not a source of contamination to the Olean Well Field Superfund Site groundwater or the Allegheny River.

OLEAN WHOLESALE

Soil gas, soil and groundwater samples were collected from the Olean Wholesale property in 1991 and 1993.

In 1991, four soil borings were sampled at the locations shown on Figure 1. Minimal concentrations of VOCs were detected.

In 1993, soil samples were collected from one additional soil boring. No VOCs were detected.

Groundwater samples were collected in December 1991 from upper aquifer monitoring well MW02 and lower aquifer monitoring well MW01. VOCs were not detected in the samples from either well.

One groundwater grab sample was collected at soil boring SB43 in 1993. TCE was detected at 7 ppb.

The soil and groundwater results indicate that Olean Wholesale is not a source of contamination to the Olean Well Field Superfund Site groundwater. VOCS contaminants were either not detected in soil samples from the property or were detected at levels which were below the RAOs for the Site.

PRIVATE DUMP

Soil gas soil samples were collected from the Private Dump in 1991, in order to determine whether past alleged uncontrolled dumping activities may be a source of contamination to the groundwater.

In 1991, two soil borings (SB25 and SB26) were drilled and sampled at the locations shown on Figure 1. Three sediment samples (SD01, SD02, and SD03) were also collected. VOCs were not detected in the soil with one exception - toluene (6 ppb) and 2-butanone (60 ppb) were detected at boring SB26. PCE was detected in the sediment at 10 ppb.

No soil samples were collected in 1993.

The soil sample results indicate that the Private Dump is not a source of contamination to the Olean Well Field Superfund Site groundwater.

BORROW PIT.

Soil gas, soil and sediment samples were collected from the Borrow Pit in 1991 and 199, in order to determine whether past alleged uncontrolled dumping activities may be a source of contamination to the groundwater.

In 1991, one soil boring (SB28) was sampled at the location shown in Figure 1. VOCs were not detected.

Three sediment samples (SD4, SD5 and SD6) were also collected (see Figure 1) in 1991. Minimal levels of VOCs were detected.

In 1993, one additional soil boring (SB39) was drilled at the location shown on Figure 1. VOCs were not detected with one exception - methylene chloride (12 ppb).

One groundwater grab sample was collected from soil boring SB39 in 1993. TCE was detected 13 ppb.

The soil and groundwater sample results indicated that the Borrow Pit is not a source of contamination to the Olean Well Field Superfund Site groundwater VOCS contaminants were either not detected in the soil samples from the property or were detected at level which were below the RAOs for the Site.

BACKGROUND SOIL SAMPLES

In 1991, two soil borings (SB29 and SB30) were drilled and sampled off-Site at the intersection of King and Seneca Streets, in the City of Olean. The samples were collected as background samples to establish a baseline upon which the Site data could be compared. The borings were located off the northwest corner of Figure 1. PCE and methylene chloride were detected a 8 ppb and 10 ppb, respectively, in a soil sample from boring SB29. No Semi-VOCs were detected. Also, inorganic analysis of the samples indicated metal concentrations which were within background concentrations of metals for the soils in the eastern United States.

No background samples were collected 1993 or 1995.

SITE-WIDE GROUNDWATER SAMPLES

Groundwater samples were also collected from twenty-four existing monitoring wells on Site in December 1991, November 1994 and March 1995. The wells included: A-1, C-1, CW-1B, CW-3B, CW-4, CW-4A, CW-5, CW-5A, CW-7A, CW-9A, CW-10, CW-10A, CW-12, CW-12A, CW-13, CW-13A, CW-15A, CW-18, CW-18A, well located at S&S Car Cleaners, DW6R-01, Aleas D-2, AVX-5D and MEC-A-2. See Figure 2 for the well locations.

Maximum concentrations of VOCs detected between 1989 and 1995 in samples from several of the existing wells were as follows: C1-TCE 40 ppb: CW-7A-TCE 590 ppb, 1,1,1-TCA 7 ppb; CW-9A-TCE 400 ppb; CW-10-340 ppb; CW-13A-methylene chloride 28 ppb; CW-18A-TCE 1400 ppb, 1,1,1-TCA - 15 ppb, cis-1,2-DCE 41 ppb, PCE 3,1 ppb; a well located at S&S Car Cleaners - TCE 39 ppb; AVX-5D - TCE 2,000 ppb, cis-1,2-DCE 15,000 1,1,1-TCA 7,200; Alcas-D2 - TCE 6,500 ppb, MEC-A2 - TCE 170 ppb.

Bis 92-Ethylhexyl) phthalate, an SVOC, was detected in CW-5 (190 ppb) and CW-12 (560 ppb).

Four metals exceeded state and federal MCLs from samples from the existing monitoring wells. Chromium was detected in CW-12 (22,500 ppb) and CW-12A (1,720 ppb). Iron was detected CW-12 (143,000 ppb) and CW-12A (23,400 ppb). Lead was detected in CW-5 (23.5 ppb) and CW-13A (84.6 ppb). Manganese was detected in CW-12 (8,560 ppb) and CW-12A (5,950 ppb). However, analysis of the groundwater, before it is treated at municipal wells M18 and M37, M38, has not revealed chromium or any other inorganic contaminants. Because of the proximity of the monitoring wells to well M18 and the high concentration of chromium detected (the MCL is 50 ppb), EPA intends to add chromium to the list of contaminants which are analyzed for as part of the Site Monitoring Plan. The monitoring plan was required EPA, as part of the remedial action for the first operable unit to monitor the effectiveness of the air strippers, which were installed to treat the groundwater from the municipal wells and will be updated as part of the second operable unit.

UPPER AQUIFER PUMP TEST

A 72-hour constant rate pumping test was performed on well EW-3 in January 1992 at the McGraw-Edison facility to determine the transmissivity and storativity of the upper aquifer in the Olean Well field. These hydraulic properties of the aquifer were obtained to order to determine the amount of contaminated groundwater which could be pumped and treated in order to restore the aquifer.

DIRECTION OF GROUNDWATER FLOW

Groundwater water level measurements were collected in selected upper aquifer and lower aquifer monitoring wells located throughout the Site on February 13, 1992, February 27, 1992, and March 26, 1992.

Water-level measurements were also collected from existing monitoring wells in the vicinity of Haskell Creek. Though several of these wells are beyond the limits of Figure 2, the water-level elevation data from these wells were evaluated in the preparation of potentiometric surface maps, which are included in the SRI report.

The potentiometric surface map for the upper aquifer indicates that lines of equal elevation for the upper aquifer generally parallel the Allegheny River. This indicates that groundwater flow is towards the river from both sides of the river valley. In general, the horizontal component of groundwater flow is consistent with the flow pattern for the upper aquifer described in the FI/FS conducted in 1984.

Groundwater in the lower, or City Aquifer, flows from east to west. Flow conditions in the lower aquifer have been altered since the 1985 RI in the during the RI, the municipal wells were inactive and the AVX production well was pumping at approximately 200 gpm. Since 1990, the three municipal wells have been pumping at a combined rate of 2,150 gpm and the AVX production well has been decreased to approximately 50 gpm due to decreased demand. The principal difference between the groundwater flow regime at the time of the 1985 RI report and the March 1992 SRI potentiometric maps, is the increased hydraulic gradient in the study area which resulted from the pumping stress imposed by the now active municipal wells. A figure identifying the capture zones is included in the SFS report.

CULTURE RESOURCE ASSESSMENT

In April 1992, an EPA contractor conducted a Stage 1A Cultural Resources Survey (CRS) of the Site which entailed a review of the historic maps and archival records on file at the New York State Office of Parks and Recreation, Historic Division; the Cattaraugus County Historical Society; and the Assessor's and Engineer's Office of the City of Olean. The contractor also reviewed previous cultural resource surveys of the region and conducted on-Site reconnaissance. A copy of the CRS report can be found in the public repositories, which are listed on page 2.

After review of the CRS report and pursuant to the National Historic Preservation Act, EPA has decided that additional cultural investigations should be completed at the Alcas Cutlery and Loohns Cleaners and and Launderers source areas. EPA believes that these areas may have cultural resource artifacts, which may be potentially disturbed by a selected remedial alternative. As such, a Stage 1 B, Cultural Resources Survery (CRS) will be completed during the remedial design phase of the selected alternative. The Stage 1B will assess whether additional investigative field work is necessary. Any additional work will be completed during remedial design.

SUMMARY OF SITE RISKS

Based upon the results of the SRI, a baseline risk assessment was conducted to estimate the risks associated with current and future Site conditions. A baseline risk assessment was conducted to determine whether soil and groundwater remediation were necessary in order to reduce unacceptable risks to human and ecological receptors.

HUMAN HEALTH RISK ASSESSMENT

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: Hazard Indentification-identifies the contaminants of concern at the site 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 baseline risk assessment began with selecting contaminants of concern which would be representative of Site risks. These contaminants included trichloroethene, 1,1-dichloroethane, 1,1-dichloroethane, 1,2-dichloroethane, tetrachloroethane, benzene and vinyl chloride. Several of the contaminants, including trichloroethene, tetrachloroethene, 1,1-dichloroethene, and 1,2-dichloroethane are known to cause cancer in laboratory animals and are suspected to be human carcinogens. Vinyl chloride and benzene are known human carcinogens.

The baseline risk assessment evaluated the health effects which could result from exposure to contamination as a result of ingestion, dermal contact and inhalation of untreated groundwater and soil contaminants. Groundwater exposure was assessed using present and future residential land use scenarios. Groundwater was also assumed to be the sole source of water. Risks were calculated for groundwater by way of ingestion, dermal contact and inhalation of volatilized contaminants during showering. Risks due to contaminants in the surface and subsurface soil were calculated for exposure as a result of ingestion or inhalation of contaminants by construction workers. A residential exposure scenario was not calculated because all of the properties are either industrial or commercial and are zone for industrial uses only.

Risks due to dermal contact with soil contaminants were assessed for the Site, but could not be calculated because dermal contact risks can only be calculated for soil which contains polychlorinated biphenyls (PCBs), dioxins or cadmium. No PCBs or dioxins were found at the Site. Cadmium was found at 5 of the 13 properties investigated. However, of the five properties, the highest concentration of cadmium detected was just above 4 ppm, which does not present an unacceptable risk.

Current federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk in the range of 10-4 to 10-6 (e.g., a one-in-tn-thousand to a one-in-a-million excess cancer risk) and a maximum health Hazard Index (which reflects noncarcinogenic effects for human receptor) equal to 1.0 (A Hazard Index (HI) greater 1.0 indicates a potential for noncarcinogenic health effects.)

The results of the baseline risk assessment indicate that untreated groundwater at the Site poses an unacceptable risk to human health. Cancer risks due to ingestion of groundwater were determined to be approximately one-in-hundred (1x 10-2) for adults and young children and six-in-one-thousand (6x10-3) for older children. Noncarcinogenic HIs for these exposure groups were 3.4 for adults, 14.7 for young children and 6.7 for older children. The aforementioned cancer and non-cancer risks are referenced in Table C-5, C-6 and C-7 of the Risk Assessment. These tables include the cancer and noncancer effects of TCE and PCE. Also, these tables did not include the potential health effects of acetone, since the presence of the compound in the sample data was attributed to laboratory contamination. Acetone is not considered a Site contaminant.

Cancer risks due to dermal contact with groundwater contaminants were determined to be approximately tow-in-one-thousand (2x10-3) for adults, nine-in-ten-thousand (9x10-1) for young children and seven-in-ten-thousand (7x10-4) for older children. The HI for each group was less than one.

Cancer and non-cancer risks due to inhalation of contaminants from untreated groundwater during showering were within EPA's acceptable risk range. Cancer risks for adults were determined to be approximately 6x10-5 for adults, 6x10-5 for young children and 3x10-5 for older children. The HI for each group was less than one.

Risks were also calculated for ingestion and inhalation of surface and subsurface soil contaminants by construction workers. The risks were calculated for a two year exposure period.

Cancer risks were found to be acceptable for each of the thirteen properties investigated. Noncancer risks were also found to be acceptable at twelve of the thirteen properties with the exception of McGraw-Edison. A minimum noncancer risk (HI of 1.14) due to soil ingestion was calculated for McGraw- Edison. The elevated risk is due mainly to arsenic.

Remedial Action Objective (see below) were used to determine the extent of groundwater and soil remediation at the identified source areas. Achieving these levels will reduce the risks associated with groundwater ingestion and dermal contact.

ECOLOGICAL RISK ASSESSMENT

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 know 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.

EPA conducted an assessment of a wetlands area, which is located to the south of the AVX facility. The assessment was conducted to determine if the wetlands are overlapped the area of contamination at the AVX facility. Sediment samples were taken to determine if AVX was impacting the wetlands area.

The wetlands area, which encompasses approximately 18.5 acres, is bordered to the north by Seneca Avenue, the south by a Conrail righ-of-way and AVX, the east by Dugan Road and the west by AVX. Three sediment samples were collected from the wetlands area south of the AVX property and north of the Conrail railroad tracts. Analysis of the samples did not reveal and VOCS contamination. Several Semi-VOCs were detected, but were attributed to the Conrail railroad tracks and were not determined to be affecting the groundwater.

The three other source (Alcas, McGraw Edison and Loohns) are developed properties with lawns, planting, and one or more buildings with asphalt entry ways and parking areas.

No other studies were conducted to assess other ecological risks since the Site is located in an urban commercial/industrialized area. There are no significant habitats present at the Site which could potentially support indigenous wildlife receptor species. The Site may however provide a habitat for various non-native species which have adapted to highly urbanized area (e.g., rats, starlings and regions).

Actual or threatened releases of hazardous substances from this Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare or 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 (ARASs), To Be Considered (TBC) guidance values, and risk-based levels established by the risk assessment.

Remedial action objectives for the Site were developed for two contaminated media - groundwater and soil. Both sets of objectives are designed to restore the upper and lower aquifers to their beneficial use as a source of drinking water.

Groundwater objectives include: 1.) removal and/or control of the sources of contamination to the groundwater; and 2.) removal of sources of contamination already in the groundwater.

Soil objectives include the elimination of leaching of contaminants of concern from the soil at each of the source areas into the groundwater.

In order to determine which source areas require remediation, EPA compared contaminants in the groundwater and soil at all of the properties to various criteria. For soil, EPA used the NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) cleanup numbers, which represent concentrations of VOCs which will not leach from the soil and dissolve into the groundwater at levels which are above federal or state MCL concentrations. For groundwater, EPA used federal and state MCLs. Facilities with contamination concentrations which exceeded these criteria are targeted for remediation. These criteria will also be used as remediation cleanup goals. The criteria can be found in Table 1.

As a result of this analysis, EPA has determined that the AVX Alcas, Loohns Dry Cleaners and McGraw Edison properties are sources of contamination to the groundwater and therefore require remediation.

For the AVX and Loohns source areas, the remediation will be phased. First, a soil cleanup will take place, after which EPA will monitor the groundwater to determine if VOCS concentrations are decreasing at a rate sufficient to meet the goal of aquifer restoration in a reasonable amount of time. If necessary, EPA will install a groundwater pump and treat system at the two source areas to facilitate aquifer restoration.

Because of close proximity of the Alcas source area to municipal well M18, remediation of the contamination will only consist of a soil remediation phase. Groundwater remediation is not necessary since any groundwater which is contaminated by the property is captured and treated by an air stripper, which currently operating at the municipal well.

Remediation of the McGraw Edison facility will only consist of a groundwater phase, since the soil was not found to be contaminated. (The contamination in the saturated soil zone will be addressed by the groundwater cleanup.)

The Sandburg and Griffith Oil properties were also determined to be sources of groundwater contamination, although the contamination was found to be petroleum related. As such, CERCLA prohibits the use of Superfund Trust Fund monies to clean up or to oversee the clean up of petroleum contamination. EPA is therefore referring the contamination at these properties to the NYSDEC for action under the State's petroleum cleanup program.

Table 1

Contaminant	Soil Clean up Objective	Federal Ground water MCLs	New York State Ground-water Standards
Benzene	60 ppb	5 ppb	0.7 ppb
2-Butanone	300 ppb	-	50 ppb
Cis 1,2- Dicloro-ethene	300	70 ppb	5 ppb
Ethylbenzene	5,500 ppb	700 ppb	5 ppb
Tetrachloro-ethene	1,400 ppb	5 ppb	5 ppb
1,1,1-Trichloro-ethene	800 ppb	200 ppb	5 ppb
Trichloroethane	700 ppb	5 ppb	5 ppb
Toluene	1,500 ppb	1,000 ppb	5 ppb
Vinyl Chlorid	200 ppb	2 ppb	2 ppb
Xylene	1,200 ppb	10,000 ppb	5 ppb

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected Site remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resources recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principle element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The supplemental FS report evaluated in detail five remedial alternatives for addressing the source areas at the Olean Well Field Superfund Site. Each source area differed with regard to the extent of contamination, general physical characteristics and location within the Site boundaries. Because of these differences, EPA is not recommending a Site-wide remedial alternative, but a specific remedy for each source area.

Also, the time periods referenced below for construction of the remedial alternatives reflect only the times required to implement the various remedies and do not include the times required to negotiate with the responsible parties, to procure any contracts which are necessary for implementation or to design the remedy.

The five remedial alternative areas follow:

Alternative 1 - No Action

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison of other alternatives. No Action results in leaving the source area properties as they currently exist with no additional work to be performed. At present, groundwater recovery and treatment with air strippers on the municipal water supply wells and on a production well at the McGraw-Edison site are in operation. A quarterly Site Monitoring Program is also being carried out. These operations would continue and are considered part of the No Action alternative. Because this alternative would result in contaminants on-Site, CERCLA requires that the Site be reviewed every 5 years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

There are no capital or operation and maintenance costs associated with this alternative.

Construction Time: Since this is a no action alternative, no time would be required for construction.

Alternative 2 - Institutional Controls

This alternative includes education programs, such as public meetings and presentations, designed to increase public awareness about the hazards present in the identified source areas. In addition, deed restrictions or other legally enforceable restrictions would be instituted at the source areas to limit on-Site excavation, property use and installation of domestic or industrial groundwater wells for potable water purpose until soil and groundwater clean-up objective concentrations identified in Table 1 are achieved. Excavation restrictions would ensure that excavation in or near an identified soil source area is accompanied by implementation of a worker/local area health and safety plan and appropriate off-Site treatment and/or disposal of any contaminated excavated soils. Legal activities associated with instituting land use restrictions could include incorporating necessary language into Site property deeds. Access restrictions could include installation of a 6-foot high fence with lockable gates (to the extent such fencing is not already in place) around each source area. The integrity of the Site fencing would be maintained indefinitely. A health and safety plan would govern future access to, or work within, the identified source areas.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 2. Costs were developed by source area. Capital costs would include fencing and manpower to obtained land access use and deed restrictions and to educate the public on the level and extent of contamination at the Site. Operation and maintenance costs would include Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: This alternative could be implemented within 3 to 6 months.

Alternative 3 - Capping and Groundwater Treatment

This alternative would involve the following major elements:

- Capping of contaminated soil.
- Implementation of land use/access restrictions to maintain integrity of the cap.
- Monitoring programs at selected monitoring wells and at the Olean Well Field municipal wells.
- Implementation of groundwater treatment if capping does not sufficiently remediate the groundwater.
- Conducting a 5 year review of Site conditions.

Stage 1

Alternative 3 would require capping of impacted soils at the soil source areas with a clay and soil cap. This would reduce further migration of the contamination from he soil to the groundwater. Land use restrictions and groundwater monitoring, as described for Alternative 2, would also be implemented.

The soil source areas would be covered with a clay cap. The surface area capped would be approximately 9,800 square feet (approximately 0.25 areas) at Alcas, approximately 3,200 square feet (approximately 0.07 acres) at AVX and approximately 6,000 square feet (approximately 0.14 acres) at Loohns. Note that a cap would not be necessary at McGraw Edison, since no soil contamination was detected at the property.

Stage 2

After soil remediation is completed at Alcas, AVX and Loohns, EPA will assess the affect on the groundwater after waiting the time for three pore volumes of groundwater to travel from all three source area properties to the municipal wells. EPA has calculated that it will take four years for the three pore volumes of groundwater to pass, or flush through, from the source areas to the municipal wells. Therefore, the groundwater quality will be monitored. The effectiveness of the remediation will be evaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells 18M, 37M, a groundwater pump-and-treat system may be installed at either the AVX or the Loohns Dry Cleaners source areas. However, such treatment will not be necessary at the ALCAS source area due to the close proximity of the source area to municipal well 18M.

If groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluate the impact of a groundwater pump and treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially advers affect on the wetlands area.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 2. Costs were developed by source area. Capital costs were developed for the construction of a cap at each source area and construction of groundwater collection and treatment systems at the Loohns and AVX source areas. The capital cost for the Alcas source area does not include groundwater treatment, since contaminated groundwater from the source area will be captured and treated by the air stripper at municipal well M18. The capital cost for the Alcas source area only includes construction of the cap Operation and maintenance and present worth costs were developed for maintenance of a cap and groundwater treatment system for thirty years and Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Capping of the source area properties could be implemented within 1 year. Groundwater treatment, if determined to be necessary, could be implemented within 9 to 12 months after the decision is made.

Alternative 3A - Groundwater Treatment

This alternative would involve the following elements:

! Groundwater treatment of the source areas
! Implement land use/access restrictions (if necessary).

Under this alternative, a groundwater recovery system would be installed. Contaminants in the recovered groundwater would be removed by an air stripping system. The treated groundwater would be treated further, if necessary, with granulated activated carbon (GAC) and discharged to the City of Olean sewer system and ultimately to the Publicly Owned Treatment Plant. If necessary to meet New York state air emission limits, the off-gas from the air stripping system would be treated with vapor phase GAC.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 2. Operation and maintenance and present worth costs are for Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Groundwater treatment, if determined to be necessary, could be implemented at AVX or Loohns within 9 to 12 months. Groundwater treatment at McGraw Edison, could be implemented within 3 to 6 months, since an air stripper with sufficient excess capacity already exists on site. McGraw Edison installed the air stripper in the early 1980's treat groundwater for industrial use on-site.

Alternative 4 - Soil Vapor Extraction (SVE)/Vacuum Enhanced Recovery (VER) and Groundwater Treatment

This alternative consists of implementing the following:

! SVE/VER of contaminated soil.
! Monitoring programs at selected monitoring wells and at Olean Well Field Municipal wells.
! Implementation of groundwater treatment if SVE does not result in sufficiently lower contaminant concentrations in the groundwater.
! Access restrictions (if necessary).

Stage 1

Two different types of in-situ treatment systems were considered for treating VOCS contaminated soil: SVE with Air Sparging (SVE/AS) and Vacuum Enhanced Recovery (VER).

Evaluations of the Alcas and AVX properties determined that a SVE/AS treatment system would not be effective. However, pilot tests were conducted at the sources areas in 1994 and the tests confirmed that vacuum enhanced recovery (VER) could effectively desorb VOCs from the contaminated subsurface at both properties. Additional data needs to be collected for the Loohns property in order to determine whether SVE/AS or VER would be the nore effective means of soil treatment. EPA intends to collect this data during a pilot test, which would be conducted as part of a remedial design for the Loohns source area.

Descriptions of VER and SVE/AS are provided as follows:

A VER system uses negative air pressure which is applied to a series of recovery wells. The negative pressure, which is generated by a high vacuum pump, causes the movement of soil vapor and some groundwater towards the wells for recovery. The vapor recovery causes desorption (removal of contaminants which are adsorbed onto soil particles) and volatilization of VOCs by continuously removing contaminated vapors and forcing clean air into the contaminated areas. An off-gas treatment system will use granulated activated carbon (GAC) to remove contaminants which are above federal and New York State air emission levels. Any groundwater which is recovered with the soil vapor, would also be treated with GAC prior to discharge to the City sewer system.

An SVE/AS system would use a soil vapor recovery process, which is discussed above, combined with air injection wells which would extend below the water table. Air, which is injected under pressure into the wells, would enter water below the water table. The air bubbles, which are formed, traverse horizontally and vertically through the water column. Volatile compounds, which are exposed to the sparged air, volatilize into the gas phase and are carried into the vadose zone where they are captured by the vapor recover system. An off-gas treatment system will use granulated activated carbon (GAC) to remove contaminants which are above federal and New York State air emission levels. Any groundwater which is recovered with the soil vapor, would also be treated GAC prior to discharge to the City sewer system or to the surface water with a New York State Pollutions Discharge Elimination System permit.

Essentially, a VER system works by applying a higher vacuum to the subsurface than a SVE/AS system. The higher vacuum allows VER to operate more effectively than SVE/AS in varied geological settings.

The SVE/VER system would be operated until contaminant levels in the soil vapor and water effluents cease to decline and remain constant at a negligible rate. At which time, the system would be shut off. EPA expects that the soil cleanup objectives in Table 1 will be met.

Stage 2

After soil remediation is completed at Alcas, AVX and Loohns, EPA will assess the affect on the groundwater after waiting the time for three pore volumes of groundwater to travel from all three source area properties to the municipal wells. EPA has calculated that it will take four years for three pore volumes of groundwater to pass, or flush through, from the source areas to the municipal wells. Therefore, the groundwater quality will be monitored. The effectiveness of the remediation will be evaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed at either the AVX or the Loohns Dry Cleaners source areas. However, such treatment will not be necessary at the ALCAS source area due to the close proximity of the source area to municipal well 18M.

If groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluate the impact of a groundwater pump and treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially adverse affect on the wetlands area.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 2. Costs were developed by source area. Capital costs were developed for the construction of SVE/ER systems at the source areas and construction of groundwater collection and treatment systems at the Loohns and AVX source areas. The capital costs for the Alcas source area does not include groundwater treatment, since contaminated groundwater from the source area will be captured and treated by the air stripper at municipal well M18. Operation and maintenance and present worth costs were developed for maintenance of an SVE/VER system for five years and groundwater treatment system for thirty years and Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Installation of SVE/ER system at the source area properties could be implemented within one year. Groundwater treatment, if determine to be necessary, could be implemented within 9 to 12 months after the date of the decision is made.

Alternative 5 - Soil Removal And Groundwater Treatment

Alternative 5 would consist of implementing the following:

- Excavation and removal of contaminated soil above and below the water table.
- Off-Site low temperature desorption of soil contaminants (if necessary).
- Monitoring programs at selected monitoring wells and at Olean Well Field municipal wells.
- Implementation of groundwater treatment if excavation and removal of the contaminated soil does not sufficiently lower contaminant concentrations in the groundwater.
- Land use/access restrictions (if necessary).

Stage 1

The soil source area(s) would be excavated and the soils tested to determine if the excavated soils are classified as RCRA hazardous waste material. If hazardous, the soils would be transported off-Site to a facility for low temperature desorption of soil contaminants. If not hazardous, the soils would be disposed of at a local landfill. Clean fill material would be brought in to restore each of the areas to grade. Confirmatory soil sampling and analyses would be conducted during soil excavation to ensure that all soils with contaminant levels higher than the levels indicated in Table 1 are removed.

Until restoration of the excavated areas is complete, land use/access restrictions (if necessary) would be placed on the source area restricting current and future use. During all phases of the soil removal, it would be necessary to implement dust and volatile emission control measures, soil erosion, and sediment control measures.

Stage 2

After soil remediation is completed at Alcas, AVX and Loohns, EPA will assess the affect on the groundwater after waiting the time for three pore volumes of groundwater to travel from all three source area properties to the municipal wells. EPA has calculated that it will take four years for three pore volume of groundwater to pass, or flush through, from the source areas to the municipal wells. Therefore, the groundwater quality will be monitored. The effectiveness of the remediation will be evaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed at either the AVX or the Loohns Dry Cleaners source areas. However, such treatment will not be necessary at the ALCAS source area due to the close proximity of the source area to municipal well 18M.

If groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluated the impact of a groundwater pump and treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially adverse affect on the wetlands area.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 2. Costs were developed by source area. Capital costs were developed for the construction of SVE/VER systems at the source areas and construction of groundwater collection and treatment systems at the Loohns and AVX source areas. The capital cost for the Alcas source area does not include groundwater treatment, since contaminated groundwater from the source area will be captured and treated by the air stripper at municipal well M18. Operation and maintenance and present worth costs were developed for maintenance of an SVE/VER system for five years and groundwater treatment system for thirty years and Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Installation of SVE/VER system at the source area properties could be implemented within one year. Groundwater treatment, if determine to be necessary, could be implemented within 9 to 12 months after the date of the decision is made.

Alternative 5 - Soil Removal And Groundwater Treatment

Alternative 5 would consist of implementing the following:

- Excavation and removal of contaminated soil above and below the water table.
- Off-Site low temperature desorption of soil contaminants (if necessary).
- Monitoring programs at selected monitoring wells and at Olean Well Field municipal wells.
- Implementation of groundwater treatment if excavation and removal of the contaminated soil does not sufficiently lower contaminant concentrations in the groundwater.
- Land use/access restrictions (if necessary).

Stage 1

The soil source area(s) would be excavated and the soils tested to determine if the excavated soils are classified as RCRA hazardous waste material. If hazardous, the soils would be transported off-Site to a facility for low temperature desorption of soil contaminants. If not hazardous, the soils would be disposed of at a local landfill. Clean fill material would be brought in to restore each of the areas to grade. Confirmatory soil sampling and analyses would be conducted during soil excavation to ensure that all soils with contaminant levels higher than the levels indicated in Table 1 are removed.

Until restoration of the excavated areas is complete, land use/access restrictions (if necessary) would be placed on the source area restricting current and future use. During all phases of the soil removal, it would be necessary to implement dust and volatile emission control measures, soil erosion, and sediment control measures.

Stage 2

After soil remediation is completed at Alcas, AVX and Loohns, EPA will assess the affect on the groundwater after waiting the time for three pore volumes of groundwater to travel from all three source area properties to the municipal wells. EPA has calculated that it will take four years for three pore volume of groundwater to pass, or flush through, from the source areas to the municipal wells. Therefore, the groundwater quality will be monitored. the effectiveness of the remediation will be evaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells 18M, 37M and 38M, a groundwater pump-and-treat system may be installed at either the AVX or the Loohns Dry Cleaners source areas. However, such treatment will not be necessary at the ALCAS source area due to the close proximity of the source area to municipal well 18M.

If groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluated the impact of a groundwater pump and treat system on the wetlands area. This evaluation will weigh the need for reducing contaminant concentrations in the groundwater with any potentially adverse affect on the wetlands area.

Capital, present worth and operation and maintenance costs for this alternative are summarized in Table 2. Costs were developed by source area. Capital costs were developed for the removal of contaminated soil at each source area and construction of groundwater collection and treatment systems at the Loohns and AVX source areas. The capital costs for the Alcas source area does not include groundwater treatment, since contaminated groundwater from the source area will be captured and treated by the air stripper at municipal well M18. Operation and maintenance and present worth costs were developed for maintenance of the groundwater treatment systems for thirty years and Site-wide sampling and analysis of the groundwater for thirty years.

Construction Time: Removal of contaminated soil from Alcas, AVX and Loohns could be implemented within one year. Groundwater treatment, if determined to be necessary, could be implemented within 1 year after the date of the decision is made.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, specified in the National Contingency Plan at 40 CFR § 300.430 (e)(9) (iii), 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, 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 pathway are eliminated, reduced,or controlled through treatment, engineering controls,or institutional controls.

- Compliance with applicable or relevant and appropriate requirements (ARARs) addressed 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.

- 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.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies 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 operation and maintenance costs, and net present worth costs.

- State acceptance indicates whether, based on its review of the RI/FS reports and Proposed Plan, the state concurs, opposes, or has no comment on the preferred alternative at the present time.

- Community acceptance will be assessed in the Record of Decision (ROD) following a review of the public comments received on the RI/FS reports and the Proposed Plan.

The following is a comparative analysis of these alternatives by source area, which is based upon the evaluation criteria noted above:

ALCAS SOURCE AREA

This subsection presents the comparative analysis of alternatives for the Alcas source area. Available data for this source area indicated that the upper aquifer cannot effectively be pumped, and that the lower aquifer is within the capture zone of the municipal wells. Therefore, groundwater treatment via pump-and-treat (Alternative 3A and Stage 2 of Alternative 3, 4 and 5) is not considered applicable for the Alcas source area.

Alternative 4, as discussed in this subsection, does not include soil vapor extraction with air sparging (SVE/AS). A field investigation conducted in July 1994 determined that a SVE/AS treatment system would not be effective due to a non-homogeneous subsurface geology. A pilot test conducted in November 1994 confirmed that vacuum enhanced recovery (VER) could effectively desorb VOCs from the contaminated subsurface. Effective mass removal of VOCs was observed during the test for both the vapor and the dissolved phases.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This Alternative would not meet the remedial action objectives (RAOs) for the Site.

Alternative 2 (Institutional Controls) provides a slightly higher level of protection of human health, since groundwater and land use restrictions would be implemented to reduce exposures to contaminated soil and groundwater; however, since no remediation of contamination takes place under this alternative, it is not protective of the environment. This alternative would meet only some of the RAOs for the Site, since it prevents exposure to contaminants, but does not provide treatment of the source area to expedite cleanup of the city aquifer.

Alternative 3 (Capping) would reduce the risk of exposure to contaminated soils and potentially reduce the migration of contaminants from this source area to the groundwater. After implementation of the alternative, the risk of exposure to contaminated soils would be reduced. Groundwater and land use restrictions would be implemented to further reduce the risk of exposures and to ensure cap integrity. This alternative should meet the groundwater RAOs by preventing exposures to contaminants and reducing migration of contaminants from the source area to the groundwater, thereby expediting cleanup of the city aquifer. However, there is a probability that after implementation of this alternative, migration of contaminants from the source area could continue as a result of groundwater flow beneath the cap, with the result that cleanup of the city aquifer is not expedited.

Alternatives 4 (Vacuum Enhanced Recovery) and 5 (Excavation, Treatment and Disposal), which both include reduction or elimination of the source area by removal and treatment, would be protective of human health and the environment. Alternative 4 would reduce the level of contaminants in the source area using vacuum enhanced recovery (VER), while Alternative 5 would completely eliminate the identified source area by excavation and off-Site treatment and disposal. Upon completion of either of these alternative, the RAOs for the Site would be achieved.

Compliance with ARARs

Chemical-, location-and action-specific ARARs were evaluated for the Alcas source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water (chemical-specific ARARs); historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirements (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed these levels, with a potential increase in contaminant levels, since the Alcas source area would continue to contribute contamination to the aquifer. Alternative 1 involves no remedial activities, and therefore does not trigger any location-or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location-and action-specific ARARs, if any are triggered by these activities. Neither of these alternatives would comply with the soil Remedial Action Objectives (RAOs), which are TBCs (to be considered levels) for soil remediation.

Alternative 3 would not initially comply with chemical-specific ARARs for the groundwater, since the contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by reducing the migration of contaminants from the soil it is expected that this alternative could result in compliance with the chemical-specific ARARs. This alternative may not fully comply with soil RAOs since it may not be 100% effective in reducing the migration of contaminants from the soil. Compliance with location-and action-specific ARARs would be achieved through proper implementation of this alternative.

Alternative 4 would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, significant quantities of contaminants in both the soil and groundwater would be removed by VER, thereby eliminating additional contributions of contamination to the city aquifer and eventually resulting in compliance with chemical-specific ARARs. Proper design and implementation of the VER system and treatment of the extracted groundwater and vapor would ensure that the implementation of this alternative would be in compliance with location-and action-specific ARARs. This alternative, upon completion of VER treatment, would also be in compliance with the soil RAOs.

Alternative 5 would provide the most rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations would be rapidly reduced by implementation of this alternative. Contaminated soil, including an extensive amounted of soil in the saturated zone, that is acting as a source of contamination to the groundwater would be removed in this alternative, thereby eliminating additional contributions of contamination to the city aquifer and resulting in compliance with chemical-specific ARARs. Proper design and implementation of the excavation, transportation and disposal of the contaminated soil would ensure that the implementation of this alternative would be in compliance with location-and action-specific ARARs. This alternative would also be in compliance with the soil RAOs.

Short-term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase in short-term risks to-workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes administrative actions and minimal construction activities (e.g., fence construction). Workers and the nearby community would be subject to a slightly increased risk of exposure to contaminants due to disturbance of contaminated soil during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Implementation of this alternative could be completed in approximately 6 months.

Alternative 3 includes construction activities for placement of a cap over the source area. Workers and the nearby community would be subject to an increased risk of exposure to contaminants due to disturbance of contaminated soil (e.g., grading) during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan (e.g., use or personal protective equipment) and appropriate engineering controls (e.g., dust suppression). Implementation of this alternative could be completed in approximately 1 year.

Alternative 4 includes construction activities; however, as this alternative involves in situ treatment, the disturbance of contaminated soils during construction activities would be limited. Any increased risks due to disturbance of contaminated soil would be mitigated through the implementation of a site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Design and installation of the VER system could be completed in approximately 1 year. Operation of the system should not result in any increased risk of exposure.

Alternative 5 includes the most intensive construction activities, including excavation and off-Site transportation of contaminated soil. Workers and the nearby community would be subject to an increase in the risk of exposure to contaminants due to disturbance of contaminated soil during excavation and transportation of contaminated materials for off-Site treatment (if necessary) and disposal. These risks would be mitigated by implementation of a site-specific health and safety plan, a site-specific traffic control plan and appropriate engineering controls (e.g., dust suppression). This alternative could be completed in approximately 1 year.

Long-term Effectiveness

Alternative 1 does not remove or contain the source of contamination. Therefore, the current risks from exposure to contaminated groundwater and soil would remain, and future risk may even be greater as the source area continues to release contaminants to the groundwater. Long-term monitoring and assessment would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future.

Alternative 2 also does not remove or contain the source of contamination, but does provide some reduction in the risk of exposure to contaminated soil and groundwater via access and use restrictions, provide these restrictions are adequately maintained and enforced. Long-term monitoring would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it would be very difficult to maintain institutional controls in the long term.

Alternative 3 provides containment of the contaminated source area, which would reduce the risk of exposure to contaminated soil and would reduce migration of contaminants from the source area to groundwater. Long-term monitoring and maintenance would be required under this alternative to ensure the integrity of the cap. It is possible that the cap may not prevent migration of contamination from the source area to the groundwater, and that additional remedial activities could be necessary in the future.

Alternative 4 provides treatment of both the source area and associated groundwater. This alternative provides a permanent remedy for the contaminated source area, including source areas below the water table, since contaminants are removed from the soil; however, as with any in situ treatment, it would be difficult to assess the level of treatment achieved in the subsurface soils. During the operation of, and upon completion of, the VER treatment, long-term monitoring would be required to assess the completeness of the remediation and to monitor improvements in the quality of the city aquifer; however, no further remediation of the source area should be required.

Alternative 5 provides removal of the source areas. This alternative provides a permanent remedy, in that contaminated soils removed from the Site would not pose any future risk and would not be subject to any further remedial action in the future. No long-term monitoring or maintenance would be required for the source area; however, long-term monitoring would be required under this alternative to monitor improvements in the water quality of the city aquifer.

Reduction of Toxicity, Mobility or Volume Through Treatment

Alternatives 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

Alternative 3, if properly maintained, should reduce the mobility of contaminants without treatment, thereby minimizing additional contamination of the groundwater form this source area. This alternative does not provide any reduction in toxicity or volume of contaminated material.

Alternative 4 provides treatment of contaminated soil and capture and treatment of contaminated groundwater. A pilot test, which was conducted at Alcas in November 1994, confirmed that a VER system would reduce the mobility of contaminants by capture, and upon completion of the remediation would significantly reduce the volume of contaminated soil at this source area. Reduction of the contaminant levels in the groundwater within the influence of a VER system should also be achieved under this alternative.

Alternative 5 provides a reduction in toxicity, mobility and volume of contaminated soil by excavation and off-Site treatment and disposal of contaminated media. Contaminated soil removed from the Site would no longer pose any risk of further contamination of the groundwater.

Implementability

Alternative 1 would be easily implemented, as it does not include any remedial activities. Alternative 2 may be difficult to implement, since it reguires cooperation from individual property owners, which would be difficult to enforce. Minor construction activities (e.g., fence) included in this alternative would be easy to implement, and would not require a significant administrative effort. Long-term maintenance would be required for Alternative 2.

Capping (Alternative 3) is a readily available and well-developed technology that could be completed using conventional construction techniques. Long-term maintenance of the cap would be required.

For Alternative 4, on-site construction activities would be minor, consisting of well installation and construction or mobilization of a small treatment system. This would result in a minimal disruption of facility operations and would also minimize any effects to the on-site building, which may be situated close to or over the subsurface contamination. In addition, a VER system may be modified, as necessary, to remediate larger or inaccessible areas. However, in situ treatment technologies are still considered innovative, and there are only a small number of vendors offering these services. In addition, effective operation requires intensive monitoring and assessment. Administratively, coordination with local authorities and other agencies may be required for the discharge of treated water and vapor; however, this alternative does not involve any off-site transportation of hazardous materials.

Alternatives 5 would require excavation to depths of approximately 16 feet with approximately 12 feet below the water table. Dewatering and shoring would be required; however, this alternative could be implemented using conventional construction techniques. Off-Site RCRA storage, treatment and disposal facilities are available for treatment and disposal of VOCS contaminated soil. Administratively, this alternative would require coordination with the local authorities and other agencies for transportation, treatment and disposal of hazardous materials.

Cost

The 30-year net present worth (NPW) of the remedial alternatives for the Alcas source area range from $0 to $1,013,495 based on a discount rate of 7%. Alternatives 1 and 2 are the least expensive to implement, with NPWs of $0 and $152,295, respectively. Alternative 3 is slightly more expensive, with a NPW of $298,158. Alternative 4 is significantly more expensive, with a NPW of $837,721. Alternative 5 is the most expensive, with a NPW of $1,013,495. Cost estimates are summarized in Table 2.

AVX SOURCE AREA

This subsection presents the comparative analysis of alternatives for the AVX source area. Available data indicate that groundwater and soil are contaminated and are amenable to remediation. Therefore, the evaluation presented in this subsection considers all stages of each of the alternatives (i.e., no action for Alternative 1; institutional controls for Alternative 2; groundwater remediation for Alternative 3A; and stages 1 and 2 for Alternatives 3, 4 and 5).

Alternative 4, as discussed in this subsection, does not include soil vapor extraction with air sparging (SVE/AS). An evaluation of the AVX property concluded that a SVE/AS treatment system would not be effective, due to low soil permeability at the property. However, a pilot test conducted in August 1994 confirmed that vacuum enhanced recovery (VER) could effectively desorb VOCs from the contaminated subsurface. Effective mass removal of VOCs was observed during the test for both the vapor and the dissolved phases.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This alternative would not meet the remedial action objectives (RAOs) for the Site.

Alternative 2 (Institutional Controls) provides a slightly higher level of protection of human health, since groundwater and land use restrictions would be implemented to reduce exposures to contaminated soil and groundwater; however, since no remediation of contamination takes place under this alternative, it is not protective of the environment. This alternative would meet only some of the RAOs for the Site, since it prevents exposure to contaminants, but does not provide treatment of the source area to expedite cleanup of the city (lower) aquifer.

Alternative 3 (Capping) would reduce the risk of exposure to contaminated soils and potentially reduce the migration of contaminants from this source area to the groundwater. After implementation of the alternative, the risk of exposure to contaminated soils would be reduced. Groundwater and land use restrictions would be implemented to further reduce the risk of exposures and to ensure cap integrity. This alternative would meet the RAOs for soil be preventing exposure to contaminants, and should meet the RAOs for groundwater by reducing migration of contaminants from the source area to the groundwater, thereby expediting cleanup of the city aquifer. The groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells M18, M37 and M38, a groundwater pump-and-treat system may be installed. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved.

Alternative 3A (Groundwater Pump-and-Treat) is identical to the pump-and-treat portion (i.e., stage 2) of Alternative 3, the difference being that the groundwater treatment system would be installed immediately upon selection of this alternative. The evaluation is identical to stage 2 of Alternative 3.

Alternative 4 (Vacuum Enhanced Recovery) and 5 (Excavation, Treatment and Disposal), which both include reduction or elimination of the source area by removal and treatment, would be protective of human health and the environment. Alternative 4 would reduce the level of contaminants in the source area using vacuum enhanced recovery (VER), while Alternative 5 would completely eliminate the identified source area by excavation and off-Site treatment and disposal. Upon completion of either Alternative 4 or 5, the RAOs for the Site should be achieved. The groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells M18, M37 and M38, a groundwater pump-and-treat system may be installed. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved.

Compliance with ARARs

Chemical, location and action-specific ARARs were evaluated for the AVX source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water (chemical-specific ARARs); wetlands protection and historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirement (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed theses level, with a potential increase in contaminant levels, since the AVX source area would continue to contribute contamination to the aquifer. Alternative 1 involves no remedial activities, and therefore does not trigger any location- or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location- and action-specific ARARs, if any are triggered by these activities. Neither of these alternatives would comply with the soil RAOs.

Alternative 3 would not initially comply with chemical-specific ARARs for the groundwater, since the contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by reducing the migration of contaminant from the soil it is expected that this alternative could result in compliance with the chemical-specific ARARs. This alternative may not fully comply with soil RAOs since it may not be 100% effective in reducing the migration of contaminants from the soil. Stage 2, if required, would supplement stage 1 to bring this area into compliance with ARARs. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved. This alternative would not comply with the soil RAOs, since it does not include removal of contaminated soil.

It would take longer to come into compliance with Alternative 3A, with chemical-specific ARARs for groundwater than those alternatives that include source area remediation of the soil (i.e., Alternative 3, 4 and 5), since contamination could continue to migrate from the contaminated soil source area, which is not remediated under this alternative. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved. This alternative would not comply with the soil RAOs, since it does not include removal of contaminated soil, which would eliminate the leaching of VOCs into the groundwater.

Alternative 4 would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, significant quantities of contaminants in both the soil and groundwater would be removed by VER, thereby eliminating additional contributions of contamination to the city aquifer and eventually resulting in compliance with chemical-specific ARARs. It is expected that compliance with chemical-specific ARARs would be achieved over time. However, if groundwater ARARs are not achieved, a groundwater pump-and-treat system may be installed to ensure compliance with ARARs. Proper design and implementation of the VER system and the groundwater pump-and-treat system (if necessary) would ensure that the implementation of both stages of this alternative would be in compliance with location-and action-specific ARARs. This alternative, upon completion of VER treatment (stage 1), would also be in compliance with the soil RAOs.

Alternative 5 would provide the most rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations would be rapidly reduced by implementation of this alternative. Contaminated soil that is acting as a source of contamination to the groundwater would be removed in this alternative, thereby eliminating additional contributions of contamination to the city aquifer and resulting in compliance with chemical-specific ARARs. If it is determined that chemical-specific ARARs in the groundwater are not achieved, a groundwater pump-and-treat system may be installed to ensure compliance with groundwater ARARs. Proper design and implementation of the excavation, transportation and disposal of the contaminated soil and proper operation of the pump-and-treat system (if necessary) would ensure that the implementation of both stages of this alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of soil excavation and disposal (stage 1), would also be in compliance with the soil RAOs.

Short-term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase short-term risks to workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes administrative actions and minimal construction activities (e.g., fence construction). Workers and the nearby community would be subject to a slightly increased risk of exposure to contaminants due to disturbance of contaminated soil during these activities. These risks would be minimized through the implementation of a Site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Implementation of this alternative could be completed in approximately 6 months.

Alternative 3 includes construction activities for placement of a cap over the source area. Workers and the nearby community would be subject to an increased risk of exposure to contaminants due to disturbance of contaminated soil (e.g., grading) during these activities. These risk would be minimized through the implementation of a site-specific health and safety plan (e.g., use of personal protective equipment) and appropriate engineering controls (e.g., dust suppression). Implementation of stage 1 of this alternative could be completed in approximately 1 year. If it is determined that stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional Site disturbances during construction of this system, resulting in additional risks of exposures to contaminated groundwater for workers. Workers may also be exposed to excessive noise during construction activities. These risks would be minimized through the implementation of a site-specific health and safety plan. There would be no increased risk to the public during construction of the pump-and-treat system, since contaminated soil would be contained beneath the cap; however, operation of the pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions. These risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of stage 2 could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (up to 30 years). The short-term effectiveness of Alternative 3A is identical to the short-term effectiveness of stage 2 of Alternative 3.

Alternative 4 includes construction activities; however as this alternative involves in situ treatment, the disturbance of contaminated soils during construction activities would be limited. Any increased risks due to disturbance of contaminated soil would be mitigated through the implementation of a site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Design and installation of the VER system could be completed in approximately 1 year. Operation of the system should not result in any increased risk of exposure. If it is determined that stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional Site disturbances during construction of this system, resulting in additional risks of exposures to contaminated groundwater for workers; however, there would be no increased risk to the public, since contaminated soil would have already been remediated during stage 1 of this alternative. Implementation of stage 2 could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Alternative 5 includes the most intensive construction activities, including excavation and off-Site transportation of contaminated soil. Workers and the nearby community would be subject to an increase in the risk of exposure to contaminants due to disturbance of contaminated soil during excavation and transportation of contaminated materials for off-Site treatment (if necessary) and disposal. These risks would be mitigated by implementation of a site-specific health and safety plan, a site-specific traffic control plan and appropriate engineering controls (e.g., dust suppression). This alternative could be completed in approximately 1 year. If it is determined that stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional site disturbances during construction of this system, resulting in additional risk of exposures to contaminated groundwater for workers; however, there would be no increased risk to the public, since contaminated soil would have already been remediated during stage 1 of this alternative. The groundwater pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions these risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of stage 2 could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Long-term Effectiveness

Alternative 1 does not remove or contain the source of contamination. Therefore, the current risks from exposure to contaminated groundwater and soil would remain, and future risk may even be greater as the source area continues to release contaminants to the groundwater. Long-term monitoring and assessment would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future.

Alternative 2 also does not remove or contain the source of contamination, but does provide some reduction in the risk of exposure to contaminated soil and groundwater via access and use restrictions, provided these restrictions are adequately maintained and enforced. Long-term monitoring would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it would be very difficult to maintain institutional controls in the long term.

Alternative 3 provides containment of the contaminated source area, which would reduce the risk of exposure to contaminated soil and reduce migration of contaminants from the source area to groundwater. Long-term monitoring and maintenance would be required under this alternative to ensure the integrity of the cap. It is possible that the cap may not prevent migration of contamination from the source area to the groundwater, and that additional remedial activities could be necessary in the future. Implementation of the stage 2 pump-and-treat system would provide and additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Alternative 3A provides some containment of the source area by preventing migration of contamination, but would not be as protection as Alternative 3, which includes the cap and the pump-and-treat system (if necessary).

Alternative 4 provides treatment of both the source area and associated groundwater. This alternative provides a permanent remedy for the contaminated source area, including source areas below the water table, since contaminants are removed from the soil; however, as with any in situ treatment, it would be difficult to assess the level of treatment achieved in the subsurface soils. During the operation of, and upon completion of, the VER treatment, long-term monitoring would be required to assess the completeness of the remediation and to monitor improvements in the quality of the city aquifer, however, no further remediation of the source area should be required. If it is determined that stage 1 of this alternative has not adequately addressed the source area, groundwater remediation, stage 2, may be implemented. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Alternative 5 provides removal of the source areas. This alternative provides a permanent remedy, in that contaminated soils removed from the Site would not pose any future risk and would not be subject to any further remedial action in the future. No long-term monitoring or maintenance would be required for the source area; however, long-term monitoring would be required under this alternative to monitor improvements in the quality of the city aquifer. If it is determined that stage 1 of this alternative has not adequately improved the quality of the city aquifer, stage 2 may be implemented. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater be preventing further migration of contamination from this source.

Reduction of Toxicity, Mobility or Volume through Treatment

Alternatives 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

The cap that would be installed in stage 1 of Alternative 3, if properly maintained, should reduce the mobility of contaminants, without treatment, thereby minimizing additional contamination of the groundwater from this source area. If the stage 2 pump-and-treat system is implemented, this system would further reduce the toxicity, mobility and volume of contamination by extracting contaminated groundwater and preventing off-Site migration. The reduction in toxicity, mobility and volume for Alternative 3A is identical to stage 2 of Alternative 3.

Stage 1 of Alternative 4 provides treatment of contaminated soil and capture and treatment of contaminated groundwater using VER. This system would reduce the mobility of contaminants by capture, and upon completion of the remediation, would significantly reduce the volume of contaminated soil at this source area. Reduction of the contaminant levels in the groundwater within the influence of the system might also be achieved under this alternative. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the toxicity, mobility and volume of remaining contamination by extracting contaminated groundwater and preventing off-site migration.

Stage 1 of Alternative 5 provides a reduction in toxicity, mobility and volume of contaminated soil be excavation and off-Site treatment and disposal of contaminated media. Contaminated soil removed from the Site would no longer pose any risk of further contamination of the groundwater. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the toxicity, mobility and volume of remaining contamination by extracting contaminated groundwater and preventing off-Site migration.

Implementability

Alternative 1 would be easily implemented, as it does not include any remedial activities. Alternative 2 may be difficult to implement, since it requires cooperation from individual property owners, which is difficult to enforce. Minor construction activities (e.g., fence) included in this alternative would be easy to implement, and would not require a significant administrative effort. Long-term maintenance would be required for Alternative 2.

Alternative 3 would involve on-Site construction. However, capping is a readily available and well-developed technology that could be completed using conventional construction techniques. Long-term maintenance of the cap would be required. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system. The implementability of Alternative 3A is identical to the implementability of stage 2 of Alternative 3.

For Alternative 4, on-Site construction activities would be minor, consisting of well installation and construction or mobilization of a small treatment system. However, in situ treatment technologies are still considered innovative, and there are only a small number of vendors offering these services. In addition, effective operation requires intensive monitoring and assessment. Administratively, coordination with local authorities and other agencies may be required for the discharge of treated water and vapor; however, this alternative does not involve any off-Site transportation of hazardous materials. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at sites with contaminated groundwater. Administratively, the requirements would be similar to the VER system requirements.

Alternative 5 would require excavation to depths of approximately 6 feet in close proximity to on-site structures. Dewatering and shoring would be required; however, this alternative could be implemented using conventional construction techniques. Given the shallow depth of contamination, technical implementation of this alternative would not be difficult. Off-Site RCRA storage, treatment and disposal facilities are available for treatment and disposal of VOCS contaminated soil. Administratively, this alternative would be moderately difficult to implement, since it would require coordination with the local authorities and other agencies for transportation, treatment and disposal of hazardous materials. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system.

Cost

The 30-year net present worth (NPW) of the remedial alternatives for the AVX source area range from $0 to $1,747,533 based on a discount rate of 7%. Alternatives 1 and 2 are the least expensive to implement, with NPWs of $0 and $165,295, respectively, Alternative 3 (stage 1) is slightly more expensive, with a NPW of $187,113. If stage 2 of Alternative 3 is implemented, the overall cost of this alternative is approximately $821,117, but treatment of contaminated groundwater is provided. Alternative 3A, which includes pump-and-treat for a longer period of time, but no capping, has a cost of $1,070,610. Alternative 4 (stage 1) is significantly more expensive than Alternative 3 (stage 1), with a NPW of $1,113,529. If stage 2 of Alternative 4 is implemented, the cost increase to $1,747,533, and additional groundwater treatment is provided. Alternative 5 (stage 1) is significantly less costly than Alternative 4 (stage 1), with a NPW of $376,295. If stage 2 of Alternative 5 is implemented, groundwater treatment is provided, and the NPW is $1,010,299. Cost estimates are summarized in Table 2.

McGRAW EDISON SOURCE AREA

This subsection presents the comparative analysis of alternatives for the McGraw Edison source area. Available data indicate that there is no contaminated soil source in this area. Therefore, Alternatives 3, 4 and 5, which all specify some kind of soil remediation, are not applicable. Alternative 3A, which specifies groundwater pump-and-treat, is applicable and was evaluated for this area.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This alternative would not meet the remedial action objectives (RAOs) for the Site.

Alternative 2 (Institutional Controls) provides a slightly higher level of protection of human health, since groundwater use restrictions would be implemented to reduce exposures to contaminated groundwater. However, since no remediation of contamination takes place under this alternative, it is not protective of the environment. After implementation of the alternative, risks of exposure would be reduced as long as the administrative restrictions were maintained. This alternative would meet only some of the RAOs for the Site, since it prevents exposure to contaminants, but does not provide any treatment to expedite cleanup of the city aquifer.

Alternative 3A would be implemented immediately at the McGraw Edison site, since there is no soil source area to be remediated. Proper operation and maintenance of the groundwater pump-and-treat system would ensure that the RAOs for groundwater would be achieved. Extraction of contaminated groundwater will protect human health and the environment by removing contamination from the aquifer and preventing migration of contaminants from this area to the municipal well field.

Compliance with ARARs

Chemical, location and action-specific ARARs were evaluated for the McGraw Edison source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water (chemical-specific ARARs); historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirements (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed these levels for an extended period of time. Alternative 1 involves no remedial activities, and therefore does not trigger any location- or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location- and action-specific ARARs, if any are triggered by thee activities.

Alternative 3A would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by treating the groundwater beneath the McGraw Edison site, further contamination migration to the municipal supply wells would be eliminated, eventually resulting in compliance with chemical-specific ARARs. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved. The soil RAOs do not apply to the McGraw Edison site, since there are no identified areas of soil contamination.

Short-term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase in short-term risks to workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes only administrative actions, since no access restrictions are required at the McGraw Edison site. Therefore, there would be no change in the risks to workers or the nearby community during implementation of this alternative. Implementation of this alternative could be completed in approximately 3 months.

Alternative 3A includes installation of a groundwater pump-and-treat system. As there is already a well and an air stripper on site, only minimal construction activities would be required to upgrade the treatment system and install one or more wells in the shallow aquifer. Workers would be subject to a slightly increased risk of exposure to contaminated groundwater and exposure to noise during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan (e.g., use of personal protective equipment). Operation of the groundwater pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions; these risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of the groundwater pump and treat system could be complete in approximately 3 to 6 months; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years).

Long-term Effectiveness

Alternative 1 does not remove or contain the contaminated groundwater. Therefore, the current risks from exposure to contaminated groundwater persist, and future risk may even be greater as the contaminated groundwater beneath the site continues to migrate. Long-term monitoring and assessment would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future.

Alternative 2 also does not remove or contain the contaminated groundwater but does provide some reduction in the risk of exposure to contaminated groundwater via access and use restrictions, provided these restrictions are adequately maintained and enforced. Long-term monitoring would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it would be very difficult to maintain institutional controls in the long term.

Alternative 3A provides for removal and treatment of groundwater contaminants beneath the site, thereby reducing the risk of exposure to contaminated groundwater and migration of contaminated groundwater off site. Long-term monitoring would be required under this alternative to confirm the effectiveness of the system. Aside from operation and maintenance of the groundwater pump-and-treat system, no further remedial actions would be required in the future.

Reduction of Toxicity, Mobility or Volume through Treatment

Alternatives 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

Alternative 3A would reduce the toxicity, mobility and volume of contaminants in the groundwater via extraction and treatment of contaminated groundwater beneath the site.

Implementability

Alternative 1 would be easily implemented, as it does not include any remedial activities. Alternative 2 may be difficult to implement, since it deals with individual property rights. There are minimal construction activities in this alternative as it applies to the McGraw Edison site. Long-term maintenance of administrative actions would be required for Alternative 2.

Alternative 3A would be easily implemented, since it would require only well installation and possibly upgrades to an existing groundwater treatment system (i.e., air stripper). As mentioned previously, McGraw Edison installed the air stripper in the early 1980's to treat groundwater for industrial use on-site. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system after these modifications are made.

Cost

The 30-year net present worth (NPW) of the remedial alternatives for the McGraw Edison site range from $0 to $935,610 based on a discount rate of 7%. Alternatives 1 and 2 are the least expensive to implement, with NPWs of $0 and $138,295, respectively. Alternative 3A has a NPW of $935,610. Cost estimates are summarized in Table 2.

LOOHNS DRY CLEANERS AND LAUNDERERS

This subsection presents the comparative analysis of alternatives for the Loohns source area. Available date indicated that both groundwater and soil are contaminated and are amenable to remediation. Therefore, the evaluation presented in this subsection considers all stages of each of the alternatives.

Overall Protectional of Human Health and the Environment

Alternative 1 (No Action) is not protective of human health and the environment. Existing restrictions on groundwater use would remain, but no further restrictions would be implemented. This alternative would not meet the remedial action objectives (RAOs) for the Site.

Alternative 2 (Institutional Controls) provides a slightly higher level of protection of human health, since groundwater and land use restrictions would be implemented to reduce exposures to contaminated soil and groundwater; however, since no remediation of contamination takes place under this alternative, it is not protective of the environment. After implementation of the alternative, risks would be slightly reduced as long as the administrative and physical restrictions were maintained. This alternative would meet only some of the RAOs for the Site, since it prevents exposure to contaminants, but does not provide treatment of the source area to expedite cleanup of the city aquifer.

Alternative 3 (Capping) would reduce the risk of exposure to contaminated soils and potentially reduce the migration of contaminants from this source area to the groundwater. After implementation of the alternative, the risk of exposure to contaminated soils would be reduced. Groundwater and land use restrictions would be implemented to further reduce the risk of exposures and to ensure cap integrity. This alternative would prevent exposure to soil contaminants, and should meet the RAOs for groundwater by reducing migration of contaminants from the source area to the groundwater, thereby expediting cleanup of the city aquifer. The groundwater will be monitored and the effectiveness of the remediation will be reevaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells M18, M37 and M38, a groundwater pump-and-treat system may be installed. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved.

Alternative 3A (Groundwater pump and treat) is identical to the pump-and-treat portion (i.e., stage 2) of Alternative 3, the difference being that the groundwater treatment system would be installed immediately upon selection of this alternative. The evaluation is identical to stage 2 of Alternative 3.

Alternatives 4 (Vacuum Enhanced Recovery (VER) or Soil Vapor Extraction with Air Sparging (SVE/AS)) and 5 (Excavation. Treatment and Disposal), which both include reduction or elimination of the source area by removal and treatment, would be protective of human health and the environment. Alternative 4 would reduce the level of contaminants in the source area using VER or SVE/AS, while Alternative 5 would completely eliminate the identified source area by excavation and off-Site treatment and disposal. Upon completion of either of these alternatives, the RAOs for the Site should be achieved. The groundwater quality will be monitored and the effectiveness of the remediation reevaluated at four year intervals. If it is determined that the city aquifer still contains contaminant concentrations above drinking water standards and if it is determined that the remediated source area continues to affect the groundwater entering the City Municipal wells M18, M37 and M38, a groundwater pump-and-treat system may be installed. Proper operation and maintenance of this system would ensure that the RAOs for groundwater would be achieved.

Compliance with ARARs

Chemical, location and action-specific ARARs were evaluated for the Loohns source area. The major ARARs considered included: state and federal maximum contaminant levels (MCLs) for drinking water (chemical-specific ARARs); historic preservation requirements (location-specific ARARs); and, RCRA hazardous waste generator, transporter and treatment, storage and disposal requirements (action-specific ARARs).

Alternatives 1 and 2 would not comply with chemical-specific ARARs. Existing contaminant concentrations in the groundwater, which already exceed chemical-specific ARARs, would continue to exceed these levels, with a potential increase in contaminant levels, since the Loohns source area would continue to contribute contamination to the aquifer. Alternative 1 involves no remedial activities, and therefore does not trigger any location- or action-specific ARARs. Alternative 2 would be implemented in such a manner so as to comply with location-and action-specific ARARs, if any are triggered by these activities. Neither of these alternatives would comply with the soil RAOs.

Alternative 3 would not initially comply with chemical-specific ARARs for the groundwater, since the contaminant concentrations would not be immediately reduced by implementation of this alternative. However, by reducing the migration of contaminants from the soil it is expected that this alternative could result in compliance with the chemical-specific ARARs. This alternative may not fully comply with soil RAOs since it may not be 100% effective in reducing the migration of contaminants from the soil. Compliance with location-and action-specific ARARs would be achieved through proper implementation of this alternative. Stage 2, if required, would supplement stage 1 to bring this area into compliance with ARARs. Through proper implementation of this alternative, compliance with location- and action-specific ARARs would be achieved.

It would take longer to come into compliance with chemical-specific ARARs with Alternative 3A for groundwater than those alternatives that include source area remediation (i.e., Alternatives 3, 4 and 5), since contamination could continue to migrate from the contaminated soil source area, which is not remediated under this alternative. Through proper implementation of this alternative, compliance with location-and action-specific ARARs would be achieved. This alternative would not comply with the soil RAOs, since it does not include removal of contaminated soil.

Alternative 4 would not initially comply with chemical-specific ARARs, since the groundwater contaminant concentrations would not be immediately reduced by implementation of this alternative. However, significant quantities of contaminants in both the soil and groundwater would be removed by VER or SVE/AS, thereby eliminating additional contributions of contamination to the city aquifer and eventually resulting in compliance with chemical-specific ARARs. It is expected that compliance with chemical-specifi ARARs would be achieved over time. However, if groundwater ARARs are not achieved, a groundwater pump-and-treat system would be installed to ensure compliance with ARARs. Proper design and implementation of the VER or SVE/AS system and the groundwater pump-and-treat system (if necessary) would ensure that the implementation of both stages of this alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of VER or SVE/AS treatment (stage 1), would also be in compliance with the soil RAOs.

Alternative 5 would provide most rapid compliance with chemical-specific ARARs, since the groundwater contaminant concentrations would be rapidly reduced by implementation of this alternative. Contaminated soil that is acting as a source of contamination to the groundwater would be removed in this alternative, thereby eliminating additional contributions of contamination to the city aquifer and resulting in compliance with chemical-specific ARARs. If it is determined that chemical-specific ARARs in the groundwater have not been achieved, a groundwater pump-and-treat system may be installed to ensure compliance with groundwater ARARs. Proper design and implementation of the excavation, transportation and disposal of the contaminated soil and proper operation of the pump-and-treat system (if necessary) would ensure that the implementation of both stages of this alternative would be in compliance with location- and action-specific ARARs. This alternative, upon completion of soil excavation and disposal (stage 1), would also be in compliance with the soil RAOs.

Short-term Effectiveness

Alternative 1 involves no remedial activities, and therefore results in no increase in short-term risks to workers or the community. Implementation of this alternative would be immediate.

Alternative 2 includes administrative actions and minimal construction activities (e.g., fence construction). Workers and the nearby community would be subject to a slightly increased risk of exposure to contaminants due to disturbance of contaminated soil during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan and appropriate engineering controls (e.g., dust suppression). Implementation of this alternative could be completed in approximately 6 months.

Alternative 3 includes construction activities for placement of a cap over the source area. Workers and the nearby community would be subject to an increased risk of exposure to contaminants due to disturbance of contaminated soil (e.g., grading) during these activities. These risks would be minimized through the implementation of a site-specific health and safety plan (e.g., use of personal protective equipment) and appropriate engineering controls (e.g., dust suppression). Implementation of stage 1 of this alternative could be completed in approximately 1 year. If it is determined the stage 2 of this alternative (i.e., groundwater pump-and-treat) is required, there would be additional Site disturbances during construction of this system, resulting in additional risks of exposures to contaminated groundwater for workers. Workers may also be exposed to excessive noise during construction activities. These risks would be minimized through the implementation of a site-specific health and safety plan. There would be no increased risk to the public during construction of the pump-and-treat system, since contaminated soil would be contained beneath the cap; however, operation of the pump-and-treat system might pose slightly increased risk of exposures to the public from fugitive air emissions. These risks would be mitigated by proper design and operation of the system and compliance with any emissions control requirements. Implementation of stage 2 could be completed in approximately 1 year; however, the pump-and-treat system would be operated for an extended period of time (e.g., 30 years). The short-term effectiveness of Alternative 3A is identical to the short-term effectiveness of stage 2 of Alternative 3.

restrictions, provided these restrictions are adequately maintained and enforced. Long-term monitoring would be required under this alternative, and there is the potential that additional remedial activities might be necessary in the future. In addition, it would be very difficult to maintain institutional controls in the long term.

Alternative 3 provides containment of the contaminated source area which would reduce the risk of exposure to contaminated soil and reduce migration of contaminants from the source area to groundwater. Long-term monitoring and maintenance would be required under this alternative to ensure the integrity of the cap. It is possible that the cap may not prevent migration of contamination from the source area to the groundwater, and that additional remedial activities could be necessary in the future. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Alternative 3A provides some containment of the source area by preventing migration of contamination, but would not be as protective as Alternative 3, which includes the cap and the pump-and-treat system.

Alternative 4 provides treatment of both the source area and associated groundwater. This alternative provides a permanent remedy for the contaminated source area, including source areas below the water table, since contaminants are removed from the soil; however, as with any in situ treatment, it would be difficult to assess the level of treatment achieved in the subsurface soils. During the operation of, and upon completion, of the VER or SVE/AS treatment, long-term monitoring would be required to assess the completeness of the remediation and to monitor improvements in the quality of the city aquifer; however, no further remediation of the source area should be required. If it is determined that stage 1 of this alternative has not adequately addressed the source area and groundwater remediation, stage 2 may be implemented. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Alternative 5 provides removal of the source areas. This alternative provides a permanent remedy, in that contaminated soils removed from the Site would not pose any future risk and would not be subject to any further remedial action in the future. No long-term monitoring or maintenance would be required for the source area; however, long-term monitoring would be required under this alternative to monitor improvements in the quality of the city aquifer. If it is determined that stage 1 of this alternative has not adequately improved the quality of the city aquifer, stage 2 may be implemented. Implementation of the stage 2 pump-and-treat system would provide an additional reduction in the risk of exposure to contaminated groundwater by preventing further migration of contamination from this source.

Reduction of Toxicity, Mobility or Volume though Treatment

Alternatives 1 and 2 provide no removal or treatment of contaminated soils or groundwater, and therefore provide no reduction in toxicity, mobility or volume of contaminated materials.

The cap that would be installed in stage 1 of Alternative 3, if property maintained, should reduce the mobility of contaminants, without treatment, thereby minimizing additional contamination of the groundwater from this source area. Stage 1 of this alternative does not provide any reduction in toxicity or volume of contaminated material. If the stage 2 pump-and-treat system is implemented, this system would further reduce the mobility of contamination by preventing off-Site migration. The reduction in toxicity, mobility and volume for Alternative 3A is identical to stage 2 of Alternative 3.

Stage 1 of Alternative 4 provides treatment of contaminated soil and capture and treatment of contaminated groundwater using VER or SVE/AS. This system would reduce the mobility of contaminants by capture, and upon completion of the remediation, would significantly reduce the volume of contaminated soil at this source area. Reduction of the contaminant levels in the groundwater within the influence of the system might also be achieved under this alternative. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the mobility of remaining contamination by preventing off-Site migration.

Stage 1 of Alternative 5 provides a reduction in toxicity, mobility and volume of contaminated soil by excavation and off-Site treatment and disposal of contaminated media. Contaminated soil removed from the

Site would no longer pose any risk of further contamination of the groundwater. If stage 1 does not adequately meet the RAOs and stage 2 is implemented, the groundwater pump-and-treat system would further reduce the mobility of remaining contamination by preventing off-Site migration.

Implementability

Alternative 1 would be easily implemented, as it does not include any remedial activities. Alternative 2 may be difficult to implement, since it requires cooperation from individual property owners, which is difficult to enforce. Minor construction activities (e.g., fence) included in this alternative would be easy to implement, and would not require a significant administrative effort. Long-term maintenance would be required for Alternative 2.

Alternative 3 would involve on-Site construction. However, capping is a readily available and well-developed technology that could be completed using conventional construction techniques. Long-term maintenance of the cap would be required. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at Sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system. The implementability of Alternative 3A is identical to the implementability of stage 2 of Alternative 3.

For Alternative 4, on-Site construction activities would be minor, consisting of well installation and construction or mobilization of a small treatment system. A pilot test will be necessary at the Loohns source area in order to determine whether VER or SVE/AS would be the more effective means of treatment and to design the treatment system. However, in situ treatment technologies are still considered innovative, and there are only a small number of vendors offering these services. In addition, effective operation requires intensive monitoring and assessment. Administratively, coordination with local authorities and other agencies may be required for the discharge of treated water and vapor; however, this alternative does not involve any off-Site transportation of hazardous materials. If stage 2 of this alternative is required, it would be relatively easy to implement technically, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at Sites with contaminated groundwater. Administratively, the requirements would be similar to the requirements for a VER or SVE/AS system.

Alternative 5 would require excavation to depths of approximately 22 feet with approximately 14 feet below the water table. Dewatering and shoring would be required; however, this alternative could be implemented using conventional construction techniques. Off-Site RCRA storage, treatment and disposal facilities are available for treatment and disposal of VOC contaminated soil. Administratively, this alternative would be moderately difficult to implement, since it would require coordination with the local authorities and other agencies for transportation, treatment and disposal of hazardous materials. If stage 2 of this alternative is required, it would be relatively easy to implement techincally, since groundwater pump-and-treat systems consist of readily available technologies and are routinely installed at Sites with contaminated groundwater. Administratively, coordination with local authorities may be required for the discharge of treated water and emissions from the treatment system.

Cost

The 30-year net present worth (NPW) of the remedial alternatives for the Loohns source area range from $0 to $4,186,299, based on a discount rate of 7%. Alternative 1 and 2 are the least expensive to implement, with NPWs of $0 and $152,295, respectively. Alternative 3 (stage 1) is slightly more expensive, with a NPW of $256,340. If stage 2 of Alternative 3 is implemented, the overall cost of this alternative is approximately $890,344, but treatment of contaminated groundwater is provided. Alternative 3A, which includes pump-and-treat for a longer period of time, but no capping, has a NPW of $1,070,610. Alternative 4 (stage 1) is significantly more expensive than Alternative 3 (stage 1), with a NPW of $1,011,024. If stage 2 of Alternative 4 is implemented the cost increases to $1,645,028, and additional groundwater treatment is provided. Alternative 5 (stage 1) is significantly more expensive than Alternative 4 (stage 1), with a NPW of $3,552,295. If stage 2 of Alternative 5 is implemented groundwater treatment is provided, and the NPW is $4,186,299.

Cost estimates are summarized in Table 2.

- State Acceptance

- Community Acceptance

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

PREFERRED ALTERNATIVES

Based upon an evaluation of the six alternatives, EPA recommends Alternative 4 for the Alcas and Loohns Dry Cleaners and Launderers source areas; Alternative 5 for the AVX source area; and Alternative 3A for the McGraw Edison source area.

ALCAS and Loohns Dry Cleaners and Launderers

After carefully weighing all of the alternatives, EPA believes that Alternative 4 would be most effective in protecting human health and the environment, while being the most cost effective for the Alcas and Loohns source areas.

EPA is also recommending that Alternative 5 be selected as a contingency for remediating the Loohns source area. Alternative 5 would be implemented if the pilot testing, which is planned for the Loohns property, indicates either that a VER or SVE/AS system would be ineffective or, if running either system would be infeasible due to the effects of the Allegheny River. While not quite as cost effective as Alternative 5 would be just as effective in protecting human health and the environment.

Treatability pilot tests, which were conducted in November 1994, indicated that an VER system would be effective in remediating the contaminated soils at the Alcas property. A pilot test will also be necessary at the Loohns source area in order to determine whether VER or SVE/AS would the more effective means of treatment.

Alternative 4 involves two different types of in-situ treatment systems: SVE with Air Sparging (SVE/AS) and Vacuum Enhanced Recovery (VER). A VER system uses negative air pressure, which is applied to a series of recovery wells. The negative pressure, which is generated by high vacuum pump, causes the movement of soil vapor and groundwater towards the recovery wells. The vapor recovery causes desorption (removal of contaminants, which are absorbed onto soil particles) and volatilization of VOCs by continuously removing contaminated vapors and forcing clean air into the contaminated areas. An off-gas treatment system would remove contaminants which are above federal and New York State air emission levels using granulated activated carbon (GAC). Groundwater, which is recovered with the soil vapor, would also be treated with GAC prior to discharge to the City sewer system.

An SVE/AS system would use a soil vapor recovery process combined with air injection wells, which would extend below the water table. Air, which is injected under pressure into the wells, would enter water below the water table. The air bubbles, which are formed, traverse horizontally and vertically through the water column. Volatile compounds, which are exposed to the sparged air, volatilize into the gas phase and are carried into the vadose zone where they are captured by a vapor recover system. An off- gas treatment system would use GAC to remove contaminants which are above federal and New York State air emission levels. Groundwater, which is recovered with the soil vapor, would also be treated with GAC prior to discharge to the City sewer system.

The SVE/VER systems would be operated until contaminant levels in the soil vapor and water effluents cease to decline and remain constant at a negligible rate. At which time, the systems will be shut off. After the SVE/VER systems are shut off, soil samples would be collected to confirm the effectiveness of the alternative.

Any contamination which can not be removed by implementation of a VER or SVE/AS system may be addressed by the installation of a groundwater pump and treat system. The need for groundwater treatment will be assessed every four years and will be based on a review of sample data for the influences to the City Municipal wells M18 and M37/38 and up and downgradient groundwater samples from Loohns and Alcas.

According to Table 2, the cost for implementing Alternative 4 is $837,721 for ALCAS. The costs for implementing Alternatives 4 and 5 is $1,654,028 and $4,186,299, respectively, for Loohns. Alternative 4 is the more cost effective alternative for both source areas.

AVX

After carefully weighing all of the alternatives, EPA believes that Alternative 5 would be most effective in protecting human health and the environment, while being cost effective for the AVX source area. The area of contaminated soil is very shallow (approximately 6 feet below the surface), which would be easily amenable to excavation. The soil to be excavated is located in and around soil borings SB04 and SB07 and is estimated to be 10,000 cubic feet.

Contaminated soil at AVX would be excavated and tested to determine if it is a RCRA hazardous waste material. If hazardous, the soils would be transported to an off-Site facility for low temperature desorption of soil contaminants. If not hazardous, the soils would be disposed of at a local landfill. Clean fill material would be brought in to restore the excavated area to grade. Confirmatory soil sampling and analyses would be conducted during soil excavation to ensure that all soils with contaminant levels higher than the levels provided in Table 1 of this Proposed Plan are removed.

Until restoration of the excavated areas is complete, land use/access restrictions (if necessary) would be placed on the source area to restrict its use. During all phases of the soil removal, it will be necessary to implement dust and volatile emission control, soil erosion and sediment control measures.

Alternative 5 proved to be more cost effective than Alternative 4, which was also found to be protective of human health and the environment. The estimated cost for Alternative 5 was $1,010,299 verses $1,747,533 for Alternative 4.

Any contamination which is not be removed from AVX, will be addressed, if necessary, by the installation of groundwater pump and treat system. The need for groundwater treatment will be assessed every four years and will be based on a review of sample data for the influences to the City Municipal wells M18 and M37/38 and up and downgradient groundwater samples from AVX.

McGraw-Edison

After carefully weighing all of the alternatives, EPA believes that Alternative 3A would be the most effective in protecting human health and the environment, while being the most cost effective for the McGraw Edison source area. An extensive investigation of the facility was conducted during the SRI, but no soil contamination was found, which could act as a source of contamination to the groundwater. However, groundwater contamination was detected at the facility, which EPA believes is the result of previous disposal activities. By capturing and treating the groundwater rather than letting it be treated by the municipal wells, cleanup of the aquifer can be expedited. Contaminated groundwater from the upper aquifer will be pumped and treated by an existing air stripping system, which is currently treating groundwater from the lower aquifer. The existing air stripper has enough excess capacity to treat additional groundwater from the upper aquifer. Groundwater monitoring will also be instituted up and downground of the source area in order to determine the continued effectiveness of the remedy.

Site Monitoring

EPA also proposes to expand the list of chemical compounds, which are currently being tested for under the current groundwater Site monitoring plan (SMP). The PRPs were the EPA Administrative Order issued on February 7, 1986. The plan was required in order assess the condition of the groundwater in the upper and lower aquifers as the remedies, which were specified in EPA's 1985 ROD were implemented. Currently, the SMP specifies that 13 groundwater monitoring wells be sampled every three months for the presence of trichloroethane, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichoroethene, 1,2-dichloroethane and tetracholoroethene.

During the supplemental RI/FS, other VOCs, which were not tested for as part of the SMP, and chromium were detected in the groundwater. Because of these other contaminants, EPA is proposing that the SMP be revised to include analyses for a full scan of volatile organic compounds and chromium. EPA will use the expanded SMP data along with the groundwater monitoring data which will be collected to determine whether or not groundwater pump and treat is needed for the AVX and Loohns's source area properties, and to access the overall improvement of the groundwater was the source control remedies are implemented.

NEXT STEPS

After EPA presents the preferred alternatives at the public meeting on July 16, 1996 and receives comments and questions during the public comment period. EPA will evaluate and respond to these questions and comments in a Responsiveness Summary. The Responsiveness Summary will become part of the Record of Decision (ROD) for the Site.

The ROD will also include a description of the final alternatives selected by EPA, the rational for selecting them, a discussion of the alternatives that were considered, but rejected, and the reasons for rejecting them.

EPA will place the ROD in the Administrative Record, which is located at Region 2's office at 290 Broadway, NY, NY, and at the public repository listed on page 2. The Administrative Record file includes all Site findings, reports and other documents that were relied upon EPA in formulating its decision regarding remedy selection. If the final remedy selections differ significantly from those presented in this Proposed Plan, EPA will include a discussion of the changes in the ROD.

Upon acceptance and final approval of the remedies, EPA will give the PRPs an opportunity to implement the remedies described in the ROD.

TABLE 2

PRESENT WORTH AND CAPITAL AND OPERATION AND MAINTENANCE COSTS BY SOURCE AREA

	Alternative 2 Institutional Controls	Alternative 3 Capping (Stage 1)	Alternative 3 Capping and Groundwater Treatment (Stage 1 & 2)	Alternative 3A Groundwater Treatment	Alternative 4 In-Situ Treatment using VER or SVE/AS (Stage 1)	Alternative 4 VER OR SVE/AS and Groundwater Treatment (Stages 1 & 2)	Alternative 5 Soil Excavation (Stage 1)	Alternative 5 Soil Excavation and Treatment (Stage 1 & 2)
ALCAS								
Capital Cost	$22,000	$81,000	-	-	$158,000	-	$883,200	-
O&M[2](1-5 yrs.)	$10,500	$17,500	-	-	$144,500	-	$10,500	-
O&M(6-30 yrs.)	$10,500	$17,500	-	-	$10,500	-	$10,500	-
PW1 of O&M	$130,295	$217,158	-	-	$679,721	-	$130,295	-
Total PW	$152,295	$298,158	-	-	$837,721	-	$1,013,495	-
AVX								
Capital Cost	$35,000	$32,000	$192,400	$233,000	$278,000	$438,400	$246,000	$406,400
O&M(1-5 yrs.)	$10,500	$12,500	$12,500	$67,500	$182,500	$182,500	$10,500	$10,500
O&M(6-30 yrs.)	$10,500	$12,500	$69,500	$67,500	$10,500	$67,500	$10,500	$67,500
PW of O&M	$130,295	$155,113	$628,717	$837,610	$835,529	$1,309,133	$139,295	$603,899
Total PW	$165,295	$187,113	$821,117	$1,070,610	$1,113,529	$1,747,533	$376,295	$1,010,299
McGraw Edison4								
Capital Cost	$8,000	-	-	$98,000	-	-	-	-
O&M (1-5 yrs.)	$10,500	-	-	$67,500	-	-	-	-
O&M (6-30 yrs.)	$10,500	-	-	$67,500	-	-	-	-
PW of O&M	$130,295	-	-	$837,610	-	-	-	-
Total PW	$130,295	-	-	$935,610	-	-	-	-
Loohns Dry Cleaners								
Capital Cost	$23,000	$64,000	$224,400	$233,000	$278,000	$438,400	$3,422,000	$3,582,400
O&M(1-5 yrs.)	$10,500	$15,500	$15,500	$67,500	$157,500	$157,500	$10,500	$10,500
O&M(6-30 yrs.)	$10,500	$15,500	$72,500	$67,500	$10,500	$67,500	$10,500	$67,500
PW of O&M	$130,295	$192,340	$665,944	$837,610	$733,024	$1,206,628	$130,295	$603,899
Total PW	$153,295	$256,340	$890,344	$1,070,610	$1,011,024	$1,645,028	$3,552,295	$4,186,299

1 - Present Worth and capital and operation and maintenance costs for groundwater treatment are not presented, since groundwater remediation will not be necessary at the Alcas source area.

2 - PW - Present Worth based on a 7 percent discount rate.

3 - O&M - Operation and maintenance costs.

4 - Capital, present worth, and operation and maintenance costs were not calculated for Alternatives 3, 4 or 5, since soil remediation will not be necessary at the McGraw-Edison source area.

GLOSSARY

Of Terms Used In the Proposed Plan

This glossary defines the technical terms used in this Proposed Plan. The terms and abbreviations contained in this glossary are often defined in the context of hazardous waste management, and apply specially to work performed under the Superfund program. Therefore, these terms may have other meanings when used in a different context.

Administrative Order on Consent: A legal and enforceable agreement between EPA and the potentially responsible parties (RPRs). Under the terms of the Order, the PRPs agree to perform or pay for Site studies or cleanup work. It also describes the oversight rules, responsibilities and enforcement options that the government may exercise in the even of non-compliance by the PRPs. This Order is signed by the PRPs and the government; it does not require approval by a judge.

Administrative Order: A legally binding document issued by EPA directing the potentially responsible parties to perform Site cleanups or studies (generally, EPA does not issue unilateral orders for Site studies.)

Aeration: A process that promotes breakdown of contaminants in soil or water by exposing them to air.

Air stripping: A process whereby volatile organic chemicals are removed from contaminated material by forcing a stream of air through it in a pressurized vessel. The contaminants are evaporated into the air stream. The air may be further treated before it is released into the atmosphere.

Aquifer: An underground layer of rock, sand, or gravel capable of storing water within cracks and pore spaces, or between grains. When water contained within an aquifer is of sufficient quantity and quality, it can be tapped and used for drinking or other purposes. The water contained in the aquifer is called groundwater.

Backfill: To refill an excavated area with removed earth; or the material itself that is used to refill an excavation area.

Borehole: A hole drilled into the ground used to sample soil and groundwater.

Borrow pit: An excavated area where soil, sand, or gravel has been dug up for use elsewhere.

Cap: A layer of material, such as clay or a synthetic material, used to prevent rainwater from penetrating and spreading contaminated materials. The surface of the cap is generally founded or sloped so small will drain off.

Carbon adsorption/carbon treatment: A treatment system in which contaminants are removed from groundwater and surface water by forcing water through tanks containing activated carbon, a specially traced material that attracts and holds or retains contaminants.

Consent decree: A legal document, approved and issued by a judge, formalizing an agreement between EPA and the potentially responsible parties (PRPs). The consent decree

describes cleanup actions that the PRPs are required to perform and/or the costs incurred and/or will be incurred by the government that the PRPs will reimburse, as well as the roles, responsibilities, and enforcement options that the government may exercise in the event of non-compliance by RPRs. If a settlement between EPA and the PRPs includes cleanup actions, it must be in the form of a consent decree. A consent decree is subject to a public comment period.

Consent Order: A legal and enforceable agreement between EPA and the potentially responsible parties (PRPs). Under the terms of the Order, the PRPs agree to perform or pay for Site studies or cleanup work. It also describes the oversight rules, responsibilities and enforcement options that the government may exercise in the event of non-compliance by the RPRs. This Order is signed by the RPRs and the government; it does not require approval by a judge.

Containment: The process of enclosing or containing hazardous substances in a structure, typically in ponds and lagoons, to prevent the migration of contaminants into the environment.

Cooperative agreement: A contract between EPA and a state wherein the State agrees to manage or monitor certain Site investigation and/or cleanup responsibilities and other activities on a cost-sharing basis.

Downgradient/downslope: A downward hydrologic slope that causes groundwater to move toward lower elevations. Therefore, wells downgradient of a contaminated groundwater sources are prone to receiving pollutants.

Effluent: Wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Generator: A facility that "generates" hazardous wastes.

Hot Spot: An area or vicinity of a Site containing exceptionally high levels of contamination.

Hydrogeology: The geology of groundwater, with particular emphasis on the chemistry and movement of water.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment system.

Long-term remedial phase: Distinct, often incremental, steps that are taken to solve Site pollution problems. Depending on the complexity, Site cleanup activities can be separated into a number of these phases.

Maximum Contaminant Level (MCL): The maximum level, or concentration, of a contaminant that is allowable in a public drinking water supply.

Migration: The movement of contaminants, water, or other liquids through porous and permeable rock.

Mitigation: Actions taken to improve Site conditions by limiting, reducing, or controlling toxicity and contamination sources.

Outfall: the place where wastewater is discharged into receiving waters.

Potentially Responsibilities Parties (PRPs): Parties, including owners, who may have contributed to the contamination at a Superfund Site and may be liable for costs of response actions. Parties are considered PRPs until they admit liability or a court makes a determination of liability. This means that PRPs may sign a consent decree or administrative order on consent (see consent decree and Administrative Order on Consent) to participate in Site cleanup activity without admitting liability.

Remedial: A course of study combined without actions to correct Site contamination problems through identifying the nature and extent of cleanup strategies under the Superfund program.

Runof: The discharge of water over land into surface water. It can carry pollutants from the air and land into receiving waters.

Sediment: The layer of soil, and minerals at the bottom of surface waters, such as streams, lakes, and rivers that absorb contaminants.

Stripping: A process used to remove volatile contaminants from a substance (see Air Stripping).

Trichloroethylene (TCE): A stable, colorless liquid with a low boiling point. TCE has many industrial applications, including use as a solvent and as a metal degreasing agent. TCE may be toxic to people when inhaled, ingested, or through skin contact and can damage vital organs, especially the liver [see also Volatile Organic Compounds.]

Unilateral Order: A legally binding document issued by EPA directing the potentially responsible parties to perform Site cleanups or studies (generally, EPA does not issue unilateral orders for Site studies).

Upgradient/Upslope: Upstream; an upward slope. Demarks areas that are higher than contaminated areas and, therefore, are not prone to contamination by the movement of polluted groundwater.

Volatile/Semi-Volatile Organic compounds Compounds (VOCs/SVOCs): VOCs vaporize easily; SVOCs vaporize less easily. Both include carbon-based compounds such as solvents and oils. Organic chemicals have varying degrees of solubility in water. VOCs tend to be more soluble in water than SVOCs.

Vadose Zone: A subsurface zone which is defined by the ground surface and the water table.

Wetland: An area that is regularly saturated by surface or groundwater and, under normal circumstances, capable of supporting vegetation typically adapted for life in saturated soil conditions. Wetlands are critical to sustaining many species of fish and wildlife. Wetlands generally include swamps, marshes, and bogs. Wetlands may be either coastal or inland. Coastal wetlands have salt or brackish (a mixture of salt and fresh) water, and most have tides, while inland wetlands are non-tidal and freshwater. Coastal wetlands are an integral component of estuaries.

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APPENDIX V

RESPONSIVENESS SUMMARY

APPENDIX B

PUBLIC NOTICES

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APPENDIX V

RESPONSIVENESS SUMMARY

APPENDIX C

PUBLIC MEETING ATTENDANCE SHEETS

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APPENDIX V

RESPONSIVENESS SUMMARY

APPENDIX D

PUBLIC MEETING TRANSCRIPT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PUBLIC MEETING

Olean Well Field Site
Proposed Remedial Action Plan

Public meeting held at the Olean Municipal Building, Olean, New York, on Tuesday, July 16, 1996, commencing at 7:00 P.M., before Theresa M. McGreevy, R.P.R., Notary Public.

Theresa M. McGreevy
Registered Professional Reporter
202 Lehn Springs Drive
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PRESENT:

KEVIN LYNCH
US Environmental Protection Agency

TOM TACCONE
US Environmental Protection Agency

MR. LYNCH: I'd like to thank everyone for coming tonight. I'm Kevin Lynch. I am chief of the EPA's Western New York Superfund Section. Tonight we're presenting the proposed plan for the source control section at the Olean Superfund site. Copies of the proposed plan are - - hopefully everybody picked them up on their way in. They are available in the front of the room if everyone doesn't have one. We also have a mailing list that I think most of you are on. If you're not and would like to be on it, if you've signed in this morning, you'll automatically be put onto it - - this evening, excuse me.

The purpose of this meeting tonight is to present the proposed remedy for the source control action at the Olean Superfund site and to elicit your comments on that plan. Any comments or questions from today's meeting are being recorded by the court reporter and will be part of the administrative record for the site. The other way to comment on the site is to comment in writing to Tom Taccone, the site manager. The address is in the proposed plan. And the public comment period will be open until August 8th.

After considering your comments, the EPA will then make a decision on the actions to take at this site. This will be published in a document that we call the Record of Decision. Responses to these comments will be included in that Record of Decision document.

Tonight there'll be two presentations. I will make the first one, which I will describe the process which we use in Superfund to address sites. Tom Taccone, project manager, manager for the Olean site will be summarizing the remedial investigation/feasibility study, then presented - - presenting the recommended alternatives for the site. Then we will take questions.

Also with us today is Steve Scharf from the New York State DEC, who is at the front desk, Sharon Kivowitz from EPA, the attorney for the site, from Foster Wheeler the EPA consultant Bob Chozick, from the New York State Department of Health, Lani Rafferty, and from the Cattaraugus County Health Department, Eric Wohlers.

In 1979 a number of environmental disasters occurred, the best known of which was Love Canal, where people discovered that they were living on a hazardous waste site. The U.S. Government at that time did not have a way to respond except for the way it would normally respond to natural disasters such as hurricanes. The response of that, in 1980 Congress passed the Comprehensive Environmental Response Compensation and Liability Act known as CERCLA, where they created a one point six billion dollar fund to address such sites. The law simply is usually known as a Superfund Law, based on that one point six billion dollar sites.

It allows us to address sites in two different ways. One, it allows us to have a quick action such as in an emergency or an action to prevent an emergency situation from developing. This is called a removal action. A removal action was taken at Olean when it was discovered that people's wells were contaminated with high levels of Chemicals, of a chemical solvent. Individual treatment systems were placed on those individual wells to protect those people until a more permanent solution could be reached. The other way to address a site is the normal way we would do it, and that would be to take a what we call response act.

The law also allows EPA to order parties responsible for contributing to the problem to take actions. These parties didn't have to have done anything illegal, they just have to have contributed to the problem. These are the parties that are liable, the owners or operators of the site. They could be generators of the hazardous substances that ended up at the site or they could be transporters of those substances to the site. This is a strict liability law. The idea is that if you are part of the problem, you should be part of the solution. This is important, because the one point six billion dollars that was first created in the fund and the over eight billion dollars that was added when the law was reauthorized in 1986 is not enough to clean up all of the problems. The problems are much more expensive to address than originally thought, and there are a lot more of the problems. So having the potentially responsible parties involved in the cleanups allow us to address a lot more sites. The law also requires that we address the worst sites first. We have developed a National Priorities List in order to ensure that we do that.

This slide, if you can read it, shows how our regulations require us to address the site. When a site is first discovered, the State will nominate the site for the National Priorities List. We will then go out and do what is called a preliminary assessment, which is gathering all the information that is already known about the site, things like what contamination - - contaminants are there at the site, what's the population around the site, where is the nearest drinking water source. More information is needed. We will do a site investigation which is where you go out, physically look at the site, take some environmental samples to gather some of this information. This information then is put into numerical model in an attempt to rank the site. If it ranks above a certain number, it goes on the National Priorities List and we can address the site with Superfund money. If not, it goes back to the State for them to address.

Once on the National Priorities List, we then perform a remedial investigation and feasibility study. The remedial investigation is a study to determine the nature and the extent of the problem. Basically we want to know what is at the site, where is it going, and what problems is it creating. We do this by going out into the environment and taking samples such as soil samples, putting in monitoring wells to determine which way the groundwater's flowing and what's in the groundwater, take that information and put it into a risk assessment. A risk assessment is an attempt to quantify what are the risks to human health that are out there on the site. You need both a contaminant and you need a pathway for that, and it's a calculation to determine what are the potential risks to the people in the area.

A feasibility study is then performed, and that is the study that identifies different alternative solutions to the problems, and then evaluates those alternatives using nine criteria. Criteria are the overall protectiveness of human health and the environment, the compliance with other environmental laws and regulations, the long-term effectiveness and permanence of the alternative, how does it reduce the toxicity, mobility or volume through treatment, what are the short-term effects, how easily can it be implemented, what is the cost, and what is the State acceptance and what is the community acceptance of the remedy.

EPA then identifies the alternative solution that we think is the best way to address the problem. We then present that preferred alternative to the public, which we're doing tonight, and we get the public's impute on it. Then we choose a remedy, publish it in what we call a Record of Decision. This remedy is then designed and implemented.

We have been through this process once before at Olean, where the result of was to install a cleaning system at the public supply wells and extend the water line to areas affected by the contamination. We are again going through the process to select a remedy, this time to stop those sources of contamination to the aquifer.

The documents we have produced can be of a highly technical nature, and the EPA does have availability a grant program where funds can be provided to citizens groups to hire independent contractors to help them interpret and comment on the sites. If anyone would like information on that, we can provide it for them later, and we can also have people from our information office in Niagara Falls assist them in putting together that application.

Tom Taccone will now summarize the remedial investigation/feasibility study and present the EPA's preferred alternative.

MR. TACCONE: Good evening. My name is Tom Taccone, and I am the project officer of the Olean Well Field Superfund site. And I'm going to provide for you a brief summary of the history of the site, present the results of a supplemental remedial investigation/feasibility of the site, which was recently completed, and summarize EPA's proposed plan for cleaning up four areas of contaminated soil and groundwater. Copies of the plan as Kevin mentioned are available at the front of the room.

Site history: Early in 1981 three municipal water supply wells in the City on Olean were found to be contaminated with trichloroethane, a volatile organic compound. Trichloroethane, or TCE, is a solvent commonly used for degreasing. The chemical was detected in the municipal water, well water concentrations which are above safe concentrations established by the New York State Department of Health. Now, this is a map of the site over here. This is the Allegheny River, and this is State Street that runs along the site. The wells I'm referring to are located north and south of the river. There's one well designated well 18M, as in Mary, north of the river, and two wells located close to one another designated 37, 38M south of the river.

The wells were closed down and an old surface water treatment plant was reactivated to provide water to the city residents. Additional tests by the Cattaraugus Health Department in 1982 revealed that sixteen private wells in the area were also contaminated with high levels of TCE. EPA installed carbon adsorption filters on the wells. And these filters are devices which removed contaminants such as TCE from the water. EPA also established a well testing program so that further contamination could be detected.

In 1984 and 1985 results from the well testing program prompted two additional EPA responses, and filters were placed on thirteen additional wells. also during 1984 and 1985, the New York State Department of Environmental Conservation, the DEC, received funding from EPA to conduct a remedial investigation/feasibility study, also called the RI/FS, of the site. The purpose of the study was to determine the nature and extent of contamination, identifying any potential risks to human health and the environment and evaluate alternatives for eliminating any risks. The

State - - the study essentially focused on investigating for the presence of contaminants in the groundwater.

The City of Olean is underlaid by two water - bearing zones, or aquifers. This is a generalized figure which will help describe what an aquifer is. This heavy line you see on the top is the surface of the ground. This dotted line would be the top of the upper water - bearing zone, or aquifer. And that is on average about ten feet below the ground surface in Olean. Continuing down, one would then encounter a layer of lesser permeability, meaning water cannot readily pass through it, and then there would be the lower aquifer, or the lower water-bearing zone. The municipal wells collect water from this lower zone. And this third, this bottom layer here doesn't existing Olean. This is just a generalized diagram.

The RI/FS sample date revealed widespread contamination of TCE in the upper and lower aquifers. In may 1985 the State DEC completed the RI/FS, and after evaluating the results of the study, EPA decided in September of 1985 on the following remedies: First, air strippers, which are treatment devices which remove volatile organic compounds such as TCE from water were installed on the wells, 18M and 37, 38M, located north and south of the river. Construction of the air strippers was completed in 1990. Both air strippers are currently operating and effectively treating contaminated water to below the safe drinking water limits.

Second, the City of Olean's water supply was extended into the Town of Olean. Ninety-three private well users were hooked up. Construction of the extension was completed in 1989.

Third, an industrial sewer at McGraw Edison, located in, right over - - this diagram is, figure one of the proposed plan, McGraw Edison, it was an industrial sewer located at that part of the site or at that property, and the sewer was acting as a conduit for contamination. Groundwater was emptying one end of the sewer and exiting further down. That sewer was repaired in 1989.

And finally, EPA decided that a supplemental

RI/FS study should be conducted of the site. The objective of the supplemental RI/FS was to identify sources of contamination to the groundwater and to determine how to remove or prevent the sources from contaminating the groundwater which flows toward the municipal wells.

In June 1991 the Alcas Corporation, the AVX Corporation, the Aluminum Company of America, McGraw Edison and Cooper Industries signed an administrative consent order with EPA. The order required the companies to determine the extent of contamination at the AVX, located to the north, the Alcas, and the McGraw Edison properties. The companies were also required to draft the supplemental RI/FS report.

In addition to the field work at the three properties, EPA, through a consultant, now called Foster Wheeler, investigated ten other properties. And these were American Olean Tile, Olean Steel, Loohns Dry Cleaners, depicted on the map as Olean Clean All. The names have been changed since to Loohns Dry Cleaners. Mastel Ford, a Ford dealership, two oil companies, Griffith and

Sandburg Oil, a private dump and a borrow pit located just south of the river. That borrow pit's a common disposal area. American Olean Wholesale, and finally Faye Avenue and Schaefer Road.

In 1991, 1993 and 1995, soil samples were collected from sixty-nine separate locations of the thirteen areas. At each location discrete soil samples were collected at regular intervals from the ground surface to the top of the upper aquifer, or the top of the upper water-bearing zone. Groundwater samples were also collected from groundwater monitoring wells at Olean Wholesale, Olean Steel, Sandburg, Griffith Oil, Loohns Dry Cleaners, McGraw Edison, and at other selected wells throughout the site.

Groundwater grab samples were also collected at many of the soil sample locations when the top of the water table - - when the water table at the top of the upper aquifer was reached. The grab samples were collected to try to establish a link between contamination in the soil and the groundwater.

And finally sediment samples were taken of the wetlands area located just south of the AVX property, and these samples were taken to determine if there was any impact of AVX on the wetlands area.

In the next several slides I'll summarize for you the results of the supplemental remedial investigation. Before I do that, let me describe to you how EPA determined whether or not properties that were investigated were a source of contamination to the groundwater.

We looked at the soil data, soil samples were taken of each of the properties, as I mentioned. The soil concentrations, contaminants in the soil were compared to a value called a soil cleanup objective. This is a value, it's different for different contaminants. It's been developed by the DEC and adopted by EPA for the site. Soil contaminations above that level, any water that's entering the soil would contaminate the groundwater. The contamination would be high enough to be a threat to the groundwater. If the soil contamination was below that, it wouldn't affect the groundwater.

The ground was tested at the site, each of the properties, and was compared against a value called an MCL, this is the maximum contaminant level, and it represents a level that if it's exceeded the water will be unsafe to drink. Below that MCL level the water is safe to drink. And the second criteria EPA uses is whether or not the groundwater flowing to and from an area that was investigated could flow toward the municipal wells.

The Alcas property was sampled, and because of the contaminants we found in the soils, considered to be a source. 1,1,1-TCA, that's trichloroethane. These are abbreviations for the contaminants found. TCE, trichloroethane, as I mentioned, and PCE, tetrachloroethane. These are solvents. These are the concentrations detected in the soil. Ppb is parts per billion. And these are the soil cleanup objectives for each of those compounds.

A VOICE: Just for a - - Alcas, you mean AVX.

MR. TACCONE: I'm sorry, AVX.

Groundwater grab samples were collected when the groundwater was reached at the soil borings. A boring is when we drill down, collect the discrete soil samples. The groundwater grab samples also found TCA, TCE and PCE in the groundwater, above MCL values. Now, these are grab samples. They're not monitoring well samples. Because of that the sample results are approximate, but these results are fine enough - - I'm sorry. Yes, the groundwater samples, they're groundwater grab samples, and because of that they're approximate. Groundwater monitoring well samples give a more exact result. And the contamination that was found at AVX is high enough to show groundwater contamination.

The AVX property was also sampled, the soil was evaluated. TCE,DCE and vinyl chloride were found in the soil. TCE and DCE were above the soil cleanup objectives. Because of that we're considering it a source area. The groundwater was tested at that property. TCE, DCE, and vinyl chloride were also found in the groundwater above the MCL values.

A VOICE: That's Alcas.

MR. TACCONE: Alcas.

Loohns Dry Cleaner was evaluated. The soil was tested at this property. TCE, PCE, 2-butanone, all called methylethylketone, solvents, dry cleaning solvents, were found at high levels in the soil. This is considered a source area. These three contaminants were found above the soil cleanup up objectives. Groundwater samples taken at that property showed elevated levels of DCE and PCE in the groundwater.

McGraw Edison, the soil was also sampled. The soil was sampled at this property, but we didn't find any soil contamination at that property. The groundwater was tested and found to have contaminants. TCE was found in both the upper and lower aquifers. Considered a source area, above the MCL levels. And these are well samples, these are not grab samples, so the results we have are more accurate, representative of what's in the groundwater.

Sandburg Oil was found to be a source of contamination to the groundwater. Xylene was found. The contaminants in the soil were above the soil cleanup objective. Benzene, ethylbenzene and xylene were found in the groundwater, in the groundwater grabs, above the MCL levels.

Griffith Oil had benzene, toluene, xylene and ethylbenzene in the soil, all above soil cleanup objectives. DCE, TCE and benzene were also found in the groundwater above MCL levels.

Now, the contamination that was found in Sandburg and Griffith Oil are all petroleum related. Benzene, xylene, toluene, all are components of gasoline. And because of that, EPA cannot spend fed resources, Superfund money, for the cleanup of petroleum contamination. Because of that, we're referring these properties to the DEC for action under the Oil Spill Cleanup Program, the State Oil Spill Cleanup Program.

The other properties we investigated, we didn't find soil above the cleanup objective, and we didn't find groundwater that was above MCLs. These are the properties, were American Olean Tile, Olean Steel, the private dump, the borrow pit, Mastel Ford, and the area Schaefer Avenue and - - Faye Avenue and Schaefer Street.

And again to summarize, the criteria we used for determining whether or not an area was investigated as a source, we looked at the contaminants in the soil to see that they were above the soil cleanup objective, a value that's been developed for the site. If the soil contaminants were above this level, they could, considered - - the soil was considered a threat to the groundwater. We looked at the groundwater sample results to see if it was above the MCL. And we looked at the groundwater movement, to see if it could flow toward the municipal well, bringing in any contamination in the groundwater and soil to the municipal wells.

Now, using these two criteria, EPA identified the source areas, Alcas AVX, Loohns Dry Cleaners, McGraw Edison and the two oil companies, Sandburg and Griffith Oil. But again we're referring the other companies to the DEC for action under the Oil Spill Cleanup Program.

The soil and groundwater data were then evaluated to determine if the contaminants which were found could pose an unacceptable risk to human health and the environment. However, before I explain to you the risk assessment process, let me first say that the people in the Town and City of Olean are drinking safe water. The risks which exist at the site are for someone who would drink untreated water from the ground, not from the city water supply.

There's a four-step process involved for assessing and evaluating human risks. Hazard identification, exposure assessment, toxicity assessment and risk characterization.

First step, hazard identification, and this involves identifying those chemicals or contaminants at the site which could cause harm. And you see here, these are the contaminants of concern that were identified in the hazard identification step.

Exposure assessment. This assessment - - this step is an assessment of the various pathways a chemical can take to affect people, contaminants in the soil or groundwater.

The third step is toxicity assessment, and this third step determines the types of adverse health effects which may be associated with the contaminants, and the relationship between the amount of exposure and the severity of the effect.

The fourth step is risk characterization of the risk assessment, and this last step combines the results of the exposure assessment and the risk assessment to produce a quantitative assessment of risk.

The risks that we found for the site, this is for groundwater ingestion, this is for drinking water, consuming. This would be over a thirty year period, drinking of water - - untreated water for thirty years. Adults and young children had a risk of cancer of one in one hundred. Older children would have risk of six in one thousand. Noncancer risks, this would be toxic effects. For the three exposure groups, adults, young children and older children, drinking of water for thirty years would have a risk that would be greater than one. For noncancer risks we use the hazard index. If it's greater than one, it's a, it's an unacceptable risk. If it's less than one, it's an acceptable risk.

We also found the risk of dermal contact, skin contact, and again, this is a risk over a thirty year period, untreated water. Adults would have a cancer risk of two in one thousand, two people in a population of one thousand. Young children would have a risk of nine in ten thousand. Older children, seven in ten thousand Noncancer or toxic risk were all less than one for those exposure groups.

The soil was also evaluated. Ingestion or consumption of soil or dermal contact with soil, but the risks we found - - we didn't find any risks associated with soil. However, the soil is contaminated enough to affect the groundwater and produce risk in the groundwater, and that's what the remedies that I'm going to be talking about shortly are all about.

Because of the potential risks, EPA is proposing to remediate or clean up the sources of contamination. The Federal Superfund Law requires that selected remedies be evaluated against nine criteria, and these are protection of human health and the environment. This is the ability of a remedy to reduce risk. The second criteria is the ability of a remedy to comply with other environmental laws. However effective the remedy is in the long-term. Number four, the way the remedy would reduce toxicity, mobility or volume of the contaminants through treatment. Short-term effectiveness, this would involve the amount of risks that could be created in the short term. Some remedies might produce an elevated risk because of the way the remedy would be conducted. Implementation, this is how easy or difficult the remedy might be implemented, technically or administratively. How costly a remedy would be The eighth criteria is State acceptance, and finally community acceptance.

There were six potential remedial alternatives that were considered for the source areas. And they are, first, the no action alternative was looked at, and a no action alternative is always looked at. It's used as a baseline fors cost and reduction of risk for the other alternative.

Alternative two would involve institutional controls, and this would include educational programs whereby the - - and for this site the groundwater would be tested, and people would be informed of the results, how contaminated the groundwater is, and in successive analyses of the water, and how toxic, how harmful the water might be to drink. This alternative would also include property. deed restictions which would control use of the property. And finally, a health a safety plan could be developed for the properties with contamination for safe use of the property.

The third alternative involves capping. Capping is simply an impervious layer that would be placed over the area of contaminated soil. This is a generalized figure. And it would simply prevent water from entering the contaminated soil, and if it's above the cleanup objective, then contaminating or adding contamination to the groundwater. Alternative three would also involve access restrictions, so that the integrity of the cap would be maintained.

Also a groundwater monitoring program would be instituted with this remedy, whereby the groundwater that enter - - that enter and leaves the source areas would be analyzed. We would look at the groundwater quality over time, and if over a certain period of time the groundwater quality improves sufficiently, that would be the end of the remedy. However, if it does not improve, EPA may require that the groundwater at the source areas be pumped and treated, and this would prevent the contamination from getting toward municipal wells.

The fourth alternative is groundwater treatment, and this would simply involve putting groundwater recovery wells at the source areas, pumping that water and treating it. No soil treatment would be required or called for under this alternative.

The fifth alternative, alternative five, involves the application of two very similar technologies, soil vapor extraction and vacuum enhanced recovery. Both types of treatment technologies involve drawing air through the contaminated soil. The contaminants for the site evaporate, and by pulling the air through the contaminated soil over time, you would slowly evaporate the contaminants and the concentration in the soil would be reduced. We would then institute a groundwater monitoring program which would be a gauge to see how well the BER or SVE system would be removing the contaminations - - contaminant source from he soil to the groundwater. And after looking at the groundwater quality over time, if the groundwater quality improves enough sufficiently so that source is not a threat to the municipal wells, that would be the end of the remedy. However, if the groundwater quality does not improve, we may institute groundwater treatment or the groundwater would be pumped and treated so that it could not get to the municipal wells.

The sixth and final alternative is excavation. This would simply involve removing the contaminated soil, excavation it until clean soil would be encountered. Contaminated soul would be transported off site and treated and then disposed of. A monitoring program would be set up, as with the other alternatives I mentioned. Groundwater quality would be monitored, coming to and from the site. It improves sufficiently over time, that would be the end of the remedy. However, if there is still contamination and still a threat to the municipal wells, EPA may require groundwater treatment at the source areas.

Those are the six potential alternatives, and for the source areas EPA is proposing the following: At the dry cleaners we are proposing that vacuum enhanced recovery or soil vapor extraction be used to remediate the soil at that property. Because this property is located so close to the Allegheny River, the river may cause a problem with the vapor recovery wells that would be used in SVE or VER. And because of that, we're proposing excavation to use as a backup remedy. There will be a pilot test that will be conducted at the Loohns Dry Cleaning property. We're planning on doing it later this year to see whether or not VER or SVE would be the better technology. VER works better in an environment or lower permeability because it uses a higher vacuum. And the river is a potential problem, and if it is, we'll go with excavation.

For the Alca property we're proposing that vacuum enhanced recovery be used. The pilot test was conducted at the Alcas property, and the test has shown that the technology will be effective in remediating the soil for that property.

At AVX we're proposing excavation.

And at McGraw Edison, you will recall that no groundwater - - no soil contamination was found at McGraw Edison. Groundwater contamination was found in the upper and lower aquifer. The contamination from the lower aquifer is currently being pumped by the facility and traced as we speak today, but the upper aquifer is not treated, and we're proposing that, a groundwater pump in the treatment system be used to remediate the upper aquifer McGraw Edison.

The next steps: EPA will evaluate and respond to any questions and comments on the proposed plan which are received tonight and during the public comment period which began on July 9th and will end on August 8th. This will be done in a responsiveness summary. The summary will become part of the Record of Decision for the site. The Record of Decision will also include a description of the final alternatives selected by EPA, and the rationale for selecting it. EPA will place the

Record of Decision in - - will place the ROD, or the Record of Decision, in the administrative record, which is located in EPA's office at 290 Broadway in New York City and at the public library.

And that concludes my remarks. Any questions? Yes, sir.

STEWART HILL: More of a comment than a question, but in regards to your map, where it shows a private dump on the AVX property, that, I live on Seneca Avenue, and that is in my backyard, and that is not a true perspective of the site of that dump. First of all, it was not a private dump. It was the loean Municipal City Landfill, the first landfill in this area. It was in operation for about five years. It takes in most of that forty acres in the back there. And if you tried to excavate that land, you're going to be knee deep in solid waste.

MR. TACCONE: You're talking about - -

STEWART HILL: That landfill was never properly maintained, it was never capped, it was never sealed and it was never drained. There is a whole lot of sump holes in that field where groundwater lays continuously. There is, the area that's, that's depicted there is not a true size of that dump at all. It takes in the, most of that whole field. And to excavate that area, if you go down more than a foot, you're going to be in solid waste.

MR. TACCONE: The area that we're proposing for AVX is right around here. The area that I think you're referring to - -

STEWARD HILL: I'm referring to what's - -

MR. TACCONE: - - that I think you're referring to was called the Seneca Landfill.

STEWART HILL: Right.

MR. TACCONE: And that's located right over here. This private dump is really separate from that.

STEWART HILL: Well - -

MR. TACCONE: So the excavation that we're going to be doing isn't really going to be in this area. It's very sharply delineated, and it's in this part of the property.

STEWART HILL: The private dump has nothing to do with the landfill?

MR. TACCONE: No, sir.

STEVE SCHARF: That was just an area where people disposed of household goods over the last maybe thirty, forty years, I'm not sure.

STEWART HILL: Well, that private dump was used for household disposal at that time, back probably seventy years ago. Nobody been dumping down there that I know of in the last thirty years.

MR. TACCONE: I think that was considered for this study, but was eliminated as an area for sampling because we didn't think that it had contamination that was getting to the, anything - - any, any source to the groundwater. But I think it was considered.

STEVE SCHARF: Steve Scharf from DEC. There's also cluster wells put in 1984 that did not show contamination, downgraded from the Seneca Avenue Landfill. And what Tom Taccone is trying to tell you is what is called a private dump is just an area that was indiscriminate disposal, maybe it was earlier than forty years ago, we're not sure, but that's separate from the landfill that was operated by the City of Olean I believe in the

1930s, is what you're referring to.

STEWART HILL: I was under the assumption that that meant for the landfill, the landfill is through the - - the landfill site is to the west of what is marked as a private dump and takes in that whole area.

STEVE SCHARF: That's correct.

MR. LYNCH: This area here.

STEWART HILL: But there's none of that area that would be excavated?

STEVE SCHARF: No. The other thing Tom is referring to is directly behind the AVX building, and it's a localized hot spot of soil that's contaminated above the cleanup criteria for organic volume - - organics. And the landfill was, the city ceased to use that probably before World Was II, if I'm - - I think the city sopped using that Seneca Avenue Landfill - -

STEWART HILL: No. No. They closed it in '53 or '54.

STEVE SCHARF: '53, I stand corrected.

STEWART HILL: It was open for about five years, I would say roughly from 1950 to 1954, something like that.

STEVE SCHARF: But those are three separate areas.

STEWART HILL: And the landfill area is not suspect of any contamination at all?

STEVE SCHARF: Not, we have not determined that to be contaminated. We determined that wasn't any contamination from the - - from the original investigation.

MR. LYNCH: Yes.

JOHN MITCHELL: Can you comment on the effects of the monitoring wells and the wells that, the changes in the city wells and the other well that are being pumped in terms of concentrations since the strippers and, you know, since the initial program was into effect?

MR. TACCONE: Well, the, you mean the concentrations in the inflow at the municipal well?

JOHN MITCHELL: Right.

MR. TACCONE: Oh, it's - - I, I guess early in 1990 when the testing was first started, it went up to two to, two hundred and fifty parts per billion, I think. Now it's down around twenty. It seems to be hover around twenty, at both wells, 18 and the two wells south.

Yes, sir.

STEWART HILL: The wells that are pumping up that are being air stripped or whatever, whatever the process is, what is the, the average amount of water that they're pumping the same as they were pumping when they were in operation for the city, was it more or less?

MR. TACCONE: I don't know the answer to that question.

STEVE SCHARF: I'd say it's about the same as it was prior to turning it off. In other words, they turned - - they put the wells in there in 1979, three municipal wells. At that time they were pumping I think around, around two, two and a half million gallons a day total, and currently that's the same amount of water they're pumping on those three wells.

STEWART HILL: When they turned those wells on in '79, we had, oh, probably twenty wells in that vicinity, East Olean, go dry, and there was some concern about whether the city wells were the culprit, taking the water. At that time the engineers explained that it was impossible until they decided that they were taking the TCE out of that area also. And then they conceded that the, the fact that the water was coming from that vicinity. I'm somewhat concerned that if these three wells start pumping at their full potential, we're going to have well problems again. But you say they are, they are pumping at their full potential now.

STEVE SCHARF: Well, they're pumping at the same rate that they were before they turned them off, is what I'm saying. And Libby Ford - -

LIBBY FORD: I'm Libby Ford, and I was the coordinator of the RI/FS for the Olean cooperating indurates. The wells, the three municipal wells today are pumping at approximately the same rate they were prior to the shutdown in 1981, and have been for six years. There was a concern that they -- there were questions raised as to whether or not they been causing some private wells to go dry back just about the time they were shut down.

You know, we were ordered to supply them with the treatment and to turn them back on. We turned them back on, and it has been six years now. So if your wells haven't had a problem, particularly back last summer when it was so dry, you're probably going to be okay, but there is no guarantee. But they're being pumped at the same rate they were before.

GARY ABRAHAM: Gary Abraham. When you do the vapor extraction process, where do the vapors go?

MR. TACCONE: They would go into a carbon adsorption type of a filter, which would capture any contaminants in the vapor before being emitted into the air. So the air would -- the vapor would be -- the contaminants would be removed from the air before it would be discharged.

STEVE SCHARF: I'd like to add something, something that you put together here, the properties that were determined not to be -- oh, I'm sorry. Steve Scharf, from DEC. I'll just add, be more specific on something you put together. when you said the properties that were investigated but not determined to be a source of contamination to the groundwater, it should be stated the municipal groundwater aquifer, lower aquifer, and that Olean Steel is listed as the second property investigated, is being referred by the EPA to the DEC for investigation based on data that was encountered by samples from EPA, so just for the record, say that.

KATHY KELLOGG: Kathy Kellogg, Buffalo News. What type of cleanup is going to proceed at Olean Steel?

STEVE SCHARF: Currently, the well that we are talking about is at the front of the property, and there was some product that was found in there based upon sampling that was done by the EPA, Edison, and it's covered under the stat section in the proposed plan, and they found pcbs in the well. And so the DEC spill response unit has gone out and resembled that well, and there's also been a report, Maurice, maybe you could add some information to this, there's been a report of a pcb spill on the property, and it's being looked at, currently being looked at by the DEC spill response program.

KATHY KELLOGG: It that - -

MR. LYNCH: To give a little history on that is EPA did go out and take a removal action on the site. Tom could comment on what was removed from the site, to remove an immediate problem, but this sample that Steve referred to we don't feel has the potential to get into the municipal wells, so we cannot address it under the Superfund site and the Olean Well Field Site. Therefore, we've referred it to the State, and the State will investigate there.

STEVE SCHARF: We are taking their information and we are taking it to be a step further.

KATHY KELLOGG: Will that be a State Superfund, or is that --

STEVE SCHARF: Currently it's not listed, is not listed as a class two act of hazardous waste site. However, we've had this report of the pcb spill, and so currently the spill response team is out there, has taken a sample and we're waiting to get the results back. That's not to say it's not possible that -- it is possible that in the future the Olean Steel property may be listed as a hazardous waste site by the State, based upon information that we are going to be gathering at the site.

MR. TACCONE: Yes.

KATHY KELLOGG: Are there, are there any people whose wells, whose private wells were contaminated who refused to be hooked up to the city's water supply?

MR. TACCONE: Yes, there were a group of people that did refuse that.

KATHY KELLOGG: Have there been any attempts to draw those people into the --

MR. TACCONE: Water supply system?

KATHY KELLOGG: Yes.

MR. TACCONE: Hookup.

KATHY KELLOGG: Encourage them or educate them.

MR. TACCONE: I believe the Department of Health did, and Lani, can you help me?

LANI RAFERTY: Lani Raferty from the State Health Department. We did send letters to some homeowners who had private wells still within the contaminant plume requesting that we sample their,

their wells or, and/or that they connect to the municipal water system. We have encouraged the people to connect a few times, and they still have not been interested in doing so. And that's certainly an individual choice. So that's basically all that we can do. We recommend that people within the plume connect to the municipal water system, but that's, that's as far as we can go.

KATHY KELLOGG: Do you have any idea how many have not been --

LANI RAFFERTY: Well, there are three homes that have contaminants in their wells. They did not connect to the water system, to the public water supply. There are other homes who have wells still and did not connect to the water supply, but their wells have not been contaminated that we have been able to determine. So I would say there are about six. That's a rough figure, but somewhere around there.

KATHY KELLOGG: Thank you.

JOHN MITCHELL: Could I ask what time frame they were last checked or, these wells, any wells?

LANI RAFFERTY: Samples, you mean?

JOHN MITCHELL: Yes.

LANI RAFFERTY: Sampled? We sampled them last September, I believe.

STEWART HILL: The wells on Seneca Avenue, in that area, were tested about the time that this was discovered. They had never been retested since, best of my knowledge. Do you intend to resemble those wells?

LANI RAFFERTY: We never found any indication that there was contamination up in that area, and so we didn't pursue sampling wells.

STEWART HILL: All the wells were contaminated.

LANI RAFERTY: I'm not saying that --

STEWART HILL: All the ones that I was aware of were contaminated, but the contamination level was below what was considered a hazard.

LANI RAFFERTY : Tom, can you indicate on the map the extent of the public water, do you have that information handy?

MR. TACCONE: You mean where the water supply was extended?

LANI RAFFERTY: Yes.

MR. TACCONE: Let's see, right around here, and down, and down Schaefer Road.

STEVE SCHART: As far as Haskell Road, which is right where your hand is there.

MR. TACCONE: Right here?

STEVE SCHARF: Little further, further down.

MR. TACCONE: Right there?

STEVE SCHARF: Yes.

MR. TACCONE: Oh, yeah, right here, right.

STEVE SCHARF: And then up to the road about as far as the end of the McGraw Edison property.

MR. TACCONE: And down Schaefer Road, Schaefer Street, yep.

LANI RAFFERTY: Okay. So you're saying you have information that indicates that there are some wells --

STEWART HILL: There, that's Seneca Avenue.

LANI RAFFERTY: Right, the one that runs along --

STEWART HILL: Yeah, that's Seneca Avenue.

LANI RAFFERTY: -- where AVE is, right?

STEWART HILL: Right, all those wells in

there were contaminated, but they were contaminated with very low amount of TCE, and it was never considered to be a health hazard. My question is, are they going to be tested again?

LANI RAFFERTY: I'm not aware of that information. If you could, if you could maybe talk to me afterwards, you can indicate to me. If we have an indication that there's wells contaminated up there, then we certainly would sample them. So if you have information that indicates that there are, talk to me afterwards.

STEWART HILL: Well, in some ways I have to report, I have a report saying that my well had so many parts per billion of TCE, but it was very low amount.

STEVE SCHARF: Is it possible for the Health Department to sample -- is it possible for the Health Department to take a sample from the homes on Seneca Avenue if they request it?

LANI RAFFERTY: We can look at the information and, you know, evaluate it. That's, that's the approach that we would take. We don't normally just randomly sample wells, but if we have information that indicates that there might be a problem, we certainly would be willing to sample. So maybe we could talk afterwards, and you can indicate to me the area that you're concerned about, and evaluate that.

LIBBY FORD: Lani, I believe that data is a 1985 -- the evidence was collected in the 1985 RI/FS, and it was collected in the 80- '81 time frame, as I recall. And the gentleman is correct, it did show, as I recall, about zero to four parts per billion.

LANI RAFFERTY: Of?

LIBBY FORD: Of the various VOCS -- I can't recall the TCE --

LANI RAFFERTY: Okay. We'll certainly look at that again, and it sound like it might warrant another trip out there, sample some private wells.

MR. TACCONE: Yes?

KATHEY KELLOGG: Kathy Kellogg again. You listed, I think there were five people who signed a consent order, five companies?

MR. TACCONE: Five companies, yes.

KATHY KELLOGG: Would you list them again for me, and were they making any -- paying any of the costs of the phase one or phase two?

MR. TACCONE: Well, the -- let's see, it's Alcas, AVX, Aluminum Company of America, McGraw Edison, and Cooper Industries. That was the 1991 consent order. And there is a provision in the order for it, to repay -- to pay EPA any costs that it incurs for overseeing the cleanup of the site.

MR. LYNCH: They actually performed the study, the investigation/feasibility study that was performed, and the past costs for the air stripper.

MR. TACCONE: That's already been resolved. I mean --

MR. LYNCH: Right, but they were the ones who paid for it.

MR. TACCONE: Yes.

MR. LYNCH: They did pay for the work that had been done previously.

KATHY KELLOGG: Do you know how much that was?

MR. TACCONE: Sharon, would you be able to --

SHARON KIVOWITZ: Not offhand, I'm sorry, I don't. I could get that information to you exactly how much was paid. I'm looking now to see if I've got anything in my files.

KATHY KELLOGG: Will those PRPs be responsible for any future costs?

MR. TACCONE : Yes.

KATHY KELLOGG: What?

MR. LYNCH: What we will do after we sign Record of Decision, we will approach them and ask them to perform the design and implement the remedy we select. And we will go into a series of negotiations with them, and in an attempt to get them to perform it. This would be, on this now, for only the action for each individual site, but they would be responsible now for the source control for their particular site, as in AVX for the action we would take at AVX, et cetera.

SHARON KIVOWITZ: If you could give me your card after the meeting, I can give you the information of who, the entire enforcement history. I'm Sharon Kivowitz with the EPA.

MR. TACCONE: Yes, sir.

JOHN HART: I'm John Hart, from Olean. Can you predict the length of time that the implementation of the remedies that your, your preferred remedies will take? And is - - and the second question is, are there any other plans after the implementation of this phase?

MR. TACCONE: Well, the soil remediation at the areas where the soil is contaminated should take about, approximately five years. The groundwater usually take a little longer than that. It would be on the order of a thirty year time frame, but that's, that's a very rough approximation. As far as the next phase, there is - - there isn't a next phase planned. I mean, this, this is the second phase or a second operable unit. The first one took care of the groundwater problem. That was the air strippers that are currently operating and treating the groundwater. This second phase is the, is a source control. We're going after, in this study, what's causing the contamination, and those are the two component parts of the plan.

Yes, sir.

STEWART HILL: Is there an estimated time when the city wells will be put back in service?

MR. TACCONE: The city wells are back in service.

STEWART HILL: They're using the water?

MR. TACCONE: Yes. The water that's pumped from the groundwater goes through these air strippers, which removes the TCE to below the drinking water levels, and then goes into the water supply. And it's tested on a regular basis, and since the air strippers have been put up on line, they've been effectively treating the groundwater.

STEWART HILL: What's, there's no contamination in the water going into the city - -

MR. TACCONE: No. It's way below the safe drinking water levels.

SHARON KIVOWITZ: What's coming out is below the safe drinking water levels.

MR. TACCONE: Yes.

SHARON KIVOWITZ: There still is contamination going in, which is why the source areas are being, which is the purpose of this - - unit, but what's coming out and what's going into people's faucets is going through this treatment process.

MR. TACCONE: Safe water. Yes.

WAYNE MIZERAK: Wayne Mizerak, from DEC, New York State DEC. You gave him a time frame for implementing the remedy. Can you give a similar time frame as to how long negotiations can be expected before the remedy can start being implemented, because that's part of the whole time frame? How, how willing are they to negotiate to get into this? Are they willing to go ahead and go, or are they going to take a while to do this? We had that in our program, that would be something, information they would need, get an idea of implementation.

MR. LYNCH: What our time frame is, after we signed the ROD, we will send out what is called special notice to the companies. And we then go into a hundred twenty day moratorium period where we can't take action while we negotiate. And what we aim for is that at the end of that hundred and twenty day period, we either have an agreement or we don't. And at that point we can either pay for the remedy ourselves, to implement it, or we can order them to do it administratively. If they cooperate, it starts then. If not, then our choices is, do we go into court to require them to do the action, to follow that administrative order, or do we pay for it ourselves, and then go after, after them later to pay for it. So hopefully it should be, what we're aiming at is after a hundred and twenty days we will then start the process.

If there are no more questions, I would like to thank everyone for coming out. And if you have questions later, you either write to us in the address that is in the proposed plan or you can call us, I believe Tom's phone number is in there too, and we'll be glad to discuss any aspects of the site that you have. Thank you.

(The meeting concluded at 8:09 P.M.)

* * * * *

APPENDIX V

RESPONSIVENESS SUMMARY

APPENDIX E

LETTERS SUBMITTED DURING THE PUBLIC COMMENT PERIOD

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July 18, 1996

VIA FAX AND CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Chief, NY/Caribbean Superfund Branch II
U.S. Environmental Protection Agency Region II
Emergency & Remedial Response Division
290n Broadway - 20th Floor
New York, New York 10007-1866

Attention: Thomas Taccone, Olean Wellfield Site Project Coordinator

RE: Olean Wellfield Supplemental RI/FS Administrative Consent Order No. II-CERCLA-10202 Comments on EPA Imposed revisions to SFS and Notice of Issue Submitted for Dispute Resolution

Dear Tom:

In accordance with Article XVII of the above referenced Administrative Order, this letter serves to not only fully reply the issues raised in EPA's July 3, 1996 SFS Letter and the attached unilaterally imposed "Preface" to the SFS Report, but also a notice on behalf of the Olean Cooperating Industries ("CIs") to EPA that we are triggering the Dispute Resolution provisions under that Order. In keeping with paragraph 87 of the Order, dispute resolution of these issues is expressly allowed under that Order because the July 3, 1996 letter constituted EPA's imposition of "required revisions to the Draft SFS" pursuant to paragraph 56(b) of the Order. While our offices were closed on July 5, 1996 (the earliest date the July 3, 1996 letter could have arrived), we are submitting this notice within 14 days of that date in order to avoid any question as to whether we have given timely notice to the Agency.

Because we strongly disagree with many of the statements made in EPA's July 3, 1996 letter and its enclosure, and because we believe that the bases for our disagreement are factual and key to the ultimate decisions which EPA will be making with respect to supplemental remedial measures within the Olean Wellfield, we request that this letter be included as an official part of the Administrative Record for the Olean Wellfield SRI/FS.

While the Olean CI's have disagreement and/or concerns with most of the content of the July 3rd EPA Letter, they wish to submit three specific issues for formal dispute resolution. Nevertheless, the remaining issues are important and deserving of correction. The main text of this letter sets out the areas for dispute resolution, while Appendix A addresses the other comments in response to EPA's July 3, 1996 letter and its attached unilateral Preface. The Olean CI's continue to believe that the final SFS (including any Preface), the final RAP and the ROD must address not only the three issues set forth in the main body of this letter but those included in Appendix A.

The Olean CI's hereby invoke the Dispute Resolution provisions (Article XVII) of the above referenced Administrative Order with regard to the following issues:

1.   The Objectives of the SRI/FS

2.   In order to be complete and to fully address the mandated NCP evaluation, the SFS must include a factual discussion of past pumpage of the groundwater beneath the AVX property and its inability to significantly remove VOC mass.

3.   The Stage 2 (groundwater pump and treat) "triggers" must reflect the SRI/FS Objectives and be tied to completion of the Stage 1 remedial measures at all four of the identified source areas.

Each of these issues is discussed below.

1. What are the Objectives of the SRI/FS?

From the initiation of the Olean Wellfield SRI/FS process, the Olean Cooperating Industries, with EPA concurrence, have viewed the SRI/FS as a continuation of the overall investigation and cleanup of the Volatile Organic Contaminants ("VOC") within the wellfield aquifer. The 1995 and 1996 SRI and SFS Reports build upon, and are integral with, the investigations done pursuant to the initial listing of the Olean Wellfield superfund site. Similarly the decisions on future remediation arising from the SRI/FS process have also been envisioned as complementing and supplementing (specifically in the form of expediting) the remedies ordered under the 1985 ROD. Thus the Objectives of the SRI/FS are interconnected to the original RI/FS and subsequent ROD.

In accordance with the 1985 ROD, the Olean Cis undertook a number of remedial measures. The remedial measure which, on a continuing basis is directly tied to the SRI/FS Objectives was the construction and operation of municipal air strippers on three City of Olean pumping wells, wells 18M, 37M and 38M. While the intent of the air stripping system on the three wells was to ensure a safe drinking water supply to City and Town residents, it was recognized that pumping and treatment of the Wellfield aquifer would

> also provide a level of groundwater rehabilitation. Prevention and treatment at the municipal wells would prevent the further spread of groundwater contamination, and would eventually reduce the levels of VOC contaminants in groundwater.

The 1985 RI/FS also evaluated "an enhanced groundwater rehabilitation alternative" involving the installation of an additional recovery well and treatment system." (Id.) The RI/FS concluded that while "[p]umping and treatment at the recovery well, in conjunction with pumping and treatment at the municipal wells, would achieve further cleanup of VOC contaminants . . . [i]t is uncertain whether the benefits of enhanced groundwater rehabilitation justifies the additional response . . . as neither level of groundwater rehabilitation can be expected to restore the quality of groundwater to a level for use without treatment in the foreseeable future" (Id.)

Subsequently, EPA issued its Record of Decision ("ROD") adopting the recommendations included in the RI/FS and also calling for the SRI/FS to determine if source control elsewhere in the aquifer could "expedite the treatment of the contaminated aquifer, and to identify if another possible source of contamination exists which may necessitate further action."

In 1990 The National Contingency Plan ("NCP") was modified to include a formal statement of the "expectations" EPA would follow in "developing appropriate remedial alternatives." One of the expectations added to the NCP was "to return usable groundwaters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site." (40 CFR § 300.430 (a)(iii)(F).) While the Olean CI's have acknowledged this NCP requirement, we have insisted, from before the above referenced Administrative Order was signed (June 1991), that application of this provision be done in the context of the Olean Wellfield SRI/FS, which is a supplemental investigation and study. The 1985 ROD ordered remediation which, while not explicitly stated in terms of the above NCP criteria, certainly was in keeping with the spirit of this NCP expectation which was not incorporated into the regulations until 5 years after the ROD was issued.

The Olean CI's have done their best since 1985 to ensure that all parties understood and agreed to the Objectives of the SRI/FS. Before we signed the SRI/FS Administrative Order (referenced in the caption), we made sure that:

1. The SRI/FS Workplan (which had been put together by an EPA contractor) was modified to clearly state the objectives as we understood them.

2. That paragraph 56(b) was included in the Administrative Order. Paragraph 56(b) states

> EPA's comments on, modifications to and directions for changes to deliverables under this Order will be consistent with the terms of this Order and the objectives of the Supplemental RI/FS as set forth in the Work Plan; will not require the performance of work inconsistent with the division of labor between Respondents and EPA described in paragraphs 36-39, above; and will neither be inconsistent with the NCP nor arbitrary and capricious. (Emphasis added.)

Despite the above provisions, even before the SRI was finalized, EPA began to indicate that it did not feel that its future decisions were bound by the 1985 ROD and the agreed upon SRI/FS Objectives (as set out in the EPA Approved Workplan amendments). The Olean CI's repeatedly tried to seek clarification of this and a written commitment from EPA on just what the Objectives of the SRI were. Time after time, we received verbal assurances from EPA that it was not seeking to expand the agreed upon SRI/FS scope. On January 14, 1994 our concerns were again heightened and we attempted to pin EPA down by triggering the Dispute Resolution process following an EPA letter dated January 10, 1994. EPA rejected our efforts to trigger dispute resolution (saying that its January 10, 1994 letter did not constitute final action on either the SRI or SFS reports, and hence it could not be the subject of dispute resolution). As a consequence, however, it did issue a letter dated February 25, 1994 which finally addressed this issue. That letter acknowledges that the objectives of the SRI/FS includes those set forth in the 1985 ROD and in the SRI/FS Objective. (See Appendix B.)

After receiving this letter the Olean CI's were under the clear understanding that while EPA would continue to examine the identified remedial measures in the context of their ability to protect and restore the aquifer, this examination would be done within the overall framework of the SRI/FS objectives. After receiving this letter we submitted revised "Remedial Action Objectives: ("RAOs") EPA edited to conform with the EPA letter. (See Appendix C.) As called for under the Administrative Order, those RAOs became the SFS objectives. They were also discussed in the introduction of the SRI Report, which EPA approved on June 30, 1995. They also have been clearly stated in all SFS-related submittals.

When we have questioned EPA why its SFS comments on this issue (which ultimately were "resolved" in the first three bullets on the July 3, 1996 Unilateral Preface to the SFS Report) continued to be included in EPA comment letters subsequent to EPA's February 25, 1994 letter we were told that this was for "administrative reasons". In addition, we were told by EPA (Kevin Lynch) that our continued inclusion of the language would not jeopardize the approval of the SFS. At no time did EPA even hint that it was planning to unilaterally remove this language from the SFS. Thus, we continued to believe the issue had been satisfactorily resolved.

As EPA clearly indicated in its February 25, 1994 letter, the beneficial use of the Olean Wellfield aquifer is for drinking water. As such, the first two bullets of the stated RAOs ("Remedial Action Objectives") for groundwater are clearly intended to support the continued beneficial use of the aquifer for drinking water. The remaining groundwater RAO and the three soil RAOs are meant to support the first two groundwater RAOs. The disputed phrase "if such restoration will expedite the current treatment of the aquifer [which is being done] at the municipal wells" is included to provide the pertinent timeframe against which the "reasonable timeframe" NCP criteria can be made. To facilitate applying this NCP criteria the following summary/conclusion statements were included in the approved SRI:

- Overall, total VOC concentrations in groundwater influent to Municipal Wells 18M and 37/38M have declined approximately 75 to 82 percent since these wells went back into full-time service in February 1990.

- The SRI data indicate that, in general, groundwater quality within the upper and lower aquifer monitoring wells in the Olean Well Field is improving as a result of the remedial measures already in place. However, despite the effectiveness of these measures, VOC concentrations, in the identified soil source areas and the existence (or former existence) of non-point VOC sources within the upper aquifer may be such that operation of the air stripping systems on the three municipal wells may be needed indefinitely. Remediation in the identified source areas is expected to lead to quantifiable groundwater quality improvement.

- The SRI data indicate that the remedial measures in place have already resulted in significant improvements in water quality within the aquifer. Despite the effectiveness of these measures, background levels of VOCs in groundwater are such that operation of the air stripping systems on the three municipal wells is likely to be needed indefinitely.

As is widely acknowledged within the environmental technical profession including within both EPA and NYDEC, aquifer rehabilitation/restoration by groundwater pump and treat is an extended progress that, at many locations, is unable to "rehabilitate/restore" an aquifer. It is ironic that this issue has become such a sticking point for EPA with respect to the Olean Wellfield SFS since, through its imposition of the Stage 2 remedies in the SFS, EPA has simply called for complementing the ongoing and effective groundwater pump and treatment system (co-located at the three municipal wells) with possibly two other groundwater pump and treatment systems. One at the AVX source area where EPA has acknowledged that such a system will not be effective as treatment mechanism, but only as a containment mechanism, and one at Olean Clean All\Loohns where the proximity of the Rivers also calls into question the effectiveness of such a system.

In the opinion of the Olean CI's, successful resolution of this matter can only be accomplished by allowing the language at issue to remain in the SFS report. This will allow the SRI and SFS reports to be internally consistent. As we have acknowledged all along, EPA can certainly clarify in its PRAP and ROD how the supplemental RI/FS objectives and the selected Remedial alternatives are consistent with the expectation of 40 CFR § 40.(a)(iii)(F) "to return usable groundwaters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site." The Olean CI's are even willing to discuss mutually agreeable "Preface" language addressing this issue.

When EPA ordered the Olean CIs to expand each of the Remedial Alternatives 3, 4 and 5 discussed in the SFS report to include a second stage groundwater pump and treat remedy, this issue became one of much more importance than just semantics and internal consistency. Because decisions as to whether groundwater pump and treat will be necessary at any of the identified source areas will not be made until after the turn of the century, it is vitally important that the SRI/FS and the subsequent RAP and ROD clearly spell out what the objectives of the study were that led to the derivation of the Stage 2 portions of the selected remedies.

The importance of this is further underscored by the subsequent two issue submitted for dispute resolution.

2. In order to be complete and to fully address the mandated NCP orders evaluation, the SFS must include a factual discussion of past pumpage of the groundwater beneath the AVX property and its inability to significantly remove VOC mass.

Through a series of imposed deletions and additions, EPA has stripped from the SFS the factual statements which indicate that over 40 years of groundwater pumping (carried out in close proximity to the identified source area) at the AVX site has not led to significant removal of VOC mass from the downgradient groundwater. This fact is extremely important in an objective evaluation as the effectiveness of a pump and treatment groundwater remedy at this site. We have already modified the SFS to support EPA's stated intention of requiring, if necessary at Stage 2 groundwater pump and treat remedy as a containment measure at the AVX source area. There is no justification for EPA to expunge the factual statements.

The removal of this language may have far reaching implications when the Stage 2 evaluations are performed and decisions made as to whether the Stage 2 remedy must be constructed and activated at the AVX site. We have also already accommodated EPA's stated intention of including the Stage 2 remedy in the ROD by asserting (at EPA's request) that the implementation of the Stage 2 remedy at the AVX source area "would provide an additional reduction in the risk..." (bullet 43) even though this reduction in risk, in actuality, is already in place because the groundwater is already being pumped. Appendix D contains Geraghty & Miller's July 19, 1995 response to EPA's June 29, 1995 comments on the SFS and where the factual basis for the SFS statements at issue were initially brought to EPA's attention. Subsequent to this submittal EPA stopped saying that groundwater pump and treatment would be an "effective treatment" mechanism and, instead began to discuss it as a "containment" option.

The NCP clearly instructs the Olean CIs and EPA to include this discussion. The very first "expectation" included in 40 CFR § 300.430(a) (iii) (A) of the NCP is that:

> EPA expects to use treatment to address the principal threats posed by a site, wherever practicable. (Emphasis added.)

In fact, without an examination of whether pump and treat will be an effective treatment measure, and a conclusion that it is not practical, any SFS discussion about the effectiveness of groundwater pump and treat as a containment measure and inclusion of Stage 2 pump and treat for containment purposes in the RAP and ROD is inconsistent with the NCP. (See 40 CFR § 300.430 (a) (iii) (B)).

Once again, the inclusion of this language in the SFS is necesary to allow decision makers in the year 2000 and beyond, to place in proper context EPA's decision to include a stage 2 remedy in the 1996 preferred remedial alternative. Only in this way can an appropriate decision be made as to whether Stage 2 is necessary and, if it is, whether the ROD ordered remedy of groundwater pump and treat is the proper remedy to meet the SRI/FS objectives, or whether a ROD amendment to allow some other type of groundwater treatment/containment measure to be used is warranted.

3. The Stage 2 (groundwater pump and treat) triggers must reflect the SRI/FS Objectives and be tied to completion of the Stage 1 remedial measures at all of the 4 identified source areas.

Through these unilateral deletions and modifications EPA has abandoned most of the agreements we have reached with it over the last year as to what would trigger the Stage 2 remedy. First, it has backed away from its agreement that its "Guidance For Evaluating the Technical Impracticability of Groundwater Restoration" ("TI Guidance") would guide decisions on whether the Stage 2 Groundwater pump and treat remedial measures would be imposed. (Bullets 4, 6, 11, 14, 17, 27, 31, 41 and 42). (See Appendix E.)

Second, EPA has also apparently changed the starting timeframe for the initial Stage 2 review from 4 years after all the remedial measures have been put into place, to a source area by source area review. Kevin Lynch (as well as Tom Taccone) agreed that this review cycle should commence only after all the Stage 1 remedies were in place during our September 21, 1995 the remedial measures have been put into place, to a source area by source area review. Kevin Lynch (as well as Tom Taccone) agreed that this review cycle should commence only after all the Stage 1 remedies were in place during our September 21, 1995 conference call. This language has been reflected in every submittal to EPA since then. EPA never commented upon, or objected to, this approach. (See Appendix E.)

Third, the modification to the Stage 2 "trigger language" (bullets 31 41 and 42) implies that if the remediated source areas continue to "affect the groundwater entering the City Municipal wells M18, M37 and M38" then Stage 2 will be triggered. This has long been a matter of discussion with EPA a conceptual agreement was reached with Mr. Lynch and Mr. Taccone on this issue in the September 21, 1995 conference call on this topic. The SFS language reflects this agreement. EPA's unilateral language not only ignores the agreement reached, it can be interpreted as establishing a lower threshold for Stage 2, i.e. if a remediated source area continues to have any "effect" on the three municipal wells. (See Appendix F,.)

<IMG SRC 0296281B4>

Conclusion

The Olean CI's have worked closely with EPA on the SRI/FS project since at least 1989. We are extremely disappointed and disheartened by the approach EPA chose to take in its July 3, 1996 letter and its attached Unilateral Preamble to the SFS. We believe that preface contradicts many of the agreements and discussions that have taken place between the agency and the Olean CI's over the last five years. For the reasons set forth above and those discussed below in Appendix A, we believe that the record must be corrected and the Unilateral Preamble either withdrawn or significantly modified before a ROD can be issued.

We look forward to a prompt reply to the issues raised in this letter. As always, if you have any questions, please do not hesitate to call me.

Very truly yours,

<IMG SRC 0296281B5>

cc: SRI/FS Consent Order Distribution List
Michael O'Brien
Larry Blue
Brent O'Dell
Dennis Oldland
Robert Horger
Jim Stitt
Greg Shkuda
Russ Huber

Appendix A

Point by Point Response to EPA's July 3, 1996 letter and its "Preface" to the Olean Wellfield SFS

A. July 3, 1996 Letter

SFS Report

We continue to disagree strongly with EPA's assertion that our final draft did not properly evaluate the NCP criteria. Rather than repeat what we said with regard to this issue in the past, we again reference our letters dated [to be completed]. Furthermore, a review of 40 CFR § 300.430 (e) (iii) (3) which sets out the NCP evaluation criteria and Section 4.1.2 of EPA's Draft "guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (October 1988) clearly indicates that the analyses we had done in the prior draft of the SFS was in full compliance with both the NCP and EPA's Guidance. The fact that our SFS was not organized in quite the same way EPA would have liked in no way detracted from the analyses. Our version of the report presented the same information in a similar but differently organized fashion and would have supported a logical, defensible analysis. What it did not completely support (from an organizational approach) was EPA's pre-drafted PRAP which we understand was prepared over six months ago, EPA's July 3, 1995 letter at least partially acknowledges this when it stated "it's true that EPA used the information which was already in the report...".

We agree that Mr. Taccone did not approve the Olean Cl's final set of submitted SFS changes during the May 15, 1996 telephone call. However on June 4, 1996 when Mr. Taccone called Ms. Ford with the instructions that we were to finalize the SFS, she asked him if the changes we had submitted were acceptable, because we did not want to go to the expense of printing the SFS if additional changes were going to be necessary. During that conversation Mr. Taccone indicated that, while EPA had not completed its review of the proposed changes, it was comfortable that any open items could be addressed through the PRAP/ROD process.

Remaining Issues in July 3, 1996 Letter

These are addressed either in the main body of this letter, or in the following discussion of the Unilateral "Preface."

B. Unilateral SFS "Preface"

In order to facilitate review of the following, we suggest that each bullet in the Preface be assigned a separate number (beginning with 1 and following sequentially until the last bullet which is bullet 55).

2. Section 2.1

Bullets 1-3

See issue #1 submitted for dispute resolution in the main body of this letter.

3. Sections 3.2.3, 3.2.4, 3.2.5, 3.4.1, 3.4.1.5, 3.4.1.6

Bullets 5, 7, 9, 12, 13,15, 16 and 18

With these changes EPA has rejected our suggested compromise between the prior draft of the SFS and EPA's position, i.e. that, subsequent to the first 4 year Stage 2 review, all subsequent reviews be done in conjunction with the statutorily mandated 5 year CERCLA reviews. EPA's basis for this is set forth in its July 3, 1996 letter in item 2 under "SFS Report."

With respect to the practical implications of this EPA imposed change, it is probably not major and was one that we had expressed a willingness to have further discussions on with EPA. We did not make these changes in our Draft Final SFS because EPA had not yet informed us of its decision at the time it ordered us to finalize the document, even though we had submitted this revised language to EPA for its consideration.

Because of the actions taken in bullets 10, 13 and 16 (discussed below), there is now uncertainty as to whether EPA intends to keep the Stage 2 review separate from the CERCLA § 121(c) review or to require that review also be done on a 4 year cycle. We suggest that in the PRAP and ROD, EPA recognize that subsequent to the first four year Stage 2 review there may be merit to combining any future Stage 2 reviews with the subsequent 5 year CERCLA § 121(c) review.

<IMG SRC 0296281B6>

Bullets 10, 13 and 16

EPA appears to have mistakenly removed from the SFS's short description of Remedial Alternatives 3, 4 and 5 the reference to the CERCLA § 121 (c) review. It did not remove reference to these reviews elsewhere in the text (for example on page 3-19, last paragraph). Also its July 3, 1996 cover letter clearly states that EPA intends that the CERCLA § 121(c) reviews be done, but on a separate schedule. We recommend that these bullets be deleted from the Preface.

Bullets 4, 6, 8, 11, 14, 17

See the discussion below in Section 5 below.

4. Sections 3.2.3, 3.2.4, 3.2.5, 3.4.3, 3.4.4, 3.4.6

Bullets 19-24

These are simply editorial comments and do not improve the clarity of these sections. EPA had not previously asked for these changes, or we would have made them. These changes could be included in either a SFS Errata sheet or a revised final "Preface".

<IMG SRC 0296281B7>

5. Sections 3.4.3.4, 3.4.3.4, 3.4.3.5, 3.4.3.6

Bullets 25, 28, 29 and 32 (and bullet 38 in Section 7 below)

See issue #2 submitted for dispute resolution in the main body of this letter.

Bullets 27, 30 and 33

Once again EPA has expunged all reference to the fact that the investigation it carried out on the Olean Clean All ("OCA")/Loohn's site was insufficient to allow either its consultant or G&M to make a determination, with the same level of certainty as was done for the three CI source areas, as to the potential effectiveness of the Stage 2 groundwater pump and treatment remedy at this source area. EPA has provided no written basis for its determination of potential effectiveness. With these deletions, the OCA/Loohn's source is the only area not explicitly discussed in these sections. At the same time, EPA and its technical consultant have acknowledged that the proximity of this site to the Allegany River does raise significant questions not only of the effectiveness of the Stage 2 remedy, but also of VER at this source area. We understand that despite this lack of groundwater data, EPA is going to recommend VER at the Olean Clean All/Loohns source area. For this reason, in the PRAP EPA has adopted our recommendation that pilot tests be carried out at the OCA/Loohns site before a decision is made as to whether to do VER or excavation at this source area.

Bullets 27, 31 (as well as bullets 4, 6, 8, 11, 14, 17, 41, and 42 in previous and subsequent sections)

See issue #3 submitted for dispute resolution in the main body of this letter.

6. Section 4.1.2

Bullet 34

See the comment above in Section 4.

7. Section 4.2.1.1

Bullets 35, 36, (and bullets 39, 40, 44, 45, 46 and 47. in subsequent sections)

The word "additional" was placed in these sections to underscore the fact that this is a Supplemental RI/FS and that unlike the typical "No Action" and "Institutional Controls" RI/FS remedial alternatives, these remedial alternatives would not be starting from ground zero (i.e. providing no protection of human health or the environment), but rather that adoption of these remedies would not provide any protection in addition to that which has already been provided.

From a practical viewpoint, the deletion of this word does not have any significant consequence since these are not the recommended remedial alternatives for any of the source areas. The deletion of this word could confuse a reviewer in that it's presence acknowledges the supplemental nature of the SFS. Therefore, we believe our original wording is warranted and serves to better remind a reviewer of the SFS that the remedial measures discussed in it are intended to supplement the remedial measures already in place.

Bullet 37

As we had explained to EPA during a conference call after we received EPA's May 1996 "final" comments on the SFS, Geraghty & Miller did not feel comfortable with the word "probability" as it pertains to a general conclusion that groundwater migration of contaminants could occur after capping. This conclusion is very site specific and depends on such factors as the volume of contaminated soil that would be beneath the top of the water table once a new groundwater equilibrium is established post-capping. Geraghty & Miller agreed that there was a "possibility" of such continued migration, but indicated that they could not conclude it was a "probability" for all four source areas without a source area by source area review. Given the lack of available groundwater date for the Olean Clean All/Loohns sites, it is currently impossible to make such a conclusion specific to that source area, even if a source area-specific review were done. I was under the impression that EPA agreed with this analysis and was comfortable with the use of the word "possibility."

Once again, because capping is not a recommended alternative for any of the source areas, there are no practical ramifications of this EPA imposed change. It should be deleted from any final "Preface".

8. Section 4.2.2

Bullet 38

See Section 4 above.

9, Section 4.2.2.1

Bullets 39 and 40

See Section 6 above.

Bullets 41 and 42

See Section 4 above.

10. Section 4.2.2.4

Bullet 43

See section 4 above.

11. Section 4.2.3.1

Bullets 44 and 45

See section 6 above.

12. Section 4.2.4.1

Bullets 46 and 47

See section 6 above.

Bullets 48 and 49

See section 4 above.

13. Section 4.2.3.3

Bullet 50

The second sentence on page 4-30 of the SFS already indicated that implementation of this alternative would "involve the use and/or upgrade of existing equipment and the possible installation of additional, similar equipment thus making implementation relatively easy and quicker." (Emphasis added) EPA's addition, two sentences later, of the sentence "Additional recovery wells will be added as necessary", is redundant. This sentence should be deleted from any SFS Preface.

14. Table 1-1
Bullet 51

This was a typographical error and, as such should be addressed in either an errata sheet or a revised SFS Preface.

Bullet 52

This was a typographical error and, as such should be addressed in either an errata sheet or a revised SFS Preface.

15. Table 3-1
Bullet 53

Similar to the discussion under Section 6 above, the Cis have always taken the position that both the No Action and Institutional Control remedial alternatives would be protective of human health and the environment. The fact that EPA and NYDOH have allowed people to continue to drink untreated aquifer water since at least 1992 indicates their conclusion that there is no unacceptable public (as opposed to individually chosen) health risk.

In addition, we note that EPA, in its most recent set of comments on the SFS, did not ask for this change. There is no practical consequence that could arise from this EPA imposed change. This change should not be included in any final "Preface" to the SFS.

16. Appendix C

Bullets 54 and 55

Geraghty & Miller assumes that the comment is in reference to the calculations provided on Page 7 of 14 not 8 of 14 as referenced in the USEPA comment letter dated July 3, 1996. The calculations provided in Appendix C, provide a basis for the cost assumptions that went into preparing Table 4-1. Since this estimate was generated by the USEPA and was considered to be conservative, we did not feel that it was necessary to include it in the computations provided in Appendix C. However, at USEPA's request, we did revise Table 4-1 to include an operating cost for Alternative 3A for McGraw-Edison of $67,500 as a conservative assumption (See also Note 2 at the bottom of Table 4-1).

As stated in Appendix C of the SFS, we had determined through evaluating current operating cost information provided by Cooper Industries, that the O&M cost for the existing system will not substantially increase (as is noted on the bottom of Page 7 of 14). As a result, Geraghty & Miller did not provide any additional cost calculations for the O&M associated with the McGraw-Edison source area. Therefore, revising the note as suggested by EPA would not be correct for the reasons stated above.

Although Appendix C was transmitted to Mr. Tom Taccone in its current form on May 24, 1996, and no comments were provided on it prior to SFS finalization, such additions (if warranted) could be addressed by way of an errata sheet documenting the referenced changes.

<IMG SRC 0296281B8>

> "In accordance with the September 185 Record of Decision, the purpose and the primary objective of the Supplemental RI/FS is to identify whether additional remediation and performance of source control at one or more locations will result in expediting the timeframe, consistent with the National Contingency Plan "NCP", within which the air stripping system on the three municipal wells will be operated. The Supplemental RI/FS will attempt to identify measures that would minimize contaminant releases from the soils and shallow groundwater to the underlying aquifer in a manner consistent with the NCP, thus accelerating the remediation of the lower aquifer. In addition, the Supplemental RI/FS will assess the risks posed by contamination from potential source areas at the Site and evaluate remedial alternatives consistent the NCP to address such risks. Thus, the Supplemental RI/FS report will recommend that source control be performed at one or more locations if it is determined that such an action, consistent with the NCP, will expedite treatment of the well field aquifer or mitigate unacceptable risks."

EPA has determined that certain of the Olean PRP properties and non-CI properties are source areas contributing to the groundwater, thus the SRI needs to consistent with the Administrative Order and the project objectives stated in the workplan, addendum, identify measures that would minimize contaminant releases from the soils and shallow groundwater to the underlying aquifer. At the November 16, 1993 meeting, EPA asked what scientific analysis the Olean PRPs used to back up the claim that additional remediation at the potential sources identified in the SRI (alone or in combination will not expedite treatment of the contaminated aquifer. Your consultant then admitted that this was only based on his opinion; however, his opinion has not been substantiated with any facts. EPA's decision on what remedial actions are necessary for the Olean site will be made based on a defensible, scientific analysis of the data. The FS must include this analysis since it was not conducted during the SRI.

Furthermore, the NCP states that "the goal of EPA's Superfund approach is to return usable ground waters to their beneficial uses within a timeframe that is reasonable given the particular circumstances of the site. The groundwater at the Olean site is used for drinking water, therefore its beneficial use is drinking water, and thus the goal is to return the Olean aquifer to drinking water standards. Therefore, the statement on page 5 of your letter that EPA's direction to the Olean PRPs to evaluate groundwater remedies is consistent with the project objectives is incorrect. EPA has not yet determined that the current remedy will meet this goal; addition extraction wells may be necesary. This analysis must be done.

The possibility of further groundwater remediation has been under active consideration since the development of the supplemental RI/FS workplan. EPA's letter of April 10, 1989, which responded to Michael O'Brien's letter of May 11, 1988, explained the that the purpose of the pump test at the McGraw Edison facility was to determine the hydraulic characteristics of the upper aquifer "in order to evaluate the groundwater capture and treatment alternatives for the upper aquifer." Page 66 of the workplan also explains that the hydraulic parameters determined by the pump test will be used to evaluate a pump and treat remedial alternative. Given the possibility of the presence of Dense Nonaqueous Phase Liquids at AVX and Alcas, which was not known when the supplemental RI/FS workplan was developed, pump and treat and/or containment should be evaluated at or near those facilities. Also, as discussed on page 6 of your letter, this evaluation should include the pumping effects of city municipal wells M18 and M37/38.

The above discussion also relates to the first bullet of EPA's January 10, 1994 letter which instructed the Olean PRPs to assess remedial alternatives for soil cleanup based upon the New York State Department of Environmental Conservation (NYSDEC) TAGM guidance and to your assertion that the guidance is beyond the scope of the objectives agreed upon for the SRI, EPA does not concur with this statement. One of the objectives of the TAGM guidance is to establish a concentration of a contaminant in the soil which could not result in a contravention of drinking water standards. Significant soil contamination exists in certain of the PRPs and non-CIs properties. Evaluating the data in these areas against the TAGM guidance gives an indication of what soils may need to be remediated in order to prevent continued degradation of the aquifer, thereby expediting the aquifer remediation time frames.

Treatability Studies

The third bullet of EPA's January 10, 1994 letter instructed the Olean PRPs to submit "a treatability pilot testing workplan for evaluating the performance of potential remedial technologies." EPA reviewed your letter of august 4, 1993, which recommended that any treatability study work be deferred until the comparative Analysis of Remedial Alternatives. However, data from the treatability studies may be needed in order to properly screen the potential remedial alternatives under consideration. Performing the studies/pilot tests will provide information on cost and potential operational difficulties which will be needed in the screening process. However, EPA does agree that no pump and treat system treatability studies will be needed since these systems are already in operation at the site. Please submit a treatability testing workplan for the technologies discussed in your letter of August 7, 1993.

<IMG SRC 0296281B9>

May 6, 1994

Ms. Libby Ford
Nixon, Hargrave, Devans & Doyle
Clinton Square
Post Office Box 1051
Rochester, New York 14603

Re: Olean Well Field, Olean, New York.

Dear Ms. Ford:

Enclosed please find the revised Memorandum on Remedial Action Objectives.

If you have any questions or comments, please do not hesitate to contact me.

Sincerely,

<IMG SRC 0296281C>

Encl.
cc: Olean Well Field Distribution List

24 Madison Avenue Extension · Albany, New York 12203 · (518) 452-7826 · FAX (518) 452-4398

Memorandum on Remedial Action Objectives

The remedial action objectives were established based on the performance of a Supplemental Remedial Investigation (SRI) for the Olean Well Field. The performance of the SRI was part of the Selected Remedy set forth in the September 24, 1985 "Record of Decision - Remedial Alternative Selection."

The Olean Cooperating Industries (CIs) entered into a Consent Order to carry out the Supplemental Remedial Investigation/Feasibility Study (SRI/FS) in a mixed work effort with the United States Environmental Protection Agency (USEPA). In that Consent Order, the USEPA added another objective (to those set forth in the 1985 ROD): "to assess the risks posed by contamination from potential source areas..." These objectives were incorporated into the Amended SRI Work Plan (1989 Ebasco as amended in 1991 SRI Work Plan) which also set for the following decision criteria:

> "Thus, the Supplemental RI/FS Report will recommend that source control be performed at one or more locations if it is determined that such an action, consistent with the NCP, will expedite treatment of the well field aquifer or mitigate unacceptable risks" (1989 Ebasco as amended in 1991 SRI Work Plan Section 1.0).

The SRI was conducted to delineate and characterize potential source areas within the Olean Well Field. The data collected during the SRI will be used to determine whether source control at one or more potential source areas will expedite the treatment of the contaminated aquifer or to mitigate unacceptable risks due to the constituents of interest. In addition, the data collected will be used to evaluate remedial alternatives in the Supplemental Feasibility Study (SFS) in accordance with the above criteria.

Therefore, the following remedial action objectives address the contaminants found in the aquifer supplying the municipal wells and these same contaminants as they relate to potential soil source areas within the Olean Well Field. The only contaminants found in the influent to the municipal air strippers are trichloroethene (TCE) (the only compound detected above trace concentrations and its federal maximum contaminant level [MCL] for drinking water [5 ug/L]) and trace concentrations of 1,1,1-trichloroethane (1,1,1-TCA) and 1,2-cis dichloroethylene (cis 1,2-DCE) which ranged from non-detect to 8 ug/L and non-detect to 9 ug/L respectively. These trace concentrations are well below the federal MCLs for 1,1,1-TCA and cis 1,2-DCE of 200 ug/L and 70 ug/L, respectively, but occasionally slightly higher than the New York State drinking water MCLs of 5 ug/L. The City of Olean has indicated that the inorganics included in the Risk Assessments have never been detected in the influent to the municipal air strippers. In addition, the data collected at all the individual sites during the SRI indicates that the inorganic constituents are naturally present in soils throughout the well field area. Acetone and methylene chloride were also reported in the SRI as being detected in some soils. These detections however, may be due to sampling and/or laboratory contamination. Acetone has never been detected in the influent to the municipal strippers. While methylene chloride has been detected in the influent to the municipal strippers, the laboratory performing the analyses indicates these detections are most likely due to laboratory contamination. To the extent that acetone and methylene chloride or any other VOCs are present at significant concentrations, the following remedial action objectives for TCE, 1,1,1-TCA and cis 1,2-DCE will also address these constituents.

The remedial action objectives for the Olean Well Field will be as follows:

Objectives for Groundwater Remediation

- Prevent ingestion of groundwater having concentrations of TCE and other site-related contaminants that would pose a potential excess cancer risk greater than 10-6. Groundwaters will be assumed to meet this objective if the TCE concentration is less than or equal to the federal and New York drinking water standards.

- Prevent ingestion of groundwater having concentrations of 1,1,1-TCA, cis 1,2-DCE and other site-related contaminants that would result in a combined Hazard Index greater than 1. Groundwaters will be assumed to meet this objectives if their concentrations are less than or equal to the federal and New York drinking water standards.

- Provide additional localized groundwater treatment for TCE, 1,1,1-TCA, cis 1,2-DCE and other site-related contaminants at one or more locations if it will expedite the current treatment of the aquifer at the municipal wells.

Objectives for Soil Remediation

- Prevent ingestion/direct contact/inhalation of soil having concentrations of TCE and other site-related contaminants that would pose a potential excess cancer risk greater than 10-6.

- Prevent ingestion/direct contact/inhalation of soil having concentrations of 1,1,1 TCA, cis 1,2-DCE and other site related contaminants that would result in a combined Hazard Index greater than 1.

- Restore soils at one or more locations to appropriate contaminant concentrations of TCE, 1,1,1-TCA, cis 1,2-DCE and other site-related contaminants if such restoration will expedite the current treatment of the contaminated aquifer at the municipal wells.

<IMG SRC 0296281C1>

Mr. Thomas Taccone
Olean Well Field Project Coordinator
Chief, New York, Caribbean Superfund Branch II
Emergency and Response Division
United States Environmental Protection Agency - Region II
290 Broadway - 20th Floor
New York, New York 10007-1866

Subject: Response to Comments, Olean Draft Feasibility Study Review

Dear Mr. Taccone:

The Olean Cooperating Industries ("Olean CIs") have directed Geraghty & Miller, Inc. to submit the following responses to the United States Environmental Protection Agency (EPA) comment letter dated June 19, 1995 (received by the Olean CI coordinator on July 5, 1995) containing additional comments on the working draft of the Olean Well Field Supplemental Feasibility Study (SFS) report that Geraghty & Miller had prepared and submitted on their behalf. The comments made on May 12, 1995 were responded to in Geraghty & Miller's letter dated May 30, 1995. Several USEPA comments from the May 12, 1995 letter were further discussed in the June 19, 1995 letter. In this response to your June 19, 1995 correspondence, we have addressed those issues which continue to require further clarification, but have not rediscussed issues satisfactorily addressed by our May 30, 1995 letter or by phone.

Geraghty & Miller has retained the comment response format from the May 30, 1995 letter for those May 12, 1995 comment responses which were accepted by EPA, Appendix A to this letter contains the permanent "change" pages to the working draft of the SFS.

Comment 1: Geraghty & Miller's response still does not address EPA's comment. A generic analysis would not, as stated in Geraghty & miller's letter, provide any new or useful information. A generic analysis is not needed. What is needed is an analysis of the seven evaluation criteria (as provided in 40 CFR 300.430 (a) (iii) (A) through (G)) for each source area. Attached is sample, partial comparative analysis of remedial alternatives for the Alcas source area. The analysis should repeated for the other sources.

We feel that the drafts submitted to date contain all the required elements of a SFS comparative analysis. Despite this, in the interest of bringing issue to closure, Geraghty & Miller will revise the SFS as suggested. The revisions will be made to Section 4.3 (Further Comparison of Remedial Alternatives by Source Area). The proposed revisions will be forwarded to USEP by July 31, 1995.

Comments 2, 23, 27, 38, 29, and 41: the volume of soil and groundwater, which need to be remediated at Loohns Dry Cleaners, was included in EPA's letter of may 12, 1995. Please incorporate the volume into the SFS. At this time, EPA does not plan on drafting an SFS addendum. A full SFS should be submitted, as required by the Order on Consent (Index No. II CERCLA-10202).

The Sandburg and Griffith oil source areas should be removed from the SFS. These areas will be addressed by the NYSDEC, under the New York State petroleum spill program since the soil and groundwater contamination at those properties are related to releases of petroleum and/or petroleum derivatives. As you may know, petroleum contamination can not be addressed using federal Superfund authority.

Regarding Olean tile, EPA does not believe that the elevated levels of toluene, which were detected at soil boring 34, are a threat to the aquifer. The soil encountered at boring 34 was very tight so that little, if any, groundwater can reach the contamination. You'll note from the boring log for SB34 that the water table was not reached. Therefore, EPA does not consider Olean Tile a source of contamination to the Olean Wellfield.

Shortly, EPA will mail to you an addendum to the supplemental remedial investigation report (SRI). The report provides the results for the additional field samples at Olean Steel, Olean Tile, Loohns Dry Cleaners, Mastel Ford, Griffith Oil and Sandburg Oil.

After we submitted our May 30, 1995 response (which indicated that without the supporting data, we could not incorporate into the SFS any conclusions with respect to the non-CI source area), we have received the data on the non-CI sites (which has been incorporated by reference into the SRI report as Appendix G - Addendum to that report). As directed by EPA, the former non-CI source area Sandburg, Griffith Oil, and Olean tile are not CERCLA-eligible source areas and will no longer be discussed in this SFS. Because of this, Sections 4.1.5, 4.1.6, 4.2.5, and 4.2.6 should be deleted from the working draft of the SFS. The data on the remaining non-CI site (now Appendix G-Addendum to the SRI report) is being reviewed and evaluations for the Loohns Dry Cleaners (Olean Clean All) will be added to the SFS. We plan to forward the appropriate change pages to EPA by July 31, 1995.

Comment 4: EPA maintains its original comment. The phrase "if it will expedite the current treatment of the aquifer at the municipal well," should be removed from the SFS report.

Based on our telephone conversation with you and Kevin Lynch on July 10, 1995, this phrase will remain in the draft SFS document.

Comment 7: The first paragraph of Geraghty & Miller's proposed language for Section 2.4.1.2 is inaccurate. Extension of the city water main and installation of backflow prevention devices are active remedial measures, not institutional controls. The city's local ordinance which prevents a private well user from connecting the well to the public water supply is an institutional control. The second paragraph is acceptable.

As discussed with EPA during our July 10, 1995 conference call, in Figure 4-5 of EPA's most recent SRI/FS guidance (October 1988), the extension of a city water main is considered an institutional control, even though it involves physical work. Similarly, the installation of a backflow prevention device, while involving physical work, is also an institutional control and we have classified it as such. This section of the SFS will remain as proposed in our May 30, 1995 letter (see Appendix 1).

Comments 24, 28, and 32: Upon further consideration, EPA is agreeable to allowing some period of time elapse before assessing whether or not groundwater recovery and treatment is necessary. However, instead of the 5 year period recommended in the draft SFS, specific time periods should be calculated for each source area. Periods should be based on the distances from each source to the air strippers, the groundwater velocity in the lower aquifer and enough time for 3 to 5 pore volumes of groundwater to flow from each source to the air strippers.

As discussed during the July 10, 1995 telephone conversation, EPA and CIs are now in agreement that it is appropriate under Alternative 3 or 5 for some period of time to elapse after a soil source area remediation has been completed before assessing whether or not groundwater recovery and treatment is necessary. As discussed with EPA, if either of these remedial measures is selected for a source area, specific time periods will be calculated for that source area. The time periods will be based on the distance from the source area to the municipal air stripper, the groundwater flow velocity in the low aquifer, and providing enough time for 3 to 5 pore volumes of groundwater to flow from the lower aquifer beneath each source area to the air stripper.

Comment 25: EPA will not agree to Alternative 3A, which specifies the possibility of groundwater treatment with no other proposed remedial measure after five years. This alternative should specify groundwater treatment right away. Please revise the alternative.

As discussed with you during the July 10, 1995 telephone call, this section has been revised to clarify that groundwater treatment would begin right away in the lower aquifer beneath any source area where this is the chosen alternative.

Comment 35: EPA disagrees with Geraghty & Miller's response. Treatment of groundwater at AVX is an appropriate alternative and would serve as an effective source control measure. Because of the proximity of Alcas to municipal well M18, treatment of groundwater may not be necessary.

We still feel that pumping in the lower aquifer will enhance migration into the lower aquifer, especially at the AVX facility. In addition, analysis of current data indicates that typical groundwater recovery has not been an effective source remediation method at the AVX facility.

AVX has been pumping an on-site well (for cooling purposes) for decades. This production well is located very close to the identified source area. In the early 1980s this well was pumped at an approximate rate of 200 gpm (288,000 gpd). Since that time, pumping rates have decreased to approximately 50 gpm (72,000 gpd). Despite these decades of extensive pumping of the lower aquifer in close proximity to the source area, that source area still contains a significant VOC burden in the tight clayey soils. There is no reason to expect that source area related groundwater recovery, even at an increased rate, will lead to significant reductions in the VOC levels in the soil source area in any time frame less than several decades In addition, as shown on figure 74 of the 1992 SRI report, VOC concentrations in lower aquifer Monitoring Well AVX-5D, on the AVX property, were very low when the well was first sampled in 1985. Since the start of quarterly monitoring in October 1989, the VOC concentrations have shown an overall increase. The increase in VOC concentrations in Well AVX-5D since October 1989 may be due to the startup of the municipal well pumping, which has resulted in the lowering of water levels in the lower aquifer beneath the till layer and thus has resulted in an increased flux/leakage from the till layer into the lower aquifer. Also, during this same time frame, the pumping rate of the AVX production well (lower aquifer) decreased from 200 gpm in 1984 to 105 gpm in 1988, to approximately 50 gpm in 1990, which remains the current pumping rate. The decrease in the AVX production well pumping have decreased the hydraulic gradient in the vicinity of this well and reduced its influence on groundwater flow.

Based upon the above information, we feel that pumping has not been effective in reducing the concentration of VOCs in the source area at the AVX facility and has enhanced migration of VOCs into the lower aquifer. This analysis will be added to the Evaluation of Alternative 3 for the AVX source area.

Comment 44: Geraghty & Miller states that a low transmissivity (T) is considered to be conservative when calculating capture zones. This is a fundamental error in their analysis, because a high T is conservative when calculating a capture zone. An examination of the equations used will show that T is on the bottom of the equation and is therefore inversely proportionate to the size of the capture zone. Therefore, the low T chosen for the calculations is not a conservative choice.

The capture zone should be recalculated using a conservative high T value. EPA recommends the selection of a conservative high T value in gpd/ft from Table D.4 of the February 1985 RI, Appendix D for the lower aquifer. The upper aquifer capture zone should be calculated using the most conservative T from the EW-3 aquifer test (1992).

A conservative valve should typically be used for environmental calculations, however, for this case, a conservative high T value is especially warranted because of the simplifications inherent in the capture zone equations used. The lower aquifer capture calculations do not take into account possible leakage from the upper aquifer to the lower aquifer and from the river. The upper aquifer capture calculations do not take into account possible river recharge. These factors could serve to reduce the actual capture zone. The use of the most conservative T (highest value) would add a necessary measure of safety to the calculation.

With the information provided in Geraghty & Miller's response letter, EPA re-examined the captures zones drawn on Figures 1 and 2 of the Draft FS, Appendix D. The following capture distances were not measured correctly: (Xo, 18M) and (Wo, EW-3). After recalculating the new capture zones based on Comment 1, above, please make all measurements as precisely as possible.

The w (upgradient Capture Width) should also be shown on the capture zone plots (Figure 1 and 2 of Appendix D).

Geraghty & Miller agrees that a conservative (high) transmissivity (T) value should be used in the capture zone equations due to the simplifications inherent in those equations. As recommended, by EPA, a T value of 8.66 x 10-5 gallons per day per foot (gpd/ft) was selected from Appendix D, Table D-4, of the February 1985 RI and used to recalculate the capture zones for Municipal Wells 18M and 37/38M.

A T value of 6,300 gpd/ft was used to calculate the capture zone of upper aquifer well EW-3 located on McGraw-Edison property. The T value selected was determined from a distance-drawdown analysis of the hydraulic data collected during the pumping of EW-3 as discussed in Section 5.8 of the SRI report. This T value is the highest value determined during the drawdown phase of the aquifer test and is considered to be conservative but representative of the transmissivity of the upper aquifer in the vicinity of the McGraw-Edison property.

The revised capture zone analysis results are provided in Tables 1 and 2 included in Appendix B. figures 1 and 2 (attached)n have also been revised to depict the recalculated capture zones. Appendix B also contains the proposed text revisions to SFS Appendix D.

The upgradient capture width (W) is depicted on the revised Figures. As the capture zone equations do not predict W at a specific distance upgradient of the pumping well, the upgradient width is interpretive.

Appendix A to this letter contains the following revised pages related to EPA's May 12, 1995 comments 3, 6-14, 16-18, 21, 22, 25, 26, 29 - 31. Additional revised pages, including those showing our proposed text changes which correspond to the phone responses will be provided by July 31, 1995, completing the revisions to the draft SFS document.

If there are any questions or comments regarding responses provided or the revised pages, please do not hesitate to contact Ms. Libby Ford or the undersigned.

Sincerely,

<IMG SRC 0296281C2>

cc: Olean SRI/FS Distribution List
B. Gray - Geraghty & Miller, Albany

APPENDIX A

Revised Pages To The SFS Document

GERAGHTY & MILLER, INC.

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Table 1-1. Nature and Extent of the Contaminants and Approximate Volumes, Olean Well Field Site, Olean, New York.

	Total VOCs in Groundwater (ug/L)	Total VOCs in Soil Above the Water Table (ug/kg)	Approximate Groundwater Volume to be Remediated (cubic feet)	Approximate Soil Volume to be Remediated (cubic feet)	References
Alcas near SB04 and SB07	38,900	12,000	Groundwater associated with the area of soil remediation	6,000	SRI at 5.3.2 SRI at 5.5.2 and Alcas Pilot Test Report
AVX	623,900	2,188,000	Groundwater associated with the area of soil remediation	10,000	SRI at 5.3.1 SRI at 5.5.1 and Pilot Test Report Section 3.0
McGraw Edison (1) EW3	2,400	--	300,000 (Volume of Groundwater)	None	SRI at 5.3.3 SRI at 5.5.3
Olean Clean All SB09	--	121,900	Not enough data available	--	SRI at 5.4.1 SRI at 5.6.8
Olean Tile SB34	--	28,014	Not enough data available	--	SRI at 5.4.7 SRI at 5.6.4
Sandburg Oil SB23	--	4,500	Not enough data available	--	SRI at 5.4.4 SRI at 5.6.9

VOCs Volatile organic compounds.
ug/L Micrograms per liter.
ug/kg Micrograms per kilogram.
SRI Supplemental Remedial Investigation.

(1) Groundwater Volume is based on a surface area estimated from Pumping Well (EW-3) and Observation Wells A-1 and C-1. A 20 foot saturated thickness with an average porosity of 30 percent is assumed.

Source: Geraghty & Miller, Inc. 1994b.

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- No action.
- Institutional controls.
- Containment.
- In-situ treatment
- Removal/treatment/disposal.
- Removal/disposal.

2.4 IDENTIFICATION AND INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

The term "remedial technologies" refers to categories of remedial action which comprise subsets of the general response actions, such as capping or thermal destruction. Process options, on the other hand, refer to specific processes within each technology type (e.g., clay cap or rotary kiln incineration). The purpose of this section is to evaluate and selectively reduce the universe of general response actions, remedial technologies, and process options which are potentially applicable at the identified source areas. This involves a screening process in which the technologies and options are evaluated on the basis of technical Implementability in accordance with "Guidance for conducting Remedial Investigations and Feasibility Studies under CERCLA" (USEPA 1988).

The technologies that have been retained following this initial screening process are further evaluated based on effectiveness, implementability, and cost, in order to select one representative process option for each technology. These process options are use to develop remedial alternatives in each of the contaminated media categories. These alternatives are then subjected to a second step screening process based primarily on effectiveness, implementability, and cost.

Alternatives that remain after the second step screening process are then subject to a detailed quantitative evaluation. The detailed analysis of each alternative involves evaluation on the basis of overall protection of human health and the environment; compliance with

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2.4.1.2 Institutional Controls

Institutional controls guard against the exposure or access to areas that have been impacted by site related COCs. Certain institutional controls are already in place in the Olean Well Field which guard against the ingestion of impacted groundwater. These include the extension of the public water supply line to areas where it was known that COCs were in excess of State and federal drinking water standards. Once the public water supply lines were extended, hookups were offered to every property. Most property owners chose to hookup. At the time of the hookup they signed a commitment to not reconnect their private wells to the property's water distribution system until such time that they have been notified by the USEPA in writing that the groundwater is no longer impacted. For the purposes of this SFS deed restrictions, restrictions on groundwater use, provisions for a alternative water supply, groundwater monitoring, and public education programs will be evaluated.

Deed Restrictions - An institutional control to prevent ingestion of impacted groundwater that could be implemented is the imposition of deed restrictions on the properties that contain the identified source areas. The deed restrictions on those properties would prevent the installation or the use of groundwater wells for potable purposes unless the groundwater was treated to consistently meet State and federal drinking water standards. Deed restrictions would be enforced by local and municipal planning, zoning and local health department officials. Deed restrictions could also be implemented if the remedial action objectives are not met for any property where a source are has been identified. A deed restriction could be used on that respective property to prevent the sale of the source area property for residential use. This technology has proven effective in minimizing contact with COCs in the groundwater, and therefore will be retained for further evaluation.

Restrictions on Groundwater Usage - Institutional measures to prevent ingestion of contaminated groundwater can include imposing deed restrictions or local zoning restrictions, prohibiting installation of new production wells in the vicinity of the site, implementing

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Restrictions on Groundwater Usage - Institutional measures to prevent ingestion of contaminated groundwater can include imposing deed restrictions or local zoning restrictions, prohibiting installation of new production wells in the vicinity of the site, implementing restrictions on the use of existing production wells for drinking water, or requiring point-of use treatment units in domestic water supply lines.

It is written in the policy of the New York State Health Department (NYSDH) that the public water supply districts (in the case of the Town of Olean) develop a backflow prevention physical inspections program designed to insure that any individual who also had a private well (for such non-consumptive uses as lawn watering) had installed and was maintaining a suitable backflow prevention device. This insures that groundwater from private wells can not enter into the drinking water distribution system; where it could be distributed to other public water supply users. The Town of Olean carried out the first physical inspection in 1992 and found no cross connections. These inspections will continue to be carried out on an annual (perhaps going to tri-annual) basis functioning as an additional institutional control. In addition, 10 NYCRR Part 5 prohibits the use of any water in the State, including groundwater, as a source for public water supply without adequate treatment that insures State and federal drinking water standards are consistently met.

This technology has been proven effective in minimizing contact with contaminants in groundwater, and, therefore, will be retained for further evaluation. Within the Olean Well Field this technology has already been implemented at most former private wells with contaminant concentrations above drinking water standards. Because the groundwater contains COCs above drinking water standards within a recognized public water supply district, new private potable water supply wells are prohibited.

Provision of Alternative Water Supply - This alternative has been implemented in accordance with the 1985 ROD. The existing treatment system at the facility is successfully treating the water.

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Groundwater Monitoring - Monitoring wells are used to collect groundwater samples to document contamination levels in the groundwater and to track contaminant migration. Groundwater monitoring can be used alone or in conjunction with other remedial technologies. This technology has already been implemented in the Olean Well Field in accordance with the 1985 ROD.

Public Education Programs - This alternative includes education programs, such as public meetings and presentations, designed to increase public awareness about the hazards present in the identified source areas. The public education programs would involve public meetings where a fact sheet would be distributed and maintenance of an information repository with the results of the Site Monitoring Programs (SMPs) and the results of the analyses of the water quality from the municipal wells after treatment.

2.4.1.3   Containment

Containment technologies restrict or impede the migration of contaminants by controlling groundwater flow. Containment technologies include capping, vertical barriers, and horizontal barriers.

2.4.1.3.1.   Capping

Capping involves the placement of an engineered cover over contaminated soil or waste areas. Capping would prevent migration of contaminants by physically isolating them from driving forces, such a precipitation percolation, surface-water runoff, and wind. Capping can be completed relatively quickly using readily available materials. The equipment needed for implementing this technology is standard construction equipment. The main disadvantages of capping are the need for long-term maintenance, uncertain design life, and the fact that it does not address source areas beneath the water table. However, with slurry walls involves the excavation of a vertical trench and the injection of slurry into the void space. Slurry walls can be installed to depths from 20 to 80 feet with widths of 2 to 3 feet. SB slurry walls are the most popular since they have a lower permeability than CB walls, and are less costly.

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Trenches are generally dug with an ordinary small back hoe when depths are less that 25 feet (bls) below land surface. When depths exceed 25 (bls), track mounted back hoes and or clam shell excavators attached to Kelly bar cranes are required. When depths exceed 40 feet bls the cost of specialized and construction methods makes slurry wall installation extremely expensive.

In order to contain contaminated groundwater at the identified source area, enclosed slurry wall systems would be needed and would have to be combined with other systems such as capping and stormwater controls to manage the increased hydraulic head in each area that requires remediation. This remedial technology only contains the impacted areas at each site, and does not address the remediation of impacted groundwater or soils. The considerable depth at which the confining layer below the lower aquifer is found (170 feet) also makes this technology expensive to implement. As there are other more effective and less costly remedies being considered, slurry walls will not be retained for further consideration.

2.4.1.3.3. Horizontal Barriers

Horizontal barriers such as grouting can be used to impede the vertical flow of contaminated groundwater.

Grouting - Grouting employs high pressure injection of a low-permeability substance into fractured or unconsolidated geologic material where it is set in place to reduce groundwater flow and strengthen the formation. Grouted barriers are seldom used for

2.4.1.5.2. Treatment

Treatment technologies for pumped groundwater can be grouped into two broad categories: physical and biological. Physical treatment methods include carbon adsorption, reverse osmosis, and air stripping. Precipitation, chemical oxidation/reduction, ion exchange, and neutralization are commonly used chemical treatment methods. Biological treatment methods include activated sludge, trickling filters, and rotating biological contractors.

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There are several groundwater treatment systems operating in the Olean Well Field site, the existing McGraw-Edison groundwater treatment system and the City of Olean municipal well treatment systems. Based on the information we have on these systems, treatment for inorganic parameters has not been implemented and is not required. Therefore, it is anticipated that no inorganic treatment technologies (e.g. precipitation, reverse osmosis or ion exchange) will be required for a groundwater treatment system implemented as part of a remedial action.

Carbon Adsorption - The use of activated carbon to purify water is well established. Activated carbon has the ability to remove relatively non-polar organic compounds. Contaminated water is generally contacted with the carbon in a series of downflow-packed bed columns. When the carbon becomes saturated with chemicals, it can either be thermally regenerated for reuse of discarded. Activated carbon can adsorb a wide range of organic compounds, but is more effective in the removal of compounds of moderate molecular weight. This includes the compounds targeted for remediation within the Olean Well Field. Removal of contaminants to non-detectable levels can generally be achieved. Activated carbon adsorption will be retained for further evaluation because of its technical feasibility.

Reverse Osmosis - Reverse osmosis employs a membrane and requires the application of sufficient pressure to a concentrated solution to overcome the osmotic pressure and force

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Important considerations include the permeability of the materials in which the upgradient injection wells are installed, and the quality of the treated groundwater. This option will be retained for further evaluation.

2.4.2 Soil Remediation Technologies

The contaminant levels in the soils at the identified source areas and their localized nature indicate that surface and subsurface soil remediation strategies may reduce or eliminate migration of contaminants to the underlying aquifers, reducing risk and potentially expediting the treatment of municipal wells. The following soil remediation technologies have been initially considered for the identified source areas.

2.4.2.1 No Action

The no-action technology, which is required by the National contingency Plan (NCP), provides a baseline against which other technologies may be compared. Under no-action, no additional cleanup would be undertaken, and the contaminated surface and subsurface soils in the identified source areas would be left as it now exists.

2.4.2.2 Institutional Controls

Institutional actions involve imposing access and/or deed restrictions on future land use of the site of the contaminated soil area. Institutional actions could also include fencing of the source areas. Institutional actions might temporarily limit public access to on-site contaminants, but cannot prevent exposure during unauthorized access. As such, they may be applicable in conjunction with other containment or treatment technologies and therefore will be retained for further evaluation.

2.4.2.3 Containment

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2.4.2.4.1 Thermal Treatment

In-situ vitrification (ISV) - ISV involves placing an array of electrodes in the soil to be vitrified and applying electric power to heat and melt the soil. A high current is passed through these electrodes, heating the adjacent soil to approximately 2,900 to 3,600 degrees Fahrenheit (F) and causing the soil to melt. As the soil melting spreads downward and outward, it thermally destroys organic contaminants by pyrolysis. Off-gases migrate to the surface where they are treated prior to atmospheric release. When the electric current ceases, the mass cools and solidifies into a glassy, solid matrix similar in form and durability to the igneous rock obsidian. This technology is primarily used to encapsulate non-volatile organic element. Although this technology can be applied to soils impacted by VOCs; VOCs would volatilize and be released during implementation, making off gas controls and treatment necessary. Additionally there is the potential for soils with a high moisture content to require remediation at the Olean Well Field site. The cost to implement ISV becomes higher with increasing soil moisture content.

As this process is more appropriately implemented for inorganic constituent impacts, and would be costly to implement due to the nature of the soils that would require remediation, ISV will not be retained for further evaluation.

In-Situ Steam Injection - In-situ steam injection removes volatile and semivolatile organics from soil without excavation of the waste. Steam is injected into the ground to raise the soil temperature and drive off volatile contaminants. Steam extraction systems may be mobile or stationary. A mobile system injects steam through rotating cutter blades that pass through the contaminated medium. In a stationary system, steam flows through individual valves from the manifold to injection wells. Recovery wells remove gases and liquids from the soil.

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and clay, in turn, are attached to sand and gravel particles by physical processes, primarily compaction and adhesion. Washing processes that separate the fine (small) clay and silt particles from the coarser sand and gravel soil particles, effectively separate and concentrate the contaminants into a smaller volume of soil that can be further treated or disposed. The clean, larger fraction can then be returned to the site for continued use. This set of assumptions forms the basis for the volume-reduction concept upon which most soil washing technology applications are being developed. At the present time, soil washing is used extensively in Europe and has had limited use in the United States.

A wide variety of chemical contaminants can be removed from soils through soil washing applications. Removal efficiencies depend on the type of contaminants as well as the type of soil. Volatile organic contaminants after are easily removed from soil by washing; experience shows that volatiles can be removed with 90 to 99 percent efficiency or more.

However, where soils have a high silt or clay content, soil washing becomes much more costly and less effective as the clean larger fraction is smaller and can not be re-used. The soils at the Olean Well Field site in general have a high silt and clay content, making soil washing less effective and more costly than other technologies to implement. Soil washing generally is not cost effective where soil volumes are below 10,000 (cy) cubic yards of soil volume. The volume of soils requiring remediation at the Olean Well Field Site are significantly less than 10,000 cy. Soil washing will not be retained for further consideration.

! Dehalogenation - An alkaline polyethylene glycolate (APEG) reagent is used to dehalogenate aromatic compounds in a batch reactor. In the APEG process, the reaction causes the polyethylene glycol to replace halogen molecules and

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Remedial Alternative 4: In-Situ Treatment of Soil and Groundwater Using Air Sparging and SVE or VER.

Remedial Alternative 5: Soil Excavation and Off-Site Thermal Treatment and Disposal and On-Site Treatment of Groundwater Using Air Stripping, Carbon Polishing, and Discharge to POTW.

Remedial Alternative 6: Soil Excavation and Off-Site Thermal Treatment (if necessary) and Disposal.

3.4 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

In this section a description of the combined remedial alternatives is provided and the results of its subsequent evaluation is summarized.

3.4.1 Description of Combined Remedial Alternatives

This section presents a description of the combined remedial alternatives, outlined in Section 3.3, which are considered for detailed analysis.

3.4.1.1 Alternative 1: No action

Implementation of Alternative 1: No Action results in leaving the source areas as they currently exist with no additional work to be performed within or outside of the source area boundaries. At present, groundwater recovery and treatment with air strippers on the municipal water supply wells and the production well at the McGraw-Edison site is in operation and a quarterly site Monitoring Program is carried out. Every 5 years, a review of site conditions will be conducted to determine if the remedial action requires modification. These operations would continue and are considered part of the No Action alternative.

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3.4.1.2 Alternative 2: Institutional Controls

Instituting Alternative 2 would involve implementing the following:

- ! Public education programs.

- ! Site monitoring program of selected monitoring wells and Olean Well Field municipal wells (this may involve an expansion or modification of the current SMP)

- ! Prohibit the use of area groundwater for potable purposes.

- ! Place deed restrictions on the sale of source area properties for residential use.

- ! Access restrictions to the identified source areas.

- ! Conduct a 5 year review of site conditions.

This alternative includes education programs such as public meetings and presentations, designed to increase public awareness about the hazards present in the identified source areas. The public education programs would involve a public meeting where a fact sheet would be distributed and maintenance of an information repository with the results of the SMPs and the results of the analyses of the effluent water quality from the municipal wells after treatment.

This alternative also involves implementation, relative to the identified source areas, of land use, deed restriction or other legally enforceable restrictions to limit on-site excavation, and to prevent installation of domestic or industrial groundwater wells for potable water purposes until soil and groundwater clean-up levels identified in Table 2-1 are achieved. Excavation restrictions would ensure that excavation in or near an identified soil source area is accompanied by implementation of a worker/local area health and safely plan and appropriate off-site treatment and/or disposal of any contaminated excavated soils. Legal activities associated with instituting land use restrictions could include incorporating necesary language into site property deeds. Access restrictions could include installation of a 6-foot high fence

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Impacted groundwater will be pumped to the central air stripper for treatment and disposal.

Groundwater Recovery from the deep aquifer at any of the soil source areas could create a migration of COCs from the shallow aquifer to the less contaminated deep aquifer. Groundwater pumping related to this alternative will be concentrate on shallow groundwater collection. Groundwater collection in the shallow aquifer could be more effective at containing the source areas a the impacted soils are above the shallow aquitard. (spelling)

As stipulated by Comprehensive Environmental Response, compensation and Liability Act (CERCLA) 121(c), a 5-year review is required under this alternative. It is also necessary to periodically monitor the effectiveness of the remedial system on the prevention of contaminant migration. This would be done as part of or as a modification to the SMP.

3.4.1.4 Alternative 3A: On-Site Treatment of Groundwater Using Air Stripping and Carbon Polishing and discharge to POTW

This alternative is similar to Alternative 3, except soil related activities would not be done, and the groundwater remedy would be implemented immediately.

3.4.1.5 Alternative 4: In-Situ Treatment of Soil Using Air Sparging and Soil Vapor Extraction or Vacuum Enhanced Recovery

This alternative consists of implementing the following:

- Installation of an air sparging/soil vapor extraction (SVE) system and/or vacuum-enhanced recovery (VER) system.
- Access restrictions (if necessary).
- Monitoring.

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This alternative provides integrated soil and groundwater treatment. For source areas where the geology is suitable, groundwater within the areas would be treated through an air sparging system which is comprised of a system of injection wells through which air is forced. As the air rises towards the vadose zone it carries VOCs with it. Soil treatment would be accomplished by installing and operating a SVE system. If source area conditions are not appropriate (primarily due to the presence of less permeable soils) variations of the SVE technique would be applied using either a VER system or a dual extraction SVE system. If necessary to meet ARARs and TCBs (primarily SGCs and AGCs included in NYDEC's Air Guide 1), an off-gas treatment system would be installed to remove contaminants from the air stream of the SVE or VER system prior to discharge.

There is no soil contamination noted at the McGraw-Edison site and the groundwater can be pumped by conventional methods and treated through the existing air stripper; VER is less directly applicable to the site.

Based on the data collected for Olean Clean All it appears that air sparging and SVE or VER could be applied. The soil data collected in the vicinity of the source area indicates a heterogeneous and silty clay formaties that would seem to indicate that VER is more directly applicable than SVE and air sparging.

Deed restrictions and/or access restrictions and periodic monitoring similar to that described in Alternative 2 could also be required.

3.4.1.6 Alternative 5: Soil Excavation And Off-Site Thermal Treatment And Disposal, On-Site Treatment of Groundwater Using Air Stripping And Carbon Polishing And Discharge To POTW

Alternative 5 would consist of implementing the following:

- Excavation and removal of soil at the identified soil source area(s).

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Objectives and Cleanup Levels, NYSDEC TAGM #4046 - 1/94) a chemical-specific TBC would be used to establish soil CGs in the soil source areas (please refer to Appendix B).

According to the requirements set forth by the NCP, if an alternative does not meet the ARARs and a waiver of the ARARs is not appropriate or justifiable, such an alternative should not be further considered.

3.4.2.1.3 Long-Term Effectiveness and Permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and the quantity/nature of waste or residual levels of contamination remaining at the site after response objectives have been met. The primary focus of this evaluation is the extent and effectiveness of the controls that may be required to both manage the residual levels of target contaminants remaining at the site and to operate the remedial system as necessary for the remedy to remain effective. The following components of the criterion are addressed:

- Permanence of the remedial alternative;
- Magnitude of remaining risk;
- Adequacy of controls; and
- Reliability of controls.

3.4.2.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This evaluation criterion assesses the remedial alternative's use of recycling or treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous wastes as their main element. CERCLA requires EPA to select remedies that use treatment to eliminate any significant threats at a site through destruction of toxic

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This allows the cost of remedial action alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the remedial action over its planned life. For this evaluation a discount interest rate of 7 percent has been assumed.

3.4.3 Analysis of Remedial Alternatives

In the sections which follow, each alternative is analyzed in reference to the evaluation criteria described in Section 3.4.2.1. A summary of the results of this analysis is provided in Table 3-1.

3.4.3.1 Alternative 1: No Action

The No-Action alternative would require no additional action be undertaken to reduce and/or remove the contaminants from the source area soils or groundwater beyond those already in place.

At this time, this alternative is not in compliance with the ARARs and does not offer any increased overall protection of human health and the environment. No remedial action is associated with this alternative; therefore, implementation poses no risks to workers or the community and environmental impacts will remain as they are presently. This alternative offers no reduction of toxicity, mobility, or volume through treatment; however, it is easy to implement as there is nothing to be done. There are no capital or operation and maintenance cost involved with this alternative.

If implemented, this alternative would require a 5-year environmental review, at which time the need for further remedial action will be decided.

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Costs for this Alternative would consist of administrative expenses related to implementing land use/deed and/or access restrictions, some enhancement of the current SMP, instituting public education programs, engineering, material, and construction costs. The estimated costs for implementing Alternative 2 is given in Table 3-2. A cost breakdown for Alternative 2 is provided in Appendix C.

3.4.3.3 Alternative 3: Capping, On-Site Treatment Using Air Stripping and Carbon Polishing and Discharge to POTW

This alternative should be protective of human health and the environment. Capping would reduce the downward migration or leaching of contaminants to the groundwater and subsequently to off-site receptors. Capping will also reduce the potential for contaminants to come in contact with human and animals and reduce erosion. Capping will require periodic maintenance and annual inspection to check integrity.

Groundwater at the McGraw-Edison site would be treated as a source area and would involve activation of the existing recovery well (EW-3) and treatment of the groundwater by the existing on-site air stripper at McGraw-Edison. This groundwater treatment program would reduce the potential for off-site migration of contaminated groundwater, and be protective of human health and the environment.

This option has the potential of being in compliance with location, action specific ARARs and TBCs. Chemical specific ARARs related to soils would continue to be exceeded. Groundwater chemical-specific ARARs could be achieved under this alternative. Location-specific and action-specific ARARs are expected to be met through proper remedial design.

If during the first 5-year review data indicates that even after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, the

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groundwater downgradient of the capped soil areas has not achieved the CGs identified in Table 2-1, a groundwater treatment program would be implemented. The groundwater would be treated by installing a recovery well system and by removing contaminants using air stripping and polishing the treated water using a GAC adsorption system (if necessary). The treated groundwater would then be discharged to the publicly owned treatment works system (POTW) or to a surface water. If necessary to meet the requirements of the NYS Air Guide 1, the off-gas from the air stripping system would be treated with activated carbon (or other appropriate methods).

This alternative will not reduce the toxicity or volume of soil contamination at the capped source areas, as no soil treatment or removal is proposed. Mobility of contaminants in these areas would be reduced. If the establishment of a new soil/groundwater equilibrium does not sufficiently reduce groundwater toxicity, mobility, and volume at groundwater source areas, those items can be effectively reduced through groundwater pumping, and treatment through on-site treatment systems(s) (McGraw-Edison) which would consist of an air stripper and (possibly) GAC polishing.

Moderate short-term impacts, such as fugitive emissions and erosion may be associated with cap installation. Air monitoring would be performed to identify harmful emissions during installation of the caps. Standard health and safety precautions would be maintained to mitigate any risks from construction operations. Standard dust control measures would control exposure to workers during construction. A health and safety plan would be required.

This alternative is implementable. Construction of the caps and on-site groundwater treatment systems is not expected to involve any implementation problems. Capping is an easily implementable technology and involves little or no implementation problems. Discharge to the POTW or a surface-water body for the groundwater treatment system will require either a permit from the POTW or a SPDES permit from the state. Modification to the

APPENDIX B
Capture Zone Analysis Revised Pages

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PRELIMINARY CAPTURE ZONE ANALYSIS

Preliminary capture zone analyses were completed for lower aquifer Municipal Wells 18M and 37/38M, and upper aquifer recovery well EW-3. These analyses were performed in response to a request by the USEPA to determine the approximate capture zones for the municipal pumping centers and the predicted capture zone for well EW-3 located on the McGraw-Edison property.

Generally, the capture zone may be described with three discreet dimensional parameters (Javandel & Tsang 1986).

Xo - the distance from the pumped well to the downgradient extent of the capture zone (stagnation point).
Wo - the width of the capture zone in the vicinity adjacent to the pumped well.
W - the maximum width of the capture zone for upgradient.

These parameters are calculated using the following equations:

X =----- W =---- W =----
° 2πTI TI ° 2TI

This analytical approach assumes the following:

- the aquifer is infinite, isotropic, and homogeneous with a horizontal base.
- steady-state conditions
- negligible vertical flow
- uniform saturated thickness

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Lower Aquifer

A preliminary, conservative, capture zone analysis was performed for Municipal Wells 18M and 37/38M using lower aquifer hydraulic data generated during the 1984 remedial investigation (RI) (Engineering Science 1985). Specifically, conservative estimates of aquifer transmissivity (T), and horizontal gradient (I) derived under non-pumping conditions were input into equations to determine the capture zone of these pumping centers. These hydraulic parameters are shown in Table 1.

Results of a conservative capture zone analyses for the municipal pumping centers indicate downgradient capture of 909 feet (18M) and 1,440 feet (37/38M). Capture zone widths in the vicinity adjacent to wells 18M and 37/38M are approximately 2,857 feet and 4,524 feet, respectively (see Table 2).

The lower aquifer is a semi-confined river valley aquifer. Under non-pumping conditions the hydraulic gradient of this aquifer is very flat as was indicated during the 1984 RI (Engineering-Science 1985). Pumping of the municipal wells in the lower aquifer has created a large capture zone between the bedrock boundaries north and south of the river valley, Figure 1. Under continuous pumping it is anticipated that flow is induced from the upper aquifer and the Allegheny River upgradient from the pumping centers.

Limitations of the Capture Zone Analysis for 18M and 37/38M

The results of the preliminary capture zone analysis presented are intended to provide a conservative general picture of the extent of the capture zone for municipal well pumping centers 18M and 37/38M in the Olean Well Field. The analysis performed has technical limitations which can not be accounted for in this type of model. The principal limitations of this capture zone analysis are as follows:

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1. The effect of impermeable boundaries along the northern and southern portions of the river valley are not considered in the equations.

2. The contributions of water from the upper aquifer and the Allegheny River to the capture zone can not be determined using this model.

3. The extent and permeability of the upper aquitard is not accounted for in this model.

UPPER AQUIFER

A conservative preliminary capture zone analysis was performed for Well EW-3 on the McGraw-Edison site using the upper aquifer hydraulic data generated during an aquifer test performed in January 1992. These hydraulic parameters are shown in Table 1. Capture zone parameters were calculated using the equations specified previously (Javandel & Tsang 1986). The results of the conservative capture zone analysis for Well EW-3 presented in Table 2. These results predict a downgradient capture of approximately 40 feet and a capture zone width of approximately 250 feet.

The upper aquifer is an unconfined river valley aquifer. Under pumping conditions, it is anticipated that the capture zone for Well EW-3 will approximate the area shown on Figure 2.

Limitations of the Capture Zone Analysis for EW-3

The results of the preliminary conservative capture zone analysis is intended to provide a prediction of the extent of the capture zone for well EW-3 at the McGraw-Edison facility.

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The principal limitations of this capture zone analysis are as follows:

1. The effect of pumping the on-site lower aquifer productions well is not considered in the equation.

2. The permeability of the upper aquitard is not considered.

3. The potential for recharge to the upper aquifer from the river is not considered in the equation.

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Table 1. Hydraulic Parameters Used in Capture Zone Analysis Olean Well Field, Olean, New York

Well	Tranmissivity (gpd/ft)	Gradient (ft/ft)	Rate (gpd)
18M	8.66 x 105	0.00025	1.2 x 106
37/38M	8.66 x 105	0.00025	1.9 x 106
EW-3	6,300	0.011	17,280

T Transmissivity
I Hydraulic Gradient
Q Pumping Rate

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Table 2. Capture Zone Analysis Results, Olean Well Field, Olean, New York.

Well	Xo Downgradient Extent of Capture (ft)	Wo Capture Width (ft)	W Upgradient Capture Width (ft)
18M	909	2,857	5,714
37/38M	1,440	4,524	9,048
EW-3	40	125	250

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<IMG SRC 0296281E5>

APPENDIX E

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November 14, 1995

VIA CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Chief, NY/Caribbean Superfund Branch II
U.S. Environmental Protection Agency
Region II
Emergency & Remedial Response Division
290 Broadway - 20th Floor
New York, New York 10007-1866

Attention: Thomas Taccone, Olean Wellfield Site Project Coordinator

RE: Olean Wellfield Supplemental RI/FS October 1995 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202

Dear Tom:

As required under paragraph 62 of the above-referenced Consent Order, this letter will update you on the progress made by the Cooperating Industries ("CIs") on the various requirements included in that Consent Order during October 1995. Because my October 11, 1995 letter to you, containing the September monthly report, discussed activities through October 11, 1995, this letter will pick up from that date until November 14, 1995. To facilitate your review, items requiring feedback from you are printed in bold print.

Reporting Period

SRI Report

As you know, the SRI Report has been finalized (July 20, 1995) and approved (June 30, 1995) by EPA (subject to the changes which EPA requested and we submitted on July 20,

Nixon, Hargrave, Devans & Doyle LLP

Thomas Taccone
November 14, 1995

SFS Report

On October 25, 1995 we received the official version of EPA's October 19, 1995 comment letter on the draft SFS report. To expedite our review and response to that letter, EPA had earlier provided us with a faxed copy of the letter.

Subsequent to receiving that letter a series of conference calls was made between yourself, Foster Wheeler (Radian) and Geraghty and Miller and/or myself. In addition, draft revisions to various portions of the draft SFS report which were responsive to EPA's comments were forwarded to you by fax. Copies of these are attached for all parties except EPA and NYDEC (as discussed below, we are providing complete copies of the text and tables to those two organizations). One of the main focuses of these discussions was the new "Attachment 1" included in the October 19, 1995 letter which was EPA's proposed revisions to our SFS description of when the various Stage 1 remedial actions would be deemed complete, and how the subsequent evaluations of the groundwater quality would be done to determine if the Stage 2 (groundwater remedy/containment) remedial actions would be needed at any source area. The draft Attachment 1 also addressed the factors which would be considered if the groundwater remedy appeared to have achieved its reasonable maximum effectiveness but the groundwater clean up goals still had not been entirely met. The CI's requested some wording changes in this Attachment to reflect past discussions with EPA and an acknowledgement that, in keeping with the stated SRI/FS objectives, one of the factors which would be evaluated when deciding whether additional (Stage 2) groundwater treatment/containment would be required was whether such treatment would result in improvement in the groundwater, which would materially affect the groundwater quality at the influent to the municipal wells. Revised section 3.2 of the SFS Report (attached) includes the SFS version of this language.

Another major topic of discussion during this time was how, if a Stage 2 groundwater remedy was found to be necessary as a result of the above evaluation, but a remedial technology other then pump and treat (which we understand will be the technology which EPA will include in its Proposed Remedial Action Plan ("PRAP")) appeared to be more effective, approval to install the alternative technology could be obtained. I understand that you informed Andy Barber that the mechanism would be a ROD amendment. Such an amendment would be triggered by the Source Area PRP sending a letter to EPA requesting and justifying such a change. If EPA concurs, it would then issue a ROD amendment.

On October 13, 1995 Brent O'Dell and I consulted with you (via telephone) to confirm our understanding that we had supplied EPA with all the requested changes to the SFS. During that conversation we agreed that the revised SFS cost table still had to be submitted, and a copy was faxed to you after the call. Unless we hear otherwise, we assume that EPA now has copies of all the revisions to the SFS that it requested and will shortly approve that Report. To facilitate EPA's and NYDEC's final review of the SFS Report, complete copies of the revised text and tables are being forwarded to you and Mr. Scarf. Once EPA approves the SFS, complete copies of it will be distributed to everyone on the distribution list.

Work during the Next Two Months

We believe that the draft SFS is essentially 100% complete. We continue to be hopeful that the draft SFS report will receive EPA's approval so that the final SFS Report, the PRAP, the public notice (with a subsequent public meeting, if necessary) and the ROD can all be completed by the end of 1995.

Looking forward to the remedial phase, one suggestion that the Olean CI's have made to EPA to expedite that process while insuring that the work done is effective and efficient is that EPA's Order outlining the remedial design process recognize that the Stage 1 remedial alternatives are straight forward and easily implementable. Because of this, the pre-approval reporting (during the final "design" process) should be able to be streamlined.

Unexpected Problems

No unexpected problems arose during the reporting period.

Percentage Completion

The SRI portion of the project is 100% complete. As indicated above, we believe the SFS portion of the project is also 100% complete.

As always, if you have any questions, please do not hesitate to call me.

<IMG SRC 0296281E6>

cc: SRI/FS Consent Order Distribution List
Michael O'Brien
Robert Horger
Andrew Barber
Jim Stitt
Joan Prager
Brent O'Dell

APPENDIX F

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October 11, 1995

VIA CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Chief, NY/Caribbean Superfund Branch II
U.S. Environmental Protection Agency Region II
Emergency & Remedial Response Division
290 Broadway - 20th Floor
New York, New York 10007-1866

Attention: Thomas Taccone, Olean Wellfield Site Project Coordinator

RE: Olean Wellfield Supplemental RI/FS September 1995 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202

Dear Tom:

As required under paragraph 62 of the above-referenced Consent Order, this letter will update you on the progress made by the Cooperating Industries ("CIs") on the various requirements included in that Consent Order during September 1995. Because my September 15, 1995 letter to you, containing the August monthly report, discussed activities through September 15, 1995, this letter will pick up from that date until October 11, 1995. To facilitate your review, items requiring feedback from you are printed in bold print.

Reporting Period

SRI Report

As you know, the SRI Report has been finalized (July 20, 1995) and approved (June 30, 1995) by EPA (subject to the changes which EPA requested and we submitted on July 20, 1995).

SFS Report

On September 21, 1995 a conference call was held between yourself, Kevin Lynch, Linda Ross, Brent Miller, Andy Barber and myself to talk about the "triggers" that would cause a source area which had been remediated under Alternatives 3, 4 or 5 to move from Phase 1 (soil source area remediation) to Phase 2 (groundwater containment and/or remediation). While no final decisions were made during that call, the following concepts were agreed to:

1. No Phase 2 will be necessary if the influent to the municipal wells is meeting the established groundwater cleanup goals ("CGs").

2. Phase 2 would not be triggered at one source area until the remediation had been completed at all source areas.

3. Phase 2 will not be triggered just because the groundwater immediately downgradient of a source area does not meet MCLs (the CGs).

4. EPA would like the Alternative 4 (SVE/VER) description of the two phases of the alternative to read the same as the description of Alternative 3 (Capping).

5. EPA believes that the ROD should specify an actual groundwater containment technology, namely groundwater pump and treat. The CIs want sufficient flexibility incorporated into the ROD with respect to Phase 2 that if another equally or more effective containment/remedial technology is available by the time Phase 2 is triggered, it can be implemented without having to go through a formal ROD amendment.

On September 22, 1995 Andy Barber faxed to you suggested language changes to the draft SFS which would address items 1 through 3 above. During the September 21 telephone call we all agreed that we understood the concerns underlying Item 4 above. It was also agreed that EPA would take the lead (As it drafted the ROD) on item number 5. If the Olean CIs are not happy with the ROD language, we will be free to comment upon it during the ROD public comment period.

Once EPA approves the SFS, complete copies of it, including the final edited changes included in the August 9 electronic version, will be distributed to everyone on the distribution list.

Work during the Next Two Months

We believe that the draft SFS is essentially 100% complete. We are awaiting EPA's comments on the most recent submittals. We continue to be hopeful that the draft SFS report will receive EPA"s approval so that the final SFS report and the ROD can be issued by the end of 1995.

Unexpected Problems

No unexpected problems arose during the reporting period.

Percentage Completion

The SRI portion of the project is 100% complete. A SFS schedule has never been approved. As indicated above, we believe the SFS portion of the project is approaching 100% completion.

As always, if you have any questions, please do not hesitate to call me.

<IMG SRC 0296281E7>

cc: SRI/FS Consent Order Distribution List
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August 5, 1996

VIA CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Chief, NY/Caribbean Superfund Branch II
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Emergency & Remedial Response Division
290 Broadway - 20th Floor
New York, New York 10007-1866

Attention: Thomas Taccone, Olean Wellfield Site Project Coordinator

RE: Additional Comments on "Superfund Proposed Plan - Olean Wellfield"

Dear Tom:

On behalf of the Olean Cooperating Industries1 ("Cis") this letter contains the CIs comments on the above-referenced Superfund Proposed Plan ("SPP"). As you know, on July 18, 1996, I submitted, on behalf of the Olean CIs, a letter commenting on EPA's July 3, 1996 letter to myself containing final comments on the Olean Wellfield SFS and unilaterally imposing a "Preface" to that report. To the extent that the issues raised in that dispute have not been fully resolved by the close of the comment period on the Olean Wellfield SPP, we request that the final resolution of those issues also be reflected in EPA's eventual "Record of Decision" ("ROD") on this matter. We also request that our July 18, 1996 letter, as well as this one, be included as a part of the Administrative Record for this project.

For ease of reference, the following comments are presented on a page-by-page basis. The order they are presented is not meant to infer anything with respect to the importance the Olean CIs attach to any particular issue.

1. (Page 2) The SPP neglects to mention an important part of the "first operable unit" for the Site, that is the inspection and repair of the McGraw-Edison industrial sewer. That inspection found numerous illegal connections to the industrial sewer. While those connections were allowed to remain, they were repaired so that the sewer itself would not act as a migration pathway for any groundwater contaminants encountered along its route.

2. (Page 3) There is no upper aquifer at the AVX site. See SRI Section 3.3.2.

3. (Page 5) The TCE concentration detected in SB05 as stated in the SPP (53 ppb) is incorrect. As Table 5 of the SRI report indicates, an estimated value of 29 ppb of TCE was reported for this sample.

4. (Page 7) While not dealing with any of the CI sites, we noticed that the text on the site in the section discussing Fay Avenue/Schaefer Street refers to Griffith Oil.

5. (Page 9) (See the discussion below on comment number 19).

6. (Page 9) On this page EPA indicates that it believes the Alcas site may have cultural resource artifacts that "may be potentially disturbed by a remedial alternative." Considering that the Alcas site is an active industrial facility and that the preferred remedy is relatively non-intrusive, Alcas and Alcoa believe that the proposed Stage 1B Cultural Resources Survey and possible subsequent investigations will have little influence on the design and construction of the remedy other than to further delay implementation and increase costs with little or no benefit. Therefore, on behalf of Alcas and Alcoa we recommend that this proposed survey be deleted before the issuance of the ROD.

7. (Page 10) In the discussion on the Human Health Risk Assessment ("HHRA"), the SPP fails to adequately differentiate between the two different groundwater exposure pathways through which residents and others may ingest groundwater from the Olean Wellfield aquifer. First and foremost are those people who drink municipal water which is withdrawn from the Wellfield aquifer and treated to remove VOCs before it enters the municipal distribution system. The December 1993 Final Risk Assessment, prepared by an EPA contractor, examined this scenario, but assumed that the water pumped from the municipal wells was not treated. Even under this invalid assumption, the Risk Assessment states that "[b]ased upon this assessment all potential carcinogenic risks fall within the USEPA acceptable risk range 10-4 to 10-6 and all HIs are below 1.0." (HHRA at 36). The Risk Assessment concludes with an acknowledgment that the water from these wells is being treated to federal drinking water standards and states that "[r]isk calculations were included in this report to demonstrate that the treated groundwater is safe to use." (Id. at 42.) The failure to mention the above analyses and conclusions in the SPP skews the summary of potential human health risks and may lead to a serious misunderstanding of the health risks to those who rely on the City's municipal water supply.

Instead, the SPP selectively discusses only those portions of the HHRA which conservatively attempt to quantify the risks to those individuals who rely on water withdrawn through private wells within the aquifer. For more than six years the Olean CIs, as well as the State and local Health Departments have been urging the owners of these properties to discontinue the use of their private wells and to connect their properties to the municipal drinking water system. Most of the property owners have chosen to do so, but a few have not. These owners have their own reasons for not connecting with the municipal water supply. As was demonstrated in § 6.1 of the SRI Report, there are many diffuse sources of VOCs to the Olean Wellfield aquifer, just as have been found in aquifers throughout the United States. No matter how effective the SRI/FS recommended source area remedial measures are, there will always remain the likelihood that water at various locations within the Wellfield aquifer will continue to contain VOC levels above the drinking water standards. Therefore, we agree with EPA and the Health Department that, ideally, people living in these areas should switch to a treated water supply. They are American citizens, however, with a freedom of choice. Apparently the Health Departments have concluded that this situation is not one which constitutes either a public health threat or a "question of security of life and health", thereby preventing them from ordering these property owners to connect their properties to the public water supply system. (§ 1301 New York Public Health Law). The Olean CI's believe that it is very important for the final Olean Supplemental Superfund Plan and the ROD to clearly differentiate between public health risks and individually chosen risks (as reflected by individual decisions not to connect with the treated water supply).

8. (Page 11) The Remedial Action Objectives ("RAOs") included in the SPP are not the agreed upon RAOs for this project. These are set forth in § 2.1 of the SFS Report. On July 30, 1996 we informed EPA of our agreement to minor revisions of the SFS § 2.1 RAOs. The final version of these RAOs must be the ones included in the final Superfund Plan and in the ROD.

9. (Page 12, Table 1).

As indicated on page 11 of the SPP, the agreed upon soil cleanup objectives are NYSDEC's Technical and Administrative Guidance Memorandum Cleanup Numbers. However, Table 1 includes a number for cis 1,2-Dichlorethene ("cis 1,2-DCE") while New York TAGM 4046 (dated January 24, 1994 contains no cleanup number for 1,2-DCE. The number contained in the Table 1 for cis 1,2-DCE is for trans cis 1,2-DCE, which is a different chemical with a different property. There should be no cleanup number established for cis 1,2-DCE since there is no established TAGM Remedial Number for this parameter. Similarly, Table 1 contains a number of substances (i.e., 2-Butanone, benzene, ethyl benzene, toulene, and vinyl chloride) for which the basis for needing remedial goals for these substances had not been established. To the extent that EPA is imposing remedial goals beyond those included in Table 2-1 of the SFS, it must identify the need and basis for each of them.

10. (Page 12) Table 1 of the PRAP lists the groundwater cleanup standards which are, according to the text on page 11, based on federal and state MCLs. However, the fourth column in Table 1 is entitled "New York State Groundwater Standards". After comparing the values in this column with New York State's Drinking Water Standards (10 NYCRR § 5-1.52 Table 3), we note that, except for benzene, the values listed in the columns are, in fact, New York MCLs. However, the New York MCL for benzene is 5 ppb, not 0.7. The title of Table 1 and the benzene groundwater clean up goal should be corrected before the ROD is issued.

11. (Page 13) In its discussion of the Stage 2 remedial measure at AVX, the SPP indicates "[i]f groundwater treatment is determined to be necessary for the AVX source area, EPA will also evaluate the impact of a groundwater pump and treat system on the wetlands area. As we have previously pointed out to EPA, groundwater pumpage has occurred at AVX for over 40 years without any detrimental effect on the wetland. Therefore, if Stage 2 groundwater pump and treat is ever necessary at the AVX site, no evaluation of its potential effect on the wetland should be necessary. This statement should not be included in the final Superfund Plan or in the ROD. (See also our letter to yourself dated July 18, 1996).

12. (Page 13) As we discussed with EPA representatives on July 29, 1996, the Olean CI's urge EPA to consider the data needs for its 5 year statutory review as it works with AVX and Olean Clean All/Loohns representatives to develop the scope of the 4 year Stage 2 groundwater reviews so that additional data is not necessary for the 5 year CERCLA review.

13. (Pages 16-28)

For the record we point out that the SFS section 4.2, which USEPA largely wrote based upon information in our prior drafts and information which was elsewhere in the draft SFS, is virtually verbatim from this section of the SPP. We continue to disagree strongly with EPA's assertion that our final draft SFS did not properly evaluate the NCP criteria. Rather than repeat what we said with regard to this issue in the past, we again reference our letters dated May 30, 1995, July 19, 1995 and July 18, 1996. Furthermore, a review of 40 CFR § 300.430 (e)(iii)(3) which sets out the NCP evaluation criteria and Section 4.1.2 of EPA's Draft "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (October 1988) clearly indicates that the analyses we had done in the prior draft of the SFS was in full compliance with both the NCP and EPA's Guidance. The fact that our SFS was not organized in quite the same way EPA would have liked in no way detracted from the analyses. Our version of the Report presented the same information in a similar but differently organized fashion and would have supported a logical, defensible analysis. What it did not completely support (from an organizational approach) was EPA's pre-drafted SPP which we understand was prepared over six months age. EPA's July 3, 1996 letter at least partially acknowledges this when it stated "it's true that EPA used the information which was already in the report...". While we do not object to EPA's use of language in its SPP, we strongly disagree with any implications that our draft SFS was not consistent with the NCP and/or with EPA RI/FS guidance.

14. (Page 29, See also page 9)

The Olean CIs object strongly to an expansion of a Site Monitoring Plan ("SMP") to include a full scan of volatile organic compounds and chromium. As the SPP correctly notes, these parameters were analyzed for during the SRI. They were not found to be at levels of concern and, hence, are not included as remedial goals in either the 1985 ROD or in the SPP for this Supplemental RI/FS. Monitoring and analysis is expensive. EPA, as well as the current Administration, has publicly committed itself to not imposing unnecessary administrative or financial burdens on taxpayers. In fact, one of the mechanisms EPA has identified to meet its stated goal of reducing administrative and reporting burdens by 25%, is to reduce environmental monitoring where it does not yield needed information. Therefore, as these parameters are not of concern and have not been tied to any of the four identified source areas which will be the focus of the ROD, there is no reasonable basis for ordering the Olean CIs to include monitoring for these parameters in its SMP. This is particularly true in the case of chromium, which has not been found to be a contaminant of concern at any of the source areas. In addition to the extent SRI monitoring detected chromium levels of concern in groundwater, it was not in wells downgradient of any of the identified source areas.

While the Olean CIs feel very strongly that the quarterly SMP monitoring should not include a full scan for the volatiles but rather that it include only those VOCs targeted for remediation in the 1985 or 1996 RODs, if EPA insist that such a scan be done, we recommend that it be limited to once a year and, unless any of them are found at or above the MCLs, that this annual requirement expire at the end of three years.

15. We have reviewed EPA's listing of documents that it believes comprises the Administrative Record for this project. In addition to those listed by EPA, we believe the documents listed in Appendix A, copies of which are appended to this letter, must also be included in the record. These documents contain information that the CIs believe may be necessary in the future if either a judicial challenge is brought subsequent to an EPA Order, or even more importantly, so that future decision makers can fully understand the issues that are involved as decisions regarding the need for a Stage 2 remedy on either the AVX or the Olean Clean All/Loohns site are made.

As always, if you have any questions, please do not hesitate to call me.

<IMG SRC 0296281E8>

Enclosure

cc: Olean Cooperating Industries (w/o enclosures)

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August 7, 1996

VIA CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Chief, NY/Caribbean Superfund Branch II
U.S. Environmental Protection Agency Region II
Emergency & Remedial Response Division
290 Broadway - 20th Floor
New York, New York 10007-1866

Attention: Thomas Taccone, Olean Wellfield Site Project Coordinator

RE: Additional Comments on "Superfund Proposed Plan - Olean Wellfield"

Dear Tom:

Since the submission of my August 5, 1996 letter, I have received the following additional comments from Geraghty & Miller:

Page 14: Under description of Alternative 4 - Stage 1, third full paragraph:

The SPP indicates that Granular Activated Carbon ("GAC") would be used to treat the extracted vapors from the proposed In-situ Vacuum Enhanced Recovery ("VER") or soil Vapor Extraction ("SVE") system(s). This may or may not be the case depending on the final designs of the Interim Remedial Measures ("IRMs").

The SFS text does not exclusively recommend the use of GAC as a treatment technology for vapor emissions; in fact Table C-1 indicates that it is assumed (for cost purposes) AVX would utilize a thermal oxidation system during the initial 6-months of operation (please refer to footnotes provided at the bottom of page 10 of 14 Table C-1). Volatile Organic Compound ("VOC") concentrations in the vapor stream may be too high at several of the source areas (AVX at least) to cost effectively treat with GAC in the initial states of remediation.

A similar comment is made regarding the assumption of the use of GAC to treat the extracted groundwater prior to discharge. Air stripping can and more than likely will be used to treat the extracted groundwater resulting from VER.

We recommend that corrections be made in the SPP to include the potential use of a thermal oxidizer or similar treatment system for vapor emissions and air stripping for groundwater extraction.

Page 17: Paragraph 5

Geraghty & Miller disagrees with the USEPA's assessment that Alternative 5 (Excavation) would provide the most rapid compliance with chemical-specific ARARs. Attenuation of constituents in groundwater, after implementation of either Alternatives 4 (In-situ treatment) or Alternative 5 (Excavation), will occur at similar rates. It is inaccurate to indicate that Alternative 5 (Excavation) will result in a more rapid compliance.

We recommend that corrections be made in the SPP to reflect this (Note: the correct language was provided in the SFS in Section 4.2).

Table 2 - Estimated Costs of Remedial Alternatives:

The estimated costs have not been changed from those included in the SFS - Table 4-1, however, footnotes that were included on Table 4-1 in the SFS were not incorporated in SPP - Table 2. These footnotes are important to explain some of the major assumptions made in estimating the costs of several remedial alternatives.

We recommend that all footnotes from Table 4-1 in the SFS be added to Table 2 of the SPP.

As always, please do not hesitate to call me if you have any questions.

<IMG SRC 0296281E9>

cc: Brent O'Dell
Olean Cooperating Industries
G. Robert Witmer, Jr.

Town of Olean

TOWN OFFICIALS
TOWN HALL
R.D. 1 - RT. 16 NORTH
OLEAN, N.Y. 14760
373-0582

HIGHWAY SUPERINTENDENT
TOWN GARAGE
GODFREY ROAD
OLEAN, N.Y. 14760
372-1060

August 23, 1996

Mr. Thomas Taccone
U.S. EPA, Region II
290 Broadway, 20th Floor
New York, NY 10007-1866

Subject: Olean Wellfield Superfund Site

Dear Mr. Taccone:

I hope this note may be timely received as a comment regarding the proposed remedial action plan.

At the Public Hearing on July 16th, a town resident, Mr. Stewart Hill advised that his water had been tested twice early in the investigation regarding this contamination and that both times he was told there was some indicated presence but below action levels to require protective measures, (i.e.- carbon filtration). The address is on Seneca Ave. which was not included in the East State St. Water District.

I have no great concern but would like to clarify as to whether or not there were positive contaminant levels found even at trace levels.

During our local flooding episode in Jan. of this year several basements were flooded in the East River Road area which was also excluded from the original action area. Due to apparent water well flooding and subsequent bacterial contamination at least one additional residence is being added to the East State district in that area. My attention was called after the flooding to a condition of the flooded basement walls being "cleaned" as if done with a cleaning solution. Mortar deterioration between concrete blocks also seems accelerated. Both conditions seem unusual as compared with a number of previous "flooded basement" episodes.

I'm simply reporting that seen and heard and wondering if there is any record of earlier trace contamination which should perhaps be revisited. The basement conditions I have observed. The residences in question are quite near the City Water Well.

<IMG SRC 0296281F>

August 23, 1996

Thomas Taccone
US EPA, Region II
290 Broadway, 20th Fl.
New York, NY 10007-1866

RE: Olean Well Field

Dear Mr. Toccone:

After reviewing the proposed superfund plan for the Olean Well Field, I find it's somewhat ironic that the area that was the prime suspect originally, as a source of the contaminants, is not even mentioned in the report or identified on the maps. The area to which I'm referring is the Olean Municipal land-fill located South of Seneca Ave. and North of Conrail tracks. This land-fill was in operation during the early and middle fifties. It is approximately forty acres of unburied waste, pits of stagnant water and across which the McGraw-Edison line traverses to meet the city sewer line. I found no evidence of even one test well that was drilled in this area. If that area has been declared to be free of any contaminants I was also unable to find that information within the report.

Almost every private water well that was tested in the Seneca Ave. area tested positive for TCE. At that time the safe level was considered to be 50ppb, I now understand that the safe level has been lower-to 5ppb. We were told that 2ppb were levels that we should not be concerned about. That level is now half-way to the maximum allowed. There has not been any further testing in this area since early eighties.

I am, however, relieved to know that there is no clean up scheduled for that area. The jungle-like vegetation that now covers that area has somewhat concealed the sins of the fifties. It would not be desirable to have that area stripped of what nature has done over the past forty years.

Another area that is mentioned in the report is that area directly South of AVX. This area is designated for clean-up, and rightfully so. The conditions that existed there were brought to the attention of the Cattaraugas Co. Health Dept. in the early seventies. They apparently failed to see any potential problem. Perhaps the many hues that spewed across the ground from the plant were considered natural.

The area designated as a private dump between Butler Ave. and Andrews Ave. seems to be a minor problem by comparison. I don't re-call any dumping in that area since the forties or fifties. I wonder about the expenditure of superfund monies on that area.

Thank you for giving me the opportunity to express my thoughts and concerns. I have lived in this area all of my life and only want what is best for all the residents. The quality of the well water in this area has always been excellent and of course we all want to preserve it for future generations.

<IMG SRC 0296281F1>
<IMG SRC 0296281F3>

Below is the Department's response to your questions concerning comments 9 and 10 of the August 5, 1996 letter from Ms. Libby Ford.

Comment 9: Though TAGM 4046 does not specify a value for (CIS)1,2-dichloroethene, it does not specify the method to be used for calculating cleanup goals for compounds not specified. Using the formulas stated in the TAGM and looking up the appropriate values to substitute into the formula, the cleanup goal for (CIS)1,2-dichloroethene is .245 ppm. It would be acceptable to round this off to .25 ppm. The values used for this calculation were:

- ! (Organic Content): f=.01
- ! (Appropriate water quality standard): C3=.005 ppm

- ! (Partition coefficient): Koc=49
- ! (Correction Factor): CF=100

Therefore:

Soil Cleanup Objective=(F)x(C3)x(Koc)x(CF)

=(.01)x(.005 ppm)x(49)x(100)

=.245ppm

Comment 10: The fourth column of Table 1 is a combination of two sets of regulations:

- ! Surface water and Groundwater Classifications and Standards from the New York State Codes, Rules and Regulations (NYCRR) Title 6, Chapter X, Part 703.5: This portion of the regulations covers several categories of surface water and groundwater. Only the standards for Class GA fresh groundwaters were used in this table.
- ! Public Health Law, Section 225, Chapter I of the State Sanitary Code, Subpart 5-1, Public Water Systems: All but one of the compounds listed are principal organic chemicals (POC). The one exception is Vinyl Chloride which is a specific organic chemical (SOC).

The title of that column should be changed to "New York State Groundwater and/or Drinking Water Standards". This title should be footnoted with the following: "If the compound was regulated in both standards, then the more stringent of the two was listed."

An `s' should be added to the Xylene at the end of the first column.

<IMG SRC 0296281F3>

bcc: L. Rafferty
R. Schick
M. J. Peachey

Appendix A

1. Office memorandum from Mary E. Ford regarding: "Summary of Meeting Between Cooperating Industries, Geraghty & Miller, EPA and EBASCO Placement of Soil Borings During Upcoming Boring Field Program and Other Field-Related Activities.

2. Letter to Libby Ford, dated 10/18/91, from Carole Petersen, EPA, regarding: Soil Gas Measurements and FOP for the Olean Well Field.

3. Letter to Libby Ford, dated 11/22/91, from Carole Petersen, EPA, regarding: Letters Dated October 15 and 23, 1991.

4. Letter to Thomas Taccone, EPA, dated 2/14/92, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS, January 1992 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

5. Letter to Thomas Taccone, EPA, dated 4/14/92, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS March 1992 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

6. Letter to Thomas Taccone, EPA, dated 5/18/92, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS April 1992 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

7. Letter to Thomas Taccone, EPA, dated 6/12/92, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS May 1992 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

8. Letter to Thomas Taccone, EPA, dated 7/15/92, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS June 1992 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

9. Letter to Thomas Taccone, EPA, dated 9/11/92, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS August 1992 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

10. Letter to Carole Petersen, dated 11/4/92, from Libby Ford, NHDD, regarding: Revised Supplement to the Supplemental RI/FS Workplan for the Olean Wellfield Superfund Site.

11. Letter to Libby Ford, from Carole Petersen, EPA, dated 4/20/92, regarding: Olean Wellfield Superfund Site; Response to your Letter of March 16, 1992.

12. Letter to Libby Ford, dated 12/14/92, from Carole Petersen, EPA, regarding: Approval of the Supplement to the Supplemental RI/FS Workplan and FOP; Olean Wellfield Superfund Site.

13. Letter to Thomas Taccone, EPA, dated 2/12/93, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS January 1993 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

14. Letter to Thomas Taccone, EPA, dated 4/12/93, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS March 1993 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

15. Letter to Thomas Taccone, EPA, dated 9/17/93, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS August 1993 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

16. Letter to Thomas Taccone, EPA, dated 10/1/93, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS--Comments on Draft EBASCO Risk Assessment and Request For a Meeting.

17. Letter to Libby Ford, dated 10/14/93, from Libby Ford NHDD, regarding: Olean Wellfield Superfund Site Supplemental RI/FS, Your Progress Report for August 1993.

18. Letter to Thomas Taccone, EPA, dated October 18, 1993, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS January 1993 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

19. Letter to Thomas Taccone, EPA, dated 11/15/93, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS October 1993 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

20. Letter to Carole Petersen, EPA, dated 11/19/93, from Libby Ford, NHDD, regarding: Olean Supplemental RI/FS -- Finalization of Risk Assessment.

21. Letter to Thomas Taccone, EPA, dated 12/15/93, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS November 1993 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

22. Letter to Thomas Taccone, EPA, dated 1/14/94, from Libby Ford, NHDD, regarding: Notification Triggering Dispute Resolution -- Olean Supplemental Remedial Investigation/Feasibility Study Objectives and How These Objectives Are To Be Incorporated Into the Supplemental Feasibility Study.

23. Letter to Libby Ford, dated 1/24/94, from Thomas Taccone, EPA, regarding: Olean Wellfield Superfund Site; January 14, 1994 Notification of Dispute Resolution.

24. Letter to Thomas Taccone, EPA, dated 1/31/94, from Libby Ford, NHDD, regarding: Administrative Order II CERCLA-10202, Olean Wellfield Supplemental RI/FS - Memorandum on Remedial Action Objectives.

25. Letter to Thomas Taccone, EPA, dated 2/9/94, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS January 1994 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

26. Letter from Geraghty & Miller to Thomas Taccone, EPA dated 2/11/94, regarding: Response to USEPA Comments on Draft Olean Well Field Supplemental Remedial Investigation Report (Project No. AY0167.001).

27. Letter to Thomas Taccone, EPA, dated 3/14/94, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS February 1994 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

28. Letter to Thomas Taccone, EPA, dated 4/18/94, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS February 1994 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

29. Letter to Libby Ford from Carole Petersen, EPA, dated 4/21/94, regarding: Olean Wellfield Superfund Site Supplemental Feasibility Study.

30. Letter to Thomas Taccone, EPA, dated 5/31/94, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS April 1994 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

31. Letter to Thomas Taccone, EPA, dated 7/15/94, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS June 1994 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

32. Letter to Thomas Taccone, EPA, dated 8/15/94, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS July 1994 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

33. Letter to Thomas Taccone, EPA, dated 9/13/94, from Libby Ford, NHDD, regarding: Submittal of Revised Preliminary Screening of Assembled Remedial Alternatives - Olean Wellfield Site.

34. Letter to Thomas Taccone, EPA, dated 9/15/94, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS August 1994 Monthly Progress Report Administrative Consent Order No. II-CERCLA-10202.

35. Letter to Thomas Taccone, EPA, dated 9/20/94, from Libby Ford, NHDD, regarding: Revised Comparative Analysis of Remedial Alternatives SFS Submittal.

36. Letter to Carole Petersen, EPA, dated 3/24/95, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS Working Draft Supplemental Feasibility Study, Administrative Consent Order No. II-CERCLA-10202.

37. Letter to Thomas Taccone, EPA, from Geraghty & Miller, dated 5/30/95, regarding: Response to

Comments, Olean Draft Feasibility Study Review.

38. Letter to Thomas Taccone, EPA, from Geraghty & Miller, dated 7/20/95, regarding: Addendum to Olean SRI Report.

39. Letter to Thomas Taccone, EPA, from Geraghty & Miller, dated 7/19/95, regarding: Response to Comments, Olean Draft Feasibility Study Review.

40. Page 2 of a letter to Thomas Taccone, EPA, dated 10/11/95, from Libby Ford, NHDD.

41. Letter to Thomas Taccone, EPA, dated 7/18/96, from Libby Ford, NHDD, regarding: Olean Wellfield Supplemental RI/FS Administrative Consent Order No. II-CERCLA-10202 Comments on EPA Imposed Revisions to SFS and Notice of Issue Submitted for Dispute Resolution.

<IMG SRC 0296281F4>