

**DECLARATION FOR THE
EXPLANATION OF SIGNIFICANT DIFFERENCES
KEEFE ENVIRONMENTAL SERVICES SUPERFUND SITE**

JUNE 2005

SITE NAME & LOCATION

Keefe Environmental Services Site

Epping, New Hampshire

IDENTIFICATION OF LEAD & SUPPORT AGENCIES

Lead Agency: **United States Environmental Protection Agency (EPA)**

Support Agency: **New Hampshire Department of Environmental Services (NHDES)**

STATEMENT OF PURPOSE

This decision document sets forth the basis for the determination to issue the attached Explanation of Significant Differences (ESD) for the Keefe Environmental Services Superfund Site (the "Site") in Epping, New Hampshire. This ESD focuses on modifications to the remedial action and groundwater cleanup goals previously selected for the Site.

STATUTORY BASIS FOR ISSUANCE OF THE ESD

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), requires that, if the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that Site, EPA shall publish an ESD between the remedial action being undertaken and the remedial action set forth in the ROD and the reasons for the changes to the remedial action. Section 300.435(c) of the National Contingency Plan (NCP), and EPA guidance (Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-23P, July 1999), indicate that an ESD, rather than a ROD amendment, is appropriate where the adjustments being made to the ROD are significant but do not fundamentally alter the remedy with respect to scope, performance or cost. EPA has determined that the adjustments to the ROD provided in this ESD are significant but do not fundamentally alter the overall remedy for the Keefe Environmental Services Site with respect to scope, performance, or cost. Therefore, this ESD is being properly issued. In accordance with Section 117(d) of CERCLA and Section 300.825(a) of the NCP, this ESD will become part of the Administrative Record for the Site, and will be available for public review at both the EPA Region 1 Record Center in Boston, Massachusetts and the Harvey-Mitchell Memorial Library in Epping, New Hampshire.

BACKGROUND

The March 1988 ROD addressed contamination at this Site with both source control and management of migration remedial measures. A June 1990 ESD removed the source control component (vacuum enhanced extraction for soils) based on sampling results which showed that the concentrations of contaminants in the soils were below the soil cleanup standards set in the ROD.

The management of migration component included the pumping and treating of contaminated groundwater. The contaminated groundwater was to undergo treatment on-site using air stripping and activated carbon technologies. Groundwater cleanup goals were established in accordance with applicable ARARs and/or risk based calculations. The extraction and treatment of contaminated groundwater, via air stripping, has been ongoing for 10 years.

OVERVIEW OF THIS ESD

Based on the information and data generated since the issuance of the March 1988 ROD, and the June 1990 ESD, the management of migration component of the ROD has been modified. Specifically, the treatment system was modified to address a new chemical of concern identified at the Site in the spring of 2003, which was not effectively treated by the current groundwater treatment system. The modified groundwater treatment system and all other parts of the remedy will remain in-place as specified in the 1988 ROD. The groundwater cleanup goals set in the 1988 ROD will remain effective and this ESD documents the criteria for a new risk-based cleanup goal of 3 ug/l for 1,4-dioxane.

In addition, this ESD documents a recently completed action involving the decommissioning of the Soils Spoil Area, which included the off-site disposal of contaminated soils. This Soils Spoil Area was a result of construction activities completed during implementation of the management of migration remedial action in 1992.

Modification of Groundwater Treatment System - This ESD documents a change in the groundwater remediation goals for the Site to include a new chemical of concern, 1,4-dioxane. This compound, 1,4-dioxane, is often associated with 1,1,1-trichloroethane (TCA), a primary contaminant in groundwater at the Site. In May 2003 1,4-dioxane was detected in the groundwater at the Site. This ESD sets forth a risk-based remediation goal for 1,4-dioxane at 3 ug/l. Because the current groundwater treatment using an air stripper was not intended to adequately address this compound, this ESD documents a modification to the groundwater treatment system at the Site. Specifically, the modification includes the removal of the air stripper and carbon adsorption units and replacing them with a high pressure oxidation system, which treats both the Site related VOCs identified in the 1988 ROD and the 1,4-dioxane documented in this ESD.

Soil Testing and Offsite Disposal - During construction of the management of migration component of the remedy, contaminated soils from a groundwater extraction trench were placed within the former lagoon area (which was previously remedied as part of OU-1 Lagoon and Surrounding Soils in the 1983 ROD) and referred to as the Soil Spoils Area. Soil sampling conducted in 2003 indicated residual contamination still existed which could, in the future, leach into the groundwater above drinking water standards. As part of the transfer from Long Term Remedial Action to Operation and Maintenance, soils from the Soil Spoils Area were excavated and transported to a regulated facility for offsite disposal, and the Soils Spoil Area decommissioned.

DECLARATION

For the foregoing reasons, by my signature below, I approve the issuance of an Explanation of Significant Differences for the Keefe Environmental Services Superfund Site in Epping, New Hampshire, and the changes stated therein.

Susan Studlien

Susan Studlien, Director
Office of Site Remediation and Restoration

06/30/05

Date

EXPLANATION OF SIGNIFICANT DIFFERENCES

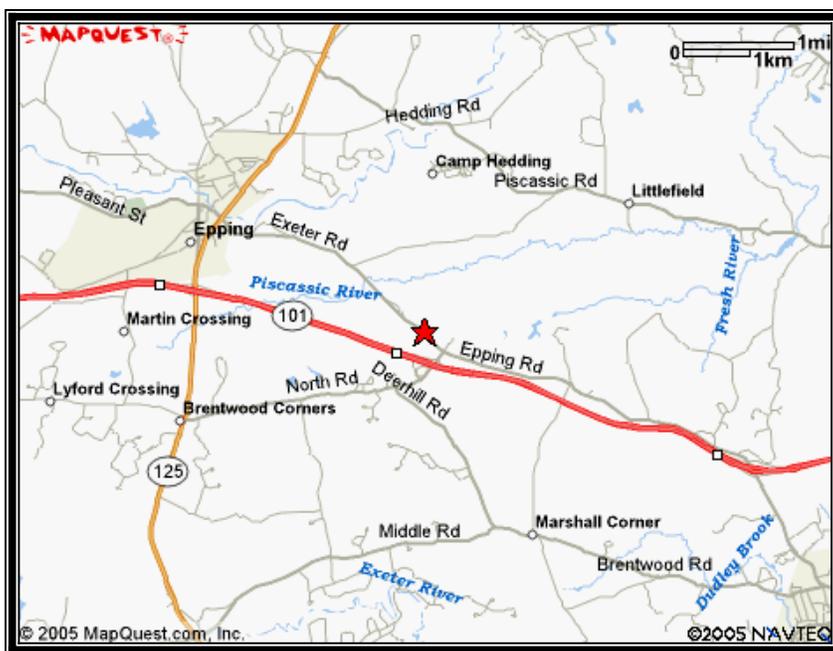
Keefe Environmental Services Superfund Site Epping, New Hampshire

I. INTRODUCTION

1. SITE NAME & LOCATION

Site Name: Keefe Environmental Services (KES) Superfund Site

Site Location: Epping, New Hampshire



KES Superfund Site

2. LEAD & SUPPORT AGENCIES

Lead Agency: United States Environmental Protection Agency (EPA)

- Contact: Cheryl Sprague, EPA Remedial Project Manager, (617) 918-1244

Support Agency: New Hampshire Department of Environmental Services (NHDES)

- Contact: Tom Andrews, NHDES Remedial Project Manager, (603) 271 -2910

3. LEGAL AUTHORITY FOR ESD

Under Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9617(c), Section 300.435(c) of the National Contingency Plan (NCP), 40 C.F.R. 300.535(c), and U.S. Environmental Protection Agency (EPA) guidance (Office of Solid Waste and Emergency Response [OSWER] Directive 9200.1-23P), if the EPA determines that differences in the remedial action significantly change but do not fundamentally alter the remedy selected in the Record of Decision (ROD), with respect to scope, performance, or cost, the EPA shall publish an Explanation of the Significant Differences (ESD) between the remedial action being undertaken and the remedial action set forth in the ROD and the reasons such changes are being made.

4. SUMMARY OF CIRCUMSTANCES NECESSITATING THIS ESD

This ESD is being issued to explain or clarify modifications to the selected remedy as set forth in the March 21, 1988 ROD for Operable Unit #2 (OU-2; Groundwater) at the Keefe Environmental Services Superfund Site (the "Site").

The 1988 ROD called for a comprehensive remedy that included both a source control component utilizing vacuum enhanced extraction to address soil contamination, and a management of migration component utilizing extraction and treatment of groundwater to remove site-related VOCs. On June 8, 1990, EPA issued an ESD to alter the 1988 ROD requirement for vacuum enhanced extraction when subsequent sampling showed that the concentrations of contaminants in the soils were already below the soil cleanup standards set forth in the 1988 ROD.

This ESD addresses the management of migration component of OU-2, and specifically, a recently identified contaminant of concern at the site, 1,4-dioxane, and is necessary to document a risk-based cleanup goal for 1,4-dioxane at 3 ug/l, and documents the modification in the treatment system needed to meet this cleanup goal. Finally, this ESD reflects actions taken at the Site in the Soils Spoils Area, also related to the OU2 groundwater remedy, which were performed as part of the transfer of the Site from Long-Term Remedial Action (LTRA) to Operation and Maintenance (O&M) in order to meet the remedial action objectives set forth in the ROD.

5. AVAILABILITY OF DOCUMENTS

This ESD and supporting documentation shall become part of the Administrative Record for the Site. The ESD, supporting documentation for the ESD, and the Administrative Record are available to the public at the following locations and may be reviewed at the times listed:

U.S. Environmental Protection Agency
Records Center
1 Congress Street
Boston, MA 02114
(617) 918-1440

Monday-Friday: 9:00am - 5:00pm; (closed first Friday of every month and federal holidays)

Harvey-Mitchell Memorial Library
52 Main Street
Epping, NH 03042
(603) 679-5944
Tuesday-Friday: 10:00am – 8:00pm; Saturday 10:00am – 2:00pm

II. SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS AND SELECTED REMEDIES

A. SITE HISTORY

The KES property consists of approximately seven acres and is located in Epping, New Hampshire just off Exeter Road (Old Route 101). Once an active industrial facility, the KES Site is currently a combination of open space, forested uplands and forested lowlands with an active groundwater pump and treat facility on the property. Approximately 12 residences are located on Exeter Road, south of the Site. The Site is secured by a gated and locked perimeter fence in good condition.

Keefe Environmental Services operated as a chemical waste storage and bulking facility from 1978 until 1981, when KES declared bankruptcy. Waste storage containers abandoned on the property at that time included 4,100 drums, four 5,000 gallon above ground storage tanks (ASTs), four 10,000 gallon ASTs, seven dumpsters containing sludges and contaminated soils, and a 700,000 gallon lined storage lagoon. Solvents, acids, caustics, heavy metals, paint sludges, waste oils, and organic chemicals were disposed of on the property.

From 1981 through 1983, EPA and the State contracted to dispose of the various hazardous materials abandoned at property. EPA signed a ROD for OU-1 (Lagoon and Surrounding Soils) on November 15, 1983 which mandated decommissioning of the 700,000 gallon lagoon and removal of the lagoon contents. In addition, the EPA and NHDES removed all of the waste containers, lagoon wastes, and contaminated soils adjacent to the lagoon and disposed of them at a regulated facility.

Based on Remedial Investigations (RI) performed from 1983 until 1988, EPA signed a ROD for OU-2 (Groundwater) on March 21, 1988 which included both source control and management of migration components. Soil and groundwater contamination consisted primarily of volatile organic compounds (VOCs). The Human Health Risk Assessment, conducted as part of the RI, indicated a potential, future, unacceptable risk from ingestion of contaminated groundwater. The 1988 ROD was written to address this risk. The source control component consisted of vacuum enhanced extraction for contaminated soils. The management of migration component included pumping and treating of groundwater to remove site-related VOCs. On June 8, 1990, EPA issued an ESD to remove the 1988 ROD requirement of vacuum enhanced extraction because subsequent sampling showed that the concentrations of contaminants in the soils were already below the soil cleanup standards specified in the ROD.

In 1992, as part of the OU-2 groundwater remedy, the NHDES, under a Cooperative Agreement with the EPA, placed contaminated soils, excavated during the installation of the extraction trench, into the lined, former lagoon area. The Soil Spoils Area (i.e., former lagoon) was constructed with a high density polyethylene (HDPE) liner and collection trenches so that water,

which leached through the soils, would gravity-drain to a collection manhole and then be piped to the groundwater treatment plant.

Since its construction in 1992, rainfall has been allowed to percolate through the soils, collect on the liner, and into the on-site groundwater treatment plant. Sampling of this leachate for volatile organic compounds was performed monthly as part of the on-going treatment operations at the Site. The monthly testing was discontinued in June 2001 after 10 consecutive months of non-detectable results. A confirmatory sample, collected in November 2002, and analyzed for VOCs also indicated that the leachate had no reportable quantities of site-related contamination entering the treatment system.

B. CONTAMINATION AT THE SITE

Groundwater contamination at the Site consists primarily of the volatile organic compounds (VOCs): benzene, tetrachloroethylene (PCE) trichloroethylene (TCE), 1,1-dichloroethylene (DCE) and 1,2-dichloroethane (DCA). The overall extent of the groundwater contamination, as well as the concentration of these five VOCs has decreased over time in response to the OU-2 remedial action. While a downward trend in concentrations of ROD targeted contaminants have been observed, there remain several on-site areas where groundwater concentrations exceed ROD specified cleanup levels. The locations of the wells, which currently exceed the ROD specified cleanup levels, are shown in Figure 1.

In the spring of 2003, EPA added 1,4-dioxane to the list of analytes being monitored for in the groundwater at the Site. Since 2003, 1,4-dioxane has been found in the groundwater at the Site in concentrations ranging from non-detect to 712 ug/l. The areal extent of the 1,4-dioxane contamination, as shown in Figure 2, was also found to be greater than the areal extent of the VOC contamination. The existing treatment system, which was installed in response to the 1988 ROD and which utilizes air stripping as the primary component to remove contamination from groundwater, does not adequately remove 1,4-dioxane from the groundwater.

C. SUMMARY OF SELECTED REMEDY (AS MODIFIED BY THE JUNE 1990 ESD)

The selected remedy for the groundwater contamination at the Site, which was embodied in the 1988 ROD, and modified in a 1990 ESD, included both a source control and a management of migration component. A summary of each component is provided below.

Source Control Component

The Source Control Component consisted of the following remedial action objectives for soils:

- Prevent or mitigate the further release of contaminants to surrounding environmental media;
- Eliminate or minimize the threat posed to public health, welfare, and the environment from the source area; and
- Reduce the volume, toxicity, or mobility of hazardous substances, pollutants, and contaminants.

For source control, EPA selected in-situ treatment using vacuum extraction technology. Vacuum extraction involves the removal of contaminants by moving air through the soil, encouraging mass transfer of the residual contamination on the soils into air, and the vacuum extraction and treatment of the contaminated air. Pre-remedial design studies, however, indicated that natural attenuation and migration of soil contamination to groundwater had occurred to the extent that soil contaminant concentrations were reduced below the cleanup standards specified in the ROD. Based on this data, the EPA issued an ESD on June 8, 1990 that eliminated the requirement for the installation of a vacuum extraction system.

Management of Migration Component

The Management of Migration Component of the remedy consisted of the following remedial action objectives for groundwater:

- Preventing or mitigating migration of contaminants beyond their current extent; and
- Eliminating or minimizing the threat posed to public health through ingestion of contaminated groundwater.

The remedy selected by EPA to meet these objectives for consisted of pumping and treating the contaminated groundwater and discharging the treated water back into the aquifer. The extracted groundwater is treated on-site using filtration, air stripping and carbon adsorption, prior to re-infiltration of the treated water back into the aquifer.

III. BASIS FOR THE DOCUMENT

The 1988 ROD for OU-2 specified that all contamination within the management of migration area would be treated by the pump and treat system. The groundwater treatment system has a number of different components and unit processes. These currently include five extraction wells, three vacuum enhanced extraction wells, a collection trench, a pump station, metals removal, pressure filtration, air stripping, vapor treatment, sludge dewatering and effluent disposal. Groundwater is collected through an on-site collection trench and an on-site and off-site extraction well network. The original effluent discharge system consisted of an on-site leach field and an off-site infiltrations trench. This system was supplemented in 1995 with an on-site spray irrigation system to dispose of treated effluent via evapotranspiration during the spring, summer and fall.

Originally, the groundwater site cleanup was expected to take 10 years at the design flow rate of 60 gallons per minute (gpm); however, due to the naturally tight soils, the system was only capable of extracting at 8 to 10 gpm. In 1995, two new extraction wells were put in place which significantly increased the effectiveness of the system. In 1997, a vacuum enhanced extraction system was also installed to further enhance the on-site remediation effort.

Since the startup of the groundwater treatment system in June 1993, optimization of the groundwater remediation system has increased the design flow rate to approximately 24 gpm and accelerated the site remediation progress while reducing the base operating costs as well as the annual operating costs. The areal extent of the groundwater plume has also been significantly reduced. While isolated pockets of the groundwater plume still exceed the 1988 ROD cleanup goals (e.g., drinking water standards), primarily in the management of migration area (area

directly below the former waste handling facility), significant reductions in contaminant mass, concentrations and distribution (e.g. plume size) has been observed.

In March 2003, the Third Five-Year Review Report was completed for the Site. This Five-Year Review was conducted because groundwater concentrations at the Site remained above drinking water standards. This review verified that the operation of the pump and treat remedy is continuing to function as designed, that progress in the cleanup and restoration of the groundwater was occurring and that in the interim, exposure pathways that could result in unacceptable risks are being controlled. This review also recommended the completion of several follow-up actions. Two primary actions related to OU-2 were identified:

1. Conduct an evaluation of alternative in-situ groundwater and/or soil treatment technology and/or source removal actions since groundwater concentrations were still in excess of cleanup levels.
2. Collect test pit soil samples from the Soil Spoils Area to evaluate trespasser/future site worker direct contact exposure scenarios.

Based on these recommendations, additional field investigation activities were conducted in 2003 and 2004. Soil sampling activities were conducted in the management of migration area and test pit excavations were performed in the Soil Spoils Area.

The results of the soil boring program indicated a lack of significant VOC contaminant mass within the Site soils, therefore an in-situ treatment technology was not recommended. The results of the test pit excavations and soil sampling in the Soil Spoils Area resulted in the recommendation to excavate and dispose off-site, of a portion of those soils for the purpose of minimizing the potential future threat to groundwater from leaching of contaminants. A further description of this activity is provided in Section IV.

In May 2003, 1,4-dioxane was detected in the Site groundwater. During this sampling round, a subset of 23 monitoring and extraction wells were analyzed for concentrations of 1,4-dioxane. Since then, 4 supplemental rounds of sampling (including one round of residential well sampling) for 1,4-dioxane has been conducted. To date, a total of 56 monitoring wells, 7 extraction wells and 5 residential wells have been tested. The results indicate that while 1,4-dioxane was not detected in any nearby residential wells, concentrations above the NHDES proposed risk-based drinking water standard of 3 ug/L were reported in most areas of the Site.

As a result of finding 1,4-dioxane in groundwater at the Site, and since the current groundwater treatment system was not intended nor was it capable of adequately treating 1,4-dioxane, it was determined that a change in groundwater treatment was required. In September 2004, potential technologies available to treat both the 1,4-dioxane and the residual VOCs found in the groundwater at the Site were reviewed. Based on this review, it was recommended that a high pressure oxidation system be installed to supplement the current groundwater treatment system. EPA and NHDES concurred and this system was installed in December 2004 and resumed full time operation as of January 3, 2005. A further description of this activity is provided in Section IV.

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES

Cleanup levels were established in the March 21, 1988 ROD for contaminants of concern in groundwater which exceeded drinking water standards at the time of the ROD. This ESD does not change the remedial action objectives for the Site, or the cleanup levels set forth in the 1988 ROD. The modifications to the remedy that are proposed are summarized below.

A. SUMMARY OF 1,4-DIOXANE TREATMENT ALTERNATIVES & RECOMMENDATIONS

In response to the 2003 detection of 1,4-dioxane in the groundwater at the Site, the NHDES, under a Cooperative Agreement with the EPA, conducted an evaluation of four treatment options for the removal and treatment of 1,4-dioxane from groundwater at the Site. These alternatives included hydrogen peroxide/ozone destruction, hydrogen peroxide/UV destruction, photocatalysis, and removal by activated carbon.

Based on an evaluation of overall protectiveness, technical implementability, and cost effectiveness a high pressure oxidation system was recommended for the removal and destruction of 1,4-dioxane from Site groundwater. This treatment option was selected based on the following rationale:

- This treatment option utilizes a permanent solution to remove hazardous constituents from the Site: 1,4-dioxane is destroyed, and not transferred to a different media;
- No waste by-products would be generated for disposal;
- The technology is well documented, with extensive use in California for treatment of 1,4-dioxane;
- Treatability bench tests indicated that this technology can achieve treatment of 1,4-dioxane to below 3 ug/l, which is a protective limit established by New Hampshire Division of Public Health Services for contaminated groundwater being restored to potable quality.
- No short term impacts, as systems are available and have a quick turnaround to have system built and shipped to the Site;
- Low operational costs compared to other treatment alternatives;
- Treatment option will also address the other Site-related groundwater contaminants of concern; and
- This treatment option represented the most protective, permanent, and cost effective solution for the treatment of 1,4-dioxane at the Site.

This ESD sets forth additional language to the cleanup requirements in the 1988 ROD to include the following language:

“In the absence of a National Primary Drinking Water Standard/Maximum Contaminant Level (MCL) for 1,4-dioxane, the New Hampshire Division of Public Health Services (DPHS), Bureau of Environmental and Occupational Health (BEOH) has developed a risk-based groundwater remediation goal for 1,4-dioxane of 3 micrograms per liter (3 ug/l). This remediation value is applicable to a site with 1,4-dioxane contaminated groundwater that is to be restored to potable quality.” Attached is the June 28, 2004 State of New Hampshire, DPHS - BEOH, letter, establishing the remediation goal for 1,4-dioxane in groundwater.

This change in language is necessary to address the unacceptable risks from future ingestion of groundwater at the Site.

This ESD also documents the selection and installation of a high pressure oxidation system as part of the groundwater treatment process at the Site.

In December 2004, a high pressure oxidation system was installed and deemed operational at the Site. Under the current operation of the KES groundwater treatment system, groundwater from 12 extraction wells and the collection trench is pumped at approximately 26 gpm to the treatment facility from the collection system pump station. Because influent iron levels at the Site have been low, the previously, operational chemical feed service has been discontinued and is no longer required. The influent flows through the clarifier by gravity to the flow equalization tank. From this tank, the water is pumped through pressure filters to an Applied Process Technology's high pressure oxidation system (HiPOx) feed tank. Currently, the air stripper and carbon adsorption units are being bypassed because the HiPOx unit is adequately removing all of the contaminants of concern. The air stripper unit will remain on-site and be maintained for any future use, if necessary. Groundwater is pumped from the HiPOx unit feed tank through the reactor where it is treated with hydrogen peroxide and ozone. After treatment, the flow is directed to an effluent discharge tank and subsequently to the effluent disposal system (infiltration trench and spray irrigation system).

B. SUMMARY OF SOIL SPOILS AREA INVESTIGATION AND OFFSITE DISPOSAL ACTIVITIES

On November 15, 1983, the EPA signed a Record of Decision (ROD) for OU-1 (the original lagoon area) which mandated decommissioning of the lagoon and removal of the lagoon contents. In February 1984, the lagoon decommissioning was completed. EPA signed a ROD for OU-2 (groundwater) on March 21, 1988, which included both source control and management of migration components. The source control component consisted of vacuum enhanced extraction for soils. The management of migration component included pumping and treating groundwater to remove site-related VOCs. On June 8, 1990 EPA signed an Explanation of Significant Differences (ESD) to remove the 1988 ROD requirement of vacuum enhanced extraction because subsequent sampling showed that concentrations of contaminants in soils were already below the soil cleanup standards at the time the ROD was issued. In 1992, while not specified as a component of the 1988 ROD, but as part of the construction of the groundwater remedy, the NHDES lined the former lagoon area and placed contaminated soils, generated during the construction of a groundwater extraction trench, into the lined lagoon area. This area is referred to as the Soil Spoil Area.

The Soil Spoil Area was constructed with a 60-millimeter thick high density polyethylene (HDPE) liner, topped with 6-inches of sand, followed by the excavated trench soil spoils. Along the southern and western ends of the lagoon, two collection trenches were constructed of 8-inch diameter perforated pipe placed along the bottom of a crushed stone-filled trench which varied in thickness (from 1-5 feet). Both trenches were sloped downward to the southwestern corner of the lagoon where water could gravity-drain to a collection trench manhole piped to the groundwater treatment plant.

Since construction in 1992, rainfall has been allowed to percolate through the soils, collect on the liner, and the collected leachate was diverted to the on-site groundwater plant for treatment.

Subsequent testing of this leachate has indicated no detectable concentrations of site-related contaminants.

In 2003, the NHDES, under a Cooperative Agreement with the EPA, evaluated the appropriateness of decommissioning this lagoon as part of the transition from Long Term Remedial Action (LTRA) to Operation and Maintenance (O&M), through a test pitting and soil sampling program.

Results of Findings

In June of 2003, a total of 16 test pit excavations were completed and subsequent laboratory analysis of soil sampling was performed. The locations of the test pit excavations are shown on Figure 3. The test pit excavations were completed to the top of the drainage/sand layer installed atop the liner. Excavations ranged in depth from 5 to 7 feet below ground surface. The soils encountered primarily consisted of the brown and gray till present at the Site. Soil samples were collected from each test pit for field screening with a total volatile organic compound (VOC) analyzer by the soil jar headspace procedure. The results of the field screening activities indicated that elevated readings were only detected at test pits TP-13 through TP-16. Observed field screening readings ranged from 10 to 135 ppm_v with the highest reading detected at test pit TP-15. Each of the elevated readings reported in TP-13 through TP-16, were from soils at the bottom of the excavations.

Based on the results of the field screening, 16 discrete soil samples were collected and submitted to an off-site laboratory for VOC analysis. The specific depths were based on the jar headspace results and/or visual conditions observed during excavation. In addition to samples selected for VOC analysis, composite soil samples were collected and analyzed for metals, SVOCs, polychlorinated biphenyls, pesticides, and petroleum hydrocarbons. Additionally, one sample of the drainage sand from Test Pit TP-15 was collected for laboratory analysis. The analytical results indicated:

- Site-related VOCs were detected in samples in 5 of the 16 samples analyzed. Concentrations of total xylenes, p-Isopropyl toluene, ethylbenzene, 1,2,4-trimethylbenzene, acetone, 2-butanone, carbon disulfide, and toluene were detected. The highest concentrations of VOCs were detected in samples collected from test pits TP-13 through TP-16.
- Total metals were detected in each of the 9 samples selected for analysis. The metals detected consisted of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, thallium, and zinc. Concentrations of selenium and silver were not detected above the laboratory's minimum reporting limit in any of the samples.
- SVOCs were detected in the composite sample from test pits TP-15 and TP-16. Bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, and benzo(a)pyrene were detected. No SVOCs were detected in the 7 remaining samples analyzed.
- Concentrations of petroleum hydrocarbons (via the MADEP Extractable Petroleum Hydrocarbon [EPH] method, as NHDES does not have criteria for EPH) were detected in 2 of the 5 samples analyzed. The greatest percentages of petroleum hydrocarbons detected were reported in the sample collected from test pits TP-15 and TP-16

- No concentrations of PCBs (9 samples) or pesticides (5 samples) were detected above the laboratory's minimum reporting limit.

When compared to the NHDES Method 1 Soil criteria, all detected concentrations of VOCs were below NHDES RCMP S-1 residential soil criteria.

Concentrations of SVOCs exhibited in one sample collected from test pits TP-15 and TP-16 (bis(2-ethylhexyl)phthalate [69,800 ug/kg], 2-methylnaphthalene [777 ug/kg], and benzo(a)pyrene [741 ug/kg]) were detected in excess of the S-1 criteria (39,000 ug/kg, 500 ug/kg, and 700 ug/kg, respectively).

Concentrations of arsenic in samples CS01 (13.1 mg/kg), CS02 (13.0 mg/kg), and CS04 (12.3 mg/kg) were detected in excess of the S-1 criteria of 12.0 mg/kg. Beryllium concentrations (ranging from 0.72 to 1.9 mg/kg) were detected in excess of the criteria (0.1 mg/kg) in each of the composite samples analyzed (CS01 through CS08). All other concentrations of metals detected in soil were generally detected at low concentrations which are consistent with background as defined by the NHDES.

For comparison purposes (since NHDES does not have specific criteria for the EPH hydrocarbon ranges), the EPH results were compared to Massachusetts Department of Environmental Protection (MADEP) criteria outlined in the Massachusetts Contingency Plan (310 CMR 40.0000). This comparison indicated that only the extractable aromatic hydrocarbon range (C11-C22) detected in sample CS08 (371,000 ug/kg) would exceed the MCP S-1/GW-1 criteria of 200,000 ug/kg. A MCP S-1/GW-1 soil criteria is equivalent to the NHDES RCMP S-1 residential soil criteria.

Recommendations

To decommission and close the Soils Spoil Area, it was recommended that the soils located on the southern end (TP-13 through TP-16) be addressed to prevent future leaching of contaminants into the groundwater above drinking water standards, consistent with the remedial action objectives established in the 1988 ROD.

Leaving the soils in place would allow the leachable contaminants to flow into the treatment plant. However, it is anticipated that the treatment plant operations would no longer be needed to address the groundwater contamination, and therefore this option does not allow for those soils to be addressed in the future. Capping of those soils would prevent leaching into the groundwater; however the size of the area is very small and therefore would make capping impracticable. Further, long-term maintenance and use restrictions would be required on that small portion of the property. Treatment alternatives for the soils also would not compare favorably due to the small volume of contaminated soils.

Due to its discrete and relatively small area in size, the presence of contaminants above the NHDES S-1 (and MCP S-1/GW-1) criteria, and the desire for a permanent solution, excavation and off-site disposal was determined to be the most protective, cost-effective, and permanent alternative and would allow for a future unrestricted access to the Soil Spoil Area. This activity would be conducted in conjunction with the liner removal and decommission process for the soil spoils area.

Summary of Soil Spoils Area Decommissioning Action

Between August 25 and September 3, 2004 approximately 900 tons of soil was excavated from the Soil Spoils Area and transported off-site for disposal. All work was conducted in accordance with the August 18, 2004 Site Specific Health and Safety Plan.

Soil removal from the Soil Spoils Area was performed between August 25th and 30th, 2004. Digsafe was contacted on August 21, 2004 and Digsafe number 20043407915 was issued. All excavation work was performed using either a front end loader or excavator. On August 25, 2004, a John Deere 544H front end loader was initially used to remove the top 2 feet of soil from the southern portion of the Soil Spoils Area. This material, which was previously characterized as uncontaminated, was set aside to be used as backfill upon completion of remaining excavation activities.

Following the removal of the upper 2 feet of material, the remaining soils lying atop the drainage layer (average of approximately 5 feet in thickness) of the Soil Spoils Area were removed with a John Deere 160LC excavator, and temporarily stockpiled on the edge of the lagoon area. The front end loader transported this material from the Soil Spoils Area to the paved staging area adjacent to the east of the treatment plant where it was covered and secured with 6 mil polyethylene sheeting at the end of each work day. Upon completion of soil excavation activities on August 30, 2004, the soil pile was covered until the material was transported off-site.

On August 31, 2004, a total of 893.1 tons (approximately 500 cubic yards) of soil were loaded into dump-style tractor trailers and transported off-site for disposal. The soil was transported under non-hazardous special waste manifests by Sam's Transportation of Georgetown, Massachusetts to Waste Management's Turnkey Landfill located in Rochester, New Hampshire (a certified RCRA D Waste Disposal Facility) for use as daily landfill cover material. In all, twenty-eight truckloads of soil were transported to Waste Management's facility for disposal.

Direct reading air monitoring was performed and recorded during excavation and loading of soil into trucks for off-site disposal. Lower explosive limit (LEL) and respirable dust were also monitored. No readings exceeded the Health and Safety Action levels established for this project.

Upon completion of soil stock piling, the associated leachate collection piping and liner were removed from the Soil Spoils Area and loaded into a 20 cubic yard roll-off container, provided by Waste Management for subsequent disposal. This material was transported as regular municipal solid waste to Rochester, New Hampshire for disposal.

Upon removal of the soil, piping, and liner, the material previously set aside (i.e., soils not destined for offsite disposal), was used to backfill the area. In order to minimize potential surface runoff and maintain a more gradual surface grade, a portion of the northern and western soil berms (previously in place and part of the original design) were cut out and used as fill material and placed atop the excavation.

Approximately 40 cubic yards of clean topsoil material (screened loam), provided by Raymond Sand & Gravel (RS&G) on September 1, 2004, completed the backfilling of the Soil Spoils Area. In total, a combined 1 foot layer of backfill and topsoil is currently covering the area which formerly made up the Soil Spoils Area. Final grading of this area was performed between August 31, 2004 and September 2, 2004

Concrete Removal & Recycling

In addition to the soil removal activities and in conjunction with work related to transferring the Site to the State of New Hampshire for future O&M responsibilities, additional decommissioning activities were also performed. Specifically, concrete structures which were no longer utilized were dismantled and transported offsite for recycling. Concrete from a former unused drum storage area pad, the former truck decontamination pad (and associated concrete manhole sump) and two concrete cleanup manholes from the Soil Spoils Area were broken up and transported off-site for recycling. The dimensions of each of the structures were as follows:

- Former storage area: 12 feet by 10 feet by 8 inches thick
- Former truck decontamination pad: 40 feet by 18 feet by 10 inches thick
- Concrete manhole sumps: each approximately 3½ feet in diameter with a standard steel manhole cover. Both manholes associated with the Soil Spoils Area were approximately 12 feet deep while the sump associated with the former truck decontamination pad was approximately 6 feet deep.

A John Deere 160LC excavator equipped with a hydraulic hammer attachment, operated by Woodard & Curran, was utilized to break up each of the concrete structures. This work, performed between August 24 and September 3, 2004, generated approximately 120 cubic yard (200 tons) of concrete. The concrete was stockpiled on-site until September 3, 2004 when it was transported by RS&G to their facility in Raymond, NH

V. SUPPORT AGENCY COMMENTS

The State of New Hampshire has participated with the EPA in reviewing the modifications to the remedy which are described herein and concurs with this ESD. The NHDES Concurrence letter is attached to this ESD.

VI. STATUTORY DETERMINATIONS

EPA believes that the modified remedy remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. The modified remedy is a permanent solution and utilizes alternative treatment technologies to the maximum extent practicable for this Site.

VII. PUBLIC PARTICIPATION COMPLIANCE

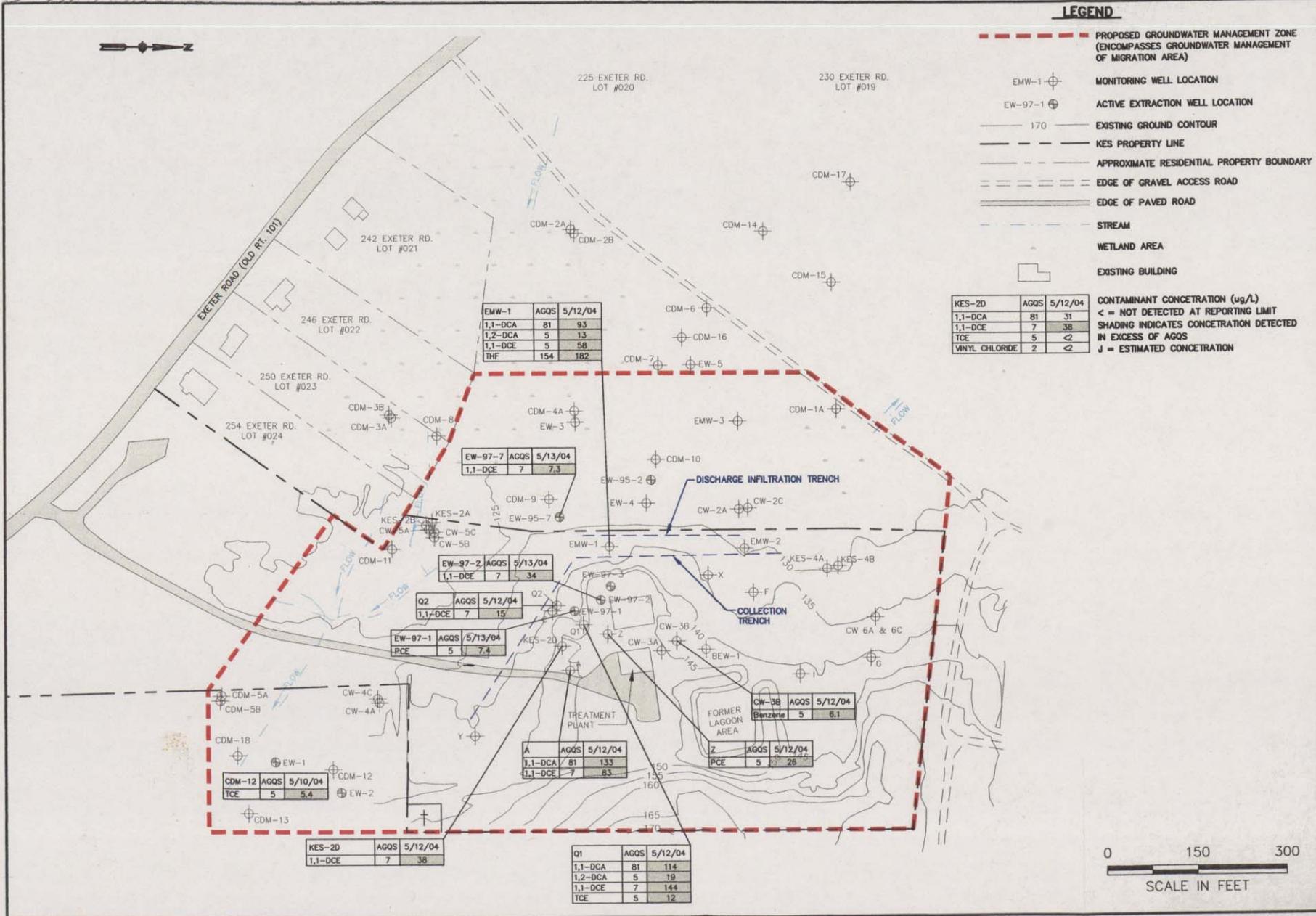
In accordance with Section 117(d) of CERCLA and Section 300.825(a) of the NCP, the ESD and supporting documentation shall become part of the Administrative Record for the Site. This ESD and the Administrative Record are available for public review at the locations and times listed in Section I(5) above. A public notice, which summarizes the modification to the remedy as set forth in the ESD shall be published in a major local newspaper of general circulation following the signing of this ESD.



LEGEND

- PROPOSED GROUNDWATER MANAGEMENT ZONE (ENCOMPASSES GROUNDWATER MANAGEMENT OF MIGRATION AREA)
- EMW-1 MONITORING WELL LOCATION
- EW-97-1 ACTIVE EXTRACTION WELL LOCATION
- 170 — EXISTING GROUND CONTOUR
- — — — — KES PROPERTY LINE
- - - - - APPROXIMATE RESIDENTIAL PROPERTY BOUNDARY
- ==== EDGE OF GRAVEL ACCESS ROAD
- ===== EDGE OF PAVED ROAD
- — — — — STREAM
- WETLAND AREA
- EXISTING BUILDING

KES-2D	AGQS	5/12/04	CONTAMINANT CONCENTRATION (ug/L)
1,1-DCA	81	31	< = NOT DETECTED AT REPORTING LIMIT
1,1-DCE	7	38	SHADING INDICATES CONCENTRATION DETECTED IN EXCESS OF AGQS
TCE	5	<2	J = ESTIMATED CONCENTRATION
VINYL CHLORIDE	2	<2	



EMW-1	AGQS	5/12/04
1,1-DCA	81	93
1,2-DCA	5	13
1,1-DCE	5	58
THF	154	182

EW-97-7	AGQS	5/13/04
1,1-DCE	7	7.3

EW-97-2	AGQS	5/13/04
1,1-DCE	7	34

Q2	AGQS	5/12/04
1,1-DCE	7	15

EW-97-1	AGQS	5/13/04
PCE	5	7.4

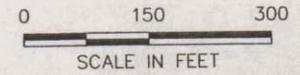
A	AGQS	5/12/04
1,1-DCA	81	133
1,1-DCE	7	83

CW-3B	AGQS	5/12/04
Benzene	5	6.1

Z	AGQS	5/12/04
PCE	5	26

KES-2D	AGQS	5/12/04
1,1-DCE	7	38

Q1	AGQS	5/12/04
1,1-DCA	81	114
1,2-DCA	5	19
1,1-DCE	7	144
TCE	5	12



**MAY 2004
GROUNDWATER MONITORING
MCL/TBC EXCEEDENCES**

DESIGNED BY: M.L.B. EVR
CHECKED BY: D.D. ANKER-07.dwg
FILE:

**KEEFE ENVIRONMENTAL SERVICE SITE
EPPING, NEW HAMPSHIRE
BASELINE HUMAN HEALTH
RISK ASSESSMENT**

JOB NO: 93424
DATE: MARCH 2005
SCALE: AS NOTED

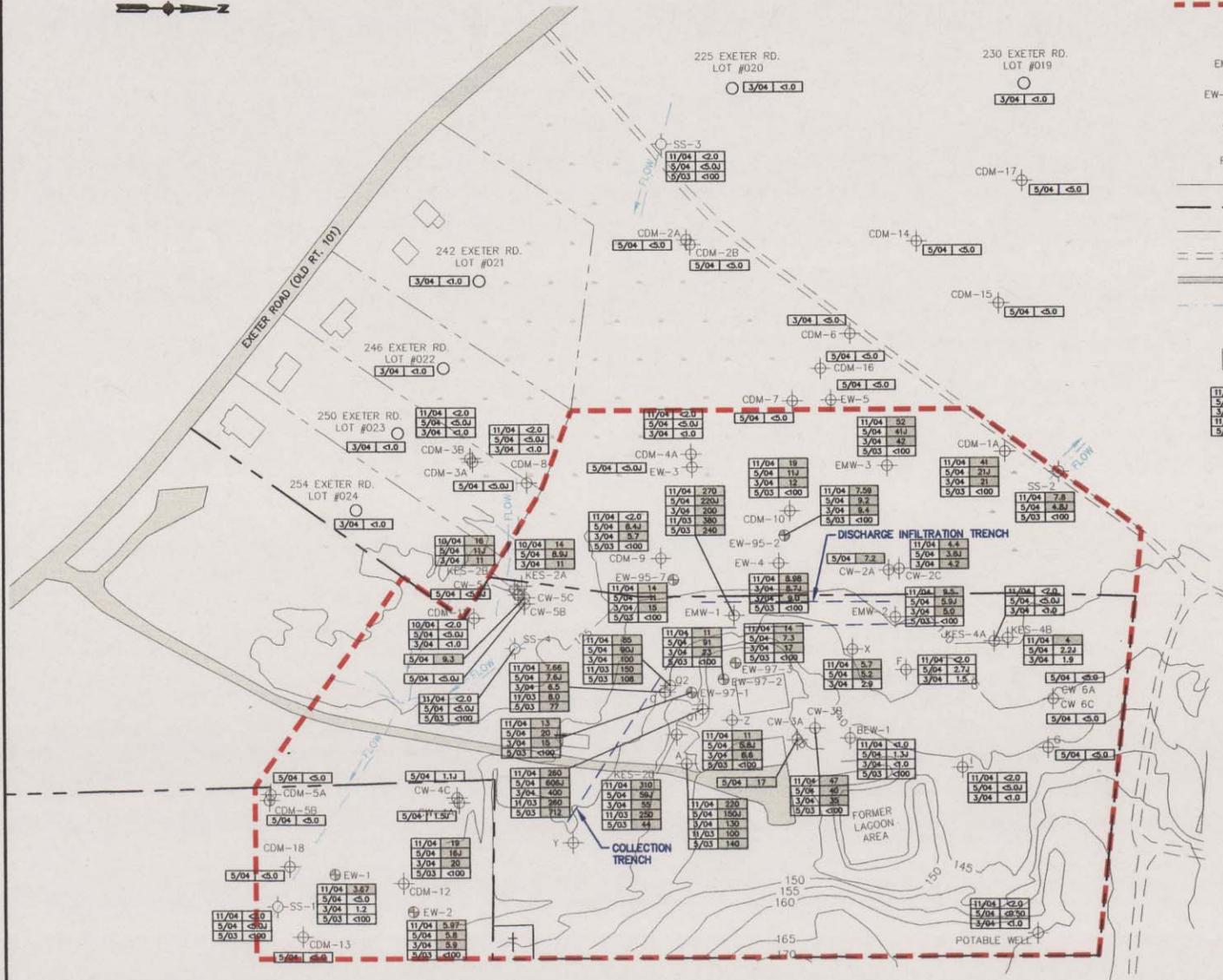


LEGEND

- PROPOSED GROUNDWATER MANAGEMENT ZONE (ENCOMPASSES GROUNDWATER MANAGEMENT OF MIGRATION AREA)
- MONITORING WELL LOCATION
- ACTIVE EXTRACTION WELL LOCATION
- SURFACE WATER SAMPLE LOCATION
- POTABLE WATER WELL
- EXISTING GROUND CONTOUR
- KES PROPERTY LINE
- APPROXIMATE RESIDENTIAL PROPERTY BOUNDARY
- EDGE OF GRAVEL ACCESS ROAD
- EDGE OF PAVED ROAD
- STREAM
- WETLAND AREA
- EXISTING BUILDING

11/04	41
5/04	903
3/04	100
11/03	150
5/03	108

1,4-DIOXANE CONCENTRATION (ug/l)
 < = NOT DETECTED AT REPORTING LIMIT
 SHADING INDICATES CONCENTRATION DETECTED IN EXCESS OF 3 ug/l (PROPOSED NHDES STANDARD).



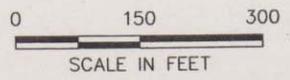
1,4 - DIOXANE CONTAMINANT DISTRIBUTION

KEEP E ENVIRONMENTAL SERVICE SITE
 EPPING, NEW HAMPSHIRE
 BASELINE HUMAN HEALTH
 RISK ASSESSMENT

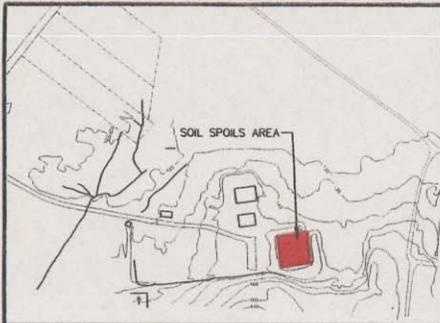
JOB NO: 93424
 DATE: MARCH 2005
 SCALE: AS NOTED

FIGURE 7

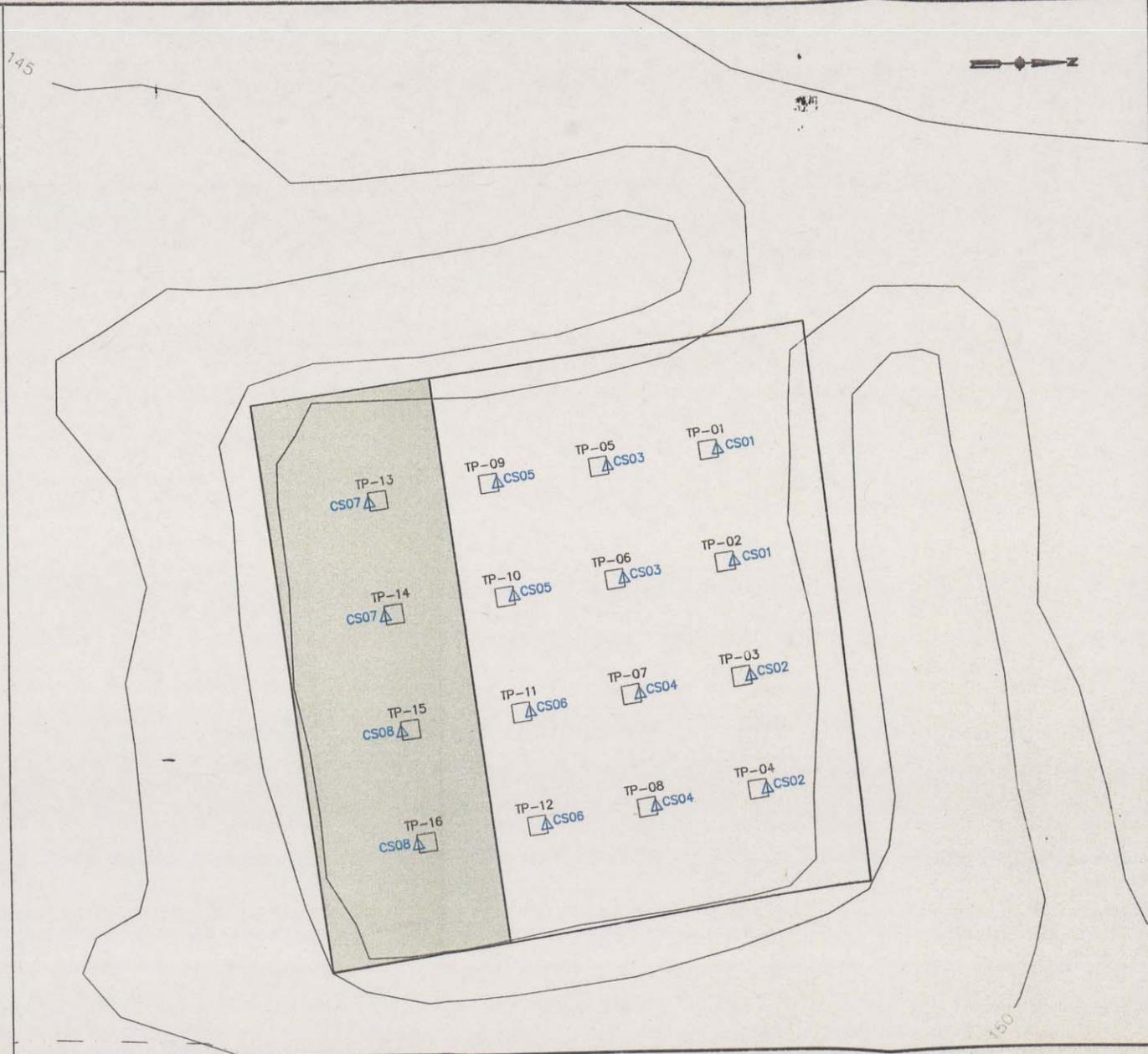
Note:
 Locations of the private/residential domestic wells are unknown, locations shown as approximate.
 PWW = potable well.



DESIGNED BY: MLB PFF
 CHECKED BY: DD FILE:
 ANKF-06.06w



SITE PLAN



LEGEND

- TP-01 TEST PIT LOCATION AND IDENTIFIER
- 170 — EXISTING GROUND CONTOUR
- APPROXIMATE EXTENT OF SOIL PROPOSED FOR OFF-SITE DISPOSAL
- △ CS01 COMPOSITE SOIL SAMPLE LOCATION AND IDENTIFIER

**SOIL SPOILS AREA
 SAMPLE LOCATIONS**

DESIGNED BY: MLB
 DRAWN BY: EVR
 CHECKED BY: KK
 FILE: ANREF-10.0wg

KEEFE ENVIRONMENTAL SERVICE SITE
 EPPING, NEW HAMPSHIRE

SOIL SPOILS AREA
 CLOSURE INVESTIGATION

JOB NO: 93424
 DATE: JUNE 2005
 SCALE: 1" = 20'



STATE OF NEW HAMPSHIRE
DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH SERVICES

29 HAZEN DRIVE, CONCORD, NH 03301-6504
603-271-4608 1-800-852-3345 Ext. 4608 Fax: 603-271-3991 TDD Access: 1-800-735-2964

John A. Stephen
Commissioner

Mary Ann Cooney
Director

June 28, 2004

FROM: David S. Gordon
HEALTH RISK ASSESSOR

AT : *Bureau of Environmental and Occupational Health*

SUBJECT: Proposed Risk-Based Remediation Value for 1,4-Dioxane (CAS #123-91-1) in
Groundwater

TO: Andrew Hoffman, DES-WMD, HWRB

As requested, the Division of Public Health Services, Bureau of Environmental and Occupational Health (BEOH) has reviewed several toxicological databases in order to develop a groundwater remediation guideline for 1,4-dioxane of 3 micrograms per liter (ug/L = parts per billion). Although specifically requested for the Ottati & Goss Superfund site, the remediation value developed is equally applicable to any site with 1,4-dioxane-contaminated groundwater that is to be restored to potable quality.

1,4-Dioxane is an industrial solvent whose primary use is as a stabilizer additive to chlorinated solvents. It has been used as an ingredient in consumer products including paints, varnishes, detergents, and cosmetics. It has also been found naturally in some foods such as tomato products, fried chicken, and brewed coffee.

There is currently no federal drinking water standard or long-term drinking water exposure guideline for this compound. Studies have indicated that 1,4-dioxane is a cancer promoter, increasing the effects of some other carcinogens. 1,4-Dioxane is itself classified as a "probable human carcinogen" (B2) by the U.S. Environmental Protection Agency (EPA), as "reasonably anticipated to be a human carcinogen" by the National Toxicology Program (NTP), and as "possibly carcinogenic to humans" by the International Agency for Research on Cancer (IARC).

The EPA has developed an oral cancer slope factor (CSF) based on a National Cancer Institute (NCI) study. Exposure to 1,4-dioxane increased the incidence of tumors of the nasal cavity and in the liver of rodents. Based on the EPA CSF, exposure to a concentration of 3 ug/L in water (using standard drinking

water exposure assumptions) results in an excess lifetime cancer risk (ELCR) of one-in-one million. Both the States of California and Massachusetts have drinking water guidelines of 3 ug/l for 1,4-dioxane. The State of Maine has a drinking water guideline of 32 ug/l for this chemical. However, for carcinogens in the EPA categories “known” or “probable”, Maine sets the acceptable ELCR at one-in-one hundred thousand for carcinogens in drinking water.

If you have any questions regarding this memo, please contact me at 271- 4608.

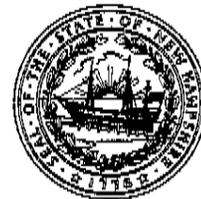
DSG

CC: Tom Andrews, DES-WMD, HWRB
Margaret Bastien, DES-WMD, HWRB
Dennis Pinski, DHHS-OCPH, BEOH

T:\OCPH\BEOH\HRA\USERS\DG\Drinking_Water2004\dioxanecleanup_ottatigoss.DOC



The State of New Hampshire
Department of Environmental Services



Michael P. Nolin
Commissioner

June 29, 2005

Ms. Susan Studlien, Director
Office of Site Remediation and Restoration
EPA - New England, Region I
1 Congress Street, Suite 1100
Boston, MA 02114-2023

**RE: Explanation of Significant Differences
Keefe Environmental Services Superfund Site
Epping, New Hampshire - [EPA ID #: NHD092059112]**

SUBJECT: Declaration of Concurrence

Dear Ms. Studlien:

The New Hampshire Department of Environmental Services (Department) has reviewed the "Declaration for the Explanation of Significant Differences Keefe Environmental Services Superfund Site" (ESD) dated June 2005. The Record of Decision (ROD), issued on March 21, 1988, included both source control and management of migration components to manage potential threats to human health and the environment at the Keefe Environmental Services Superfund Site ("Site"). The ESD is necessary to document a risk-based cleanup goal of 3 ug/l for a recently identified contaminant of concern, 1,4-dioxane, and documents the modification in the treatment system needed to meet this cleanup goal. The ESD also reflects actions taken at the Site in the Soils Spoils Area, which included the off-site disposal of contaminated soils.

Basis for the ESD

Treatment of 1,4 Dioxane - In the spring of 2003, EPA added 1,4-dioxane to the list of analytes being monitored for in the groundwater at the Site. Since 2003, 1,4-dioxane has been found in the groundwater at the Site in concentrations ranging from non-detect to 712 ug/l. The areal extent of the 1,4-dioxane contamination was also found to be greater than the areal extent of the VOC contamination. The existing treatment system, which was installed in response to the 1988 ROD and which utilizes air stripping as the primary component to remove contamination from groundwater, does not adequately remove 1,4-dioxane from the groundwater.

As a result of finding 1,4-dioxane in groundwater at the Site, and since the current groundwater treatment system was not intended nor was it capable of adequately treating 1,4-dioxane, it was determined that a change in groundwater treatment was required. Based on a review completed in September 2004, it was recommended that a high pressure oxidation system be installed to supplement the current groundwater treatment system. EPA and the Department concurred and this system was installed in December 2004 and resumed full time operation as of January 3,

Letter to Ms. Susan Studlien
Keefe Environmental Services Superfund Site ESD - Declaration of Concurrence
June 29, 2005
Page 2 of 2

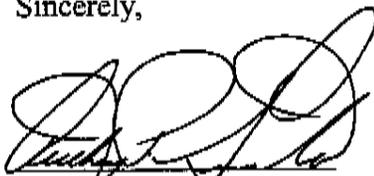
2005. The ESD includes placing the air stripper and carbon adsorption units off-line with a high pressure oxidation system, which treats both the Site related VOCs identified in the 1988 ROD and the 1,4-dioxane.

Soil Testing and Offsite Disposal - During construction of the management of migration component of the remedy, contaminated soils from a groundwater extraction trench were placed within the former lagoon area and referred to as the Soil Spoils Area. Due to the presence of contaminants in soil above the Department's S-1 criteria, and the desire for a permanent solution, excavation and off-site disposal was determined to be the most protective, cost-effective, and permanent alternative and would allow for a future unrestricted access to the Soil Spoil Area. Between August 25, 2004 and September 3, 2004, approximately 900 tons of soil was excavated from the Soil Spoils Area and transported off-site for disposal to Waste Managements Turnkey Landfill located in Rochester, New Hampshire (a certified RCRA D Waste Disposal Facility) for use as daily landfill cover material.

State Concurrence

The Department believes that the remedy as modified in the ESD remains protective of human health and the environment and complies with all federal and state requirements that are applicable or relevant and appropriate to this remedial action. Therefore, the Department, acting on behalf of the State of New Hampshire, concurs with modifying the selected elements, as described in the ESD. As always, the Department stands ready to provide the guidance and assistance that EPA may require to take the actions necessary to protect human health and the environment completely and cost-effectively.

Sincerely,



Anthony P. Giunta, P.G.

Director

Waste Management Division

CC: Frederick J. McGarry, P.E., DEE, NHDES-WMD
Carl W. Baxter, P.E., NHDES-HWRB
Richard Pease, P.E., NHDES-HWRB
Thomas C. Andrews, P.E., NHDES-HWRB
Dennis Pinski, MPH, NHDHHS-BEOH
Cheryl Sprague, USEPA
Michael Jasinski, USEPA