FIVE-YEAR REVIEW

EASTERN SURPLUS COMPANY SUPERFUND SITE
MEDDYBEMPS, MAINE

Prepared by:

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Region 1

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09/29/06
Date

ES EXECUTIVE SUMMARY

This is the first five-year review for the Eastern Surplus Company Superfund Site (Site). This statutory five-year review is required since hazardous contamination remains at the Site above levels that allow for unlimited use and unrestricted exposure. The review was completed in accordance with EPA guidance entitled "Comprehensive Five-Year Review Guidance," OSWER No. 9355.7-03B-P, June 2001.

Starting in 1946, two owners, Harry Smith, Sr., and Harry Smith, Jr., used the Site as a storage and salvage yard. The area north of Route 191 at one time had debris/junk covering over 50% of the area, with thick vegetation covering the remaining areas. Some of the junk/surplus materials contained hazardous substances that were released into the site soils and further released into the groundwater. In 1985 Maine Department of Environmental Protection (Maine DEP) performed an inspection and identified the Site as an uncontrolled hazardous substance site. Maine DEP initiated a removal action to stabilize the Site, including removing approximately 120 transformers and other waste and fencing the Site. At the request of Maine DEP, EPA then took over the removal activities. Most of the liquid hazardous waste, drums, containers, and compressed gas cylinders were removed during the first EPA removal action in the 1980s. Two distinct groundwater plumes of contaminated groundwater were identified in the remedial investigation (RI). The northern plume is situated in the northern half of the properties north of Route 191. The southern plume started just north of Route 191, migrated beneath the highway, and flows underneath the southern area of the Site.

In June 1996, EPA placed the Site on the National Priorities List, the list of hazardous waste sites eligible for long-term remedial action financed under the Superfund program, and began a remedial investigation and feasibility study (RI/FS). In 1998-1999, EPA performed a non-time-critical removal action (NTCRA) that, among other things, excavated and disposed of contaminated soils and sediment to an approved off-site facility. In September 2000, EPA issued a Record of Decision (ROD) for the Site. The ROD set forth the selected remedy for the Site. The major components of the selected remedy included:

- Installation and operation of a groundwater extraction and treatment system to prevent off-site migration of contaminated groundwater and restore the aquifer to drinking water standards;
- Enhancement of the extraction system by flushing with treated water and /or injection of a chemical reagent to facilitate the removal of contamination;
- Implementation of land-use restrictions on the two properties north of Route 191 to prevent ingestion of groundwater and disturbance of archaeological resources, implementation of institutional controls on properties south of Route 191 where groundwater contamination is located until the groundwater met cleanup levels;
- Long-term monitoring of groundwater, surface water, sediments (and possibly biota sampling) on a regular basis to evaluate changes in site conditions over time;
- Implementation of archaeological mitigation activities; and
- Performance of a review of the Site every five years until cleanup goals are met to ensure that the remedy remains protective of human health and the environment.

The ROD did not include any source control component because EPA's risk assessment concluded that the 1999 NTCRA addressed the risks that were posed by soils and sediment.

Based on the data reviewed, observations from the site inspection, and interviews, the remedy is functioning as intended by the ROD. Groundwater extraction and treatment are continuing, use of in-situ oxidation was successful in the southern plume and may be used again in the northern plume, maintenance is performed as necessary, and long-term monitoring has been carried out since the ROD, all of which has thus far ensured the integrity of the remedy and prevented exposure to site groundwater.

The primary ARARs for groundwater beneath the Site are the Safe Drinking Water Act's Maximum Contaminant Levels (MCLs) or Maine's Maximum Exposure Guidelines (MEGs). The MCLs and MEGs continue to be met in the wells outside of the Site, and are essentially being met in the southern plume.

Land use on properties surrounding the Site has not changed since the ROD and is not expected to change in the immediate future. Land use remains agricultural and residential (both year-round and seasonal). A seasonal home is being constructed several hundred feet south of the southern plume extraction wells; its drinking water well will be included in the next sampling event.

Five-Year Review Protectiveness Statement

Because the remedy selected for the Site is protective, the Site is protective of human health and the environment. The groundwater extraction and treatment system and ownership of the northern properties of the Site by Maine DEP prevent exposure to site groundwater ensuring the Site remains protective of human health. Groundwater monitoring within the southern plume has shown reductions in concentrations of contaminants so that now only one contaminant is above the MEG, and only slightly so (April 2006 PCE maximum concentration was 9 ppb, with an average concentration of 6 ppb, compared to a MEG of 3 ppb). Groundwater monitoring beyond the northern plume demonstrates that there is no off-site migration and therefore ensures that the remedy is protective of human health and the environment. The monitoring program will continue to ensure that no off-site migration is occurring.

Five-Year Review Summary Form

SITE IDENTIFICATION
Site name *(from WasteLAN)*: Eastern Surplus Company Superfund Site
EPA ID *(from WasteLAN)*: MED981073711
Region: 1 State: ME City/County: Meddybemps/Washington
SITE STATUS
NPL status: Added on June 17, 1996
Remediation status: Ongoing
Multiple OUs?* No Construction completion date: August 27, 2001
Has site been put into reuse? No
REVIEW STATUS
Lead agency: USEPA
Author name: Terrence Connelly
Author title: Remedial Project Manager
Author affiliation: EPA Region I
Period for this review: 03/20/06 to 09/30/06 (Time period covered by this review, 2001 - 2006)
Date of site inspection: 05/28/06 Type of review: Post-SARA Review number: 1st Triggering action:Implementation of Remedial Action, August 2001 Triggering action date *(from WasteLAN)*: 08/27/2001 Due date *(five years after triggering action date)*: 08/27/06 * "OU" refers to operable unit.

Five-Year Review Summary Form, cont'd.

ISSUES:

- While concentrations in the southern plume have approached the clean-up standards following the full-scale application of sodium permanganate, the concentrations in the northern plume suggest a residual DNAPL in the plume core.

RECOMMENDATIONS and FOLLOW-UP ACTIONS:

- Reach resolution with Maine DEP regarding implementation of a bedrock blasting program in the northern plume and additional application of permanganate.

- Assessment of the groundwater extraction and treatment system to optimize operation.

- Reassess the long-term monitoring program for media monitored, frequency of monitoring, and analytes sampled.

- Continue inter-agency discussions on institutional controls for the northern portion of the Site.

PROTECTIVENESS STATEMENT:

Because the remedy selected for the Site is protective, the Site is protective of human health and the environment. While the groundwater extraction and treatment system continues to contain the northern plume, ownership of the northern properties of the Site by Maine DEP prevents exposure to site groundwater ensuring the Site remains protective of human health. Groundwater monitoring has shown significant reductions in contaminants of concerns in the southern plume. Surface water, sediment, and biota monitoring indicate the impact from contaminants of concern from groundwater discharge, already at levels that did not pose an unacceptable risk at the time of the 2000 ROD, continue to decrease.

OTHER COMMENTS:

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1.0 INTRODUCTION

The purpose of this five-year review is to determine if the remedy selected in the 2000 Record of Decision (ROD) for the Eastern Surplus Company Superfund Site (Site) in Meddybemps, Maine, is protective of human health and the environment. This report summarizes the five-year review process, investigations and remedial actions undertaken at the Site; evaluates the monitoring data collected; reviews the Applicable or Relevant and Appropriate Requirements (ARARs) specified in the ROD for changes; discusses any issues identified during the review; and presents recommendations to address these issues.

The United States Environmental Protection Agency, Region 1 (EPA) prepared this five-year review pursuant to the Section 121 of the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) and the National Contingency Plan. CERCLA § 121 states:

> "If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."

The EPA interpreted this requirement further in the National Contingency Plan; 40 CFR § 300.430(f)(4)(ii) states:

> "If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."

This is the first five-year review for the Site. This statutory five-year review is required since hazardous contamination remains at the Site above levels that allow for unlimited use and unrestricted exposure. The triggering action for the initial statutory review was initiation of the remedial action following remedial design.

Work on this review was performed between March and September 2006. The review was completed in accordance with EPA Guidance OSWER No. 9355.7-03B-P.

2.0 SITE CHRONOLOGY

Table 1: CHRONOLOGY OF SITE EVENTS
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EASTERN SURPLUS COMPANY SUPERFUND SITE

EVENT	DATE
Property occupied by a farm and a mill	pre-1946
Two owners operated the Site as a storage/salvage yard to store and resell, among other things, materials and equipment acquired from US Department of Defense (DOD). Most of the business activities had ceased by 1976.	1946 – 1976
Maine DEP performed an inspection and identified the Site as an uncontrolled hazardous substance site. Maine DEP initiated a removal action to stabilize the Site, including removing approximately 120 transformers, 4500 gallons of waste oil, and fencing the Site.	1985
EPA initiated removal activities. Over four years, EPA removed thousands of leaking drums and cans, and over two thousand compressed gas cylinders.	1986 – 1990
EPA issued a Unilateral Order to Matheson Gas Products to remove eight commercial compressed gas cylinders. Matheson complied with the order.	1989
EPA notified US DOD of liability with respect to the Site and demanded reimbursement of response costs. EPA reached agreement for $1.4 million in past response costs.	1993 – 1995
Department of Justice, on behalf of EPA, filed complaint against one owner for refusing to comply with request for information. Default judgment against the owner for $357,000 in US District Court for the District of Maine	1994 and February 25, 1995
EPA placed the Site on the National Priorities List.	June 17, 1996
EPA began an remedial investigation and feasibility study (RI/FS)	1996
EPA issued a community relations plan.	June 1997
EPA notified owners of two parcels of property that represent the Site north of Route 191, and DOD of their potential liability with respect to the Site.	April 22, 1998
Negotiations commenced with these potentially responsible parties (PRPs).	1998
EPA performed an Engineering Evaluation/Cost Analysis, and signed an Action Memorandum for a non-time-critical removal action (NTCRA)	July 1998
Consent Decree entered in US District Court for cash-out settlement and transfer of title of properties north of Route 191 to Maine DEP.	March 1999
EPA published notice of Proposed Plan in local and regional newspapers	August 1999
EPA extended public comment period to December 20, 1999	September 1999
EPA completed the soil component of the NTCRA	1999

EPA completed the groundwater component of the NTCRA – northern plume extraction system online in Jan 2000 and southern plume extraction system online September 2000	2000
EPA issued the ROD with State concurrence describing the remedial action to be implemented at the Site.	September 28, 2000
Archaeological field work	Summers 2000 and 2001
Final Remedial Design report	July 2001
Baseline sampling to assess conditions prior to ROD-designated response actions	June – July 2001
EPA initiates enhancement and flushing of groundwater component of ROD using sodium permanganate	pilot phase 1 July 2000 to April 2001; pilot phase 2 April 2001 to June 2001; full-scale Aug 2002 through Jan 2003
Spring and fall groundwater sampling and annual surface water and sediment sampling commences	2002 – present
Groundwater Rebound Period	Jan 2003 – April 2003
Resumption of Groundwater Extraction System	August 2003
Fish and Mussel Sampling Study	July 2003
Bedrock Delineation Study in northern plume	May 2006
Completion of archaeological reports and installation of commemorative plaques	Summer 2006

3.0 BACKGROUND

3.1 Physical Characteristics

The Site consists of approximately 4-5 acres of land north of Route 191 and another 2-3 acres of land south of Route 191 in Meddybemps, Maine. The area north of Route 191 was designated as the "surficial site". The Site is bounded by residential property and Meddybemps Lake to the north, by the Dennys River to the east, and undeveloped land to the south and west. A dam controls the outlet of the lake to the river, and a small wetland exists adjacent to the river just downstream of the dam. Most of the Site is above the floodplain as a steep bank runs along the Dennys River. See Figure 1 for the site location map.

The topography west of the Site consists of generally level land with the elevation decreasing in the surficial site toward the river. The land east of the Dennys River (and south of Meddybemps Lake) is also generally level with a slight elevation decrease occurring toward the river. Groundwater flow direction at the Site generally mimics surface contours.

Surficial runoff from the Site (storm water, snow melt and from groundwater seeps) drains into the Dennys River. The Dennys River is classified by the State of Maine as a Class AA river based on its designation as an Atlantic salmon river. The river flows into Dennys Bay, a part of the larger Cobscook Bay estuary.

The surficial materials are glacial deposits that range from stratified beds of gravel, sand, and mixed sands and silt. This overburden soil ranges from 5 to 20 feet in thickness in the northern plume and 10 – 30 feet in the southern plume. The overburden in the northern portion of the Site is only seasonally saturated with the water table fluctuating as much as six feet during the year. The overburden in the southern part of the Site has a saturated thickness of several feet. Bedrock at the Site is a combination of Meddybemps granite with a gabbro-diorite intrusion.

3.2 Land and Resource Use

The Site is located in an area of mixed land use. The Site is surrounded by permanent and seasonal homes that ring Meddybemps Lake. Farther away from the lake, land use includes agricultural, woodlots, and residential properties. There is an inactive gravel borrow pit adjacent to Stone Road, the private road immediately to the west of the Site. MaineE DEP and EPA performed a removal of transformers and contaminated soil in another gravel pit approximately a mile further to the west. There is another junkyard situated about three miles to the west along Route 191. All of these locations lie within the Dennys River watershed. The location of the Site would be considered a prime building lot but for the contamination and the archaeological restrictions.

Reasonable anticipated future uses of the northern area of the Site are quite limited for three reasons. First, the groundwater contamination prevents consumption of groundwater from the properties that make up the northern area of the Site during the timeframe required for restoration of the groundwater. Second, under the Consent Decree entered in 1999, the titles of these parcels were transferred to State of Maine. With the Maine DEP responsible for the operation and maintenance of the remedial system beginning in 2012 and continuing until the groundwater has been restored, it is not likely that Maine DEP would allow unlimited use of these parcels until the groundwater has been restored. Third, the designation of a portion of the northern parcel of the Site (adjacent to the lake) as a prehistoric Native American site also prevents excavation to preserve the archaeological resources. A possible future use for the northern area may be as a park.

Reasonable anticipated future uses of the southern area of the Site are not as limited. First, the application of permanganate with the operation of the groundwater extraction system has reduced the groundwater contamination since remedial activities began such that the drinking water standards have essentially been met in both the overburden and bedrock groundwater (PCE is the only contaminant above its standard, averaging 6 ppb for the past three years with an MCL of 5 ppb and a MEG of 3 ppb). Second, the parcel is not required to be transferred to the State of Maine, as the Consent Decree only dealt with the northern area parcels, and no restrictions have been placed on the parcel. Third, since the removal of the soils only occurred in the northern area of the Site, the southern portion was not subject to any archaeological mitigation requirements; most notably, there are no known archaeological resources on this parcel that need to be protected. Within the past several months, a seasonal home has been under construction on the parcel, about

600 feet south of the farthest southern extraction well, RWS-6. The homeowner plans to drill a drinking water well to provide water for the dwelling. Since groundwater samples from RWS-6 meet drinking water standards, EPA anticipates that this new seasonal well will provide clean water (EPA will include it in future sampling to confirm this). Commercial use of the land also remains a possibility.

Reasonably anticipated future uses of adjacent land and the surrounding area include mostly residential use with the possibility of some light commercial and agricultural uses. Low-bush wild blueberry fields are the major agricultural activity in the area.

The current uses of the groundwater at the Site and surrounding areas are for agricultural and residential purposes. The potential beneficial use of the groundwater at the Site could be as a water supply for maintaining a park. However, it is unlikely that the groundwater at the Site would be used as a water supply in the near future (30 years) given the planned land use restrictions. The areas surrounding the Site are dependent upon groundwater for residential and agricultural water. This is based on good quality aquifers in both the overburden (dug wells) and bedrock (drilled wells) and the lack of a public water supply.

The current uses of the surface water adjacent to the Site are as a water supply, fishery, swimming, and recreation. The potential beneficial use of the surface water at the Site and surrounding area is the same. The State of Maine has classified Meddybemps Lake as a GPA surface water and the Dennys River as a Class AA river.

3.3 History of Contamination

The record indicates that prior to the start of Eastern Surplus Company in 1946, the property was used as a farm with a mill (the prehistoric record indicates the use of the land as a gathering place for the Passamaquoddy people).

Starting in 1946, two owners, Harry Smith, Sr., and Harry Smith, Jr., used the Site as a storage and salvage yard. The area north of Route 191 at one time had debris/junk covering over 50% of the area, with thick vegetation covering the remaining areas. Some of the junk/surplus materials contained hazardous substances that were released into the site soils and further released into the groundwater. Most of the liquid hazardous waste, drums, containers, and compressed gas cylinders were removed during the first EPA removal action. Two distinct groundwater plumes of contaminated groundwater were identified in the RI. The northern plume is situated in the northern half of the properties north of Route 191. The southern plume started just north of Route 191, migrated beneath the highway, and flows underneath the southern area of the Site. The groundwater between the two plumes meets drinking water standards.

3.4 Initial Response

In 1985, following an inspection, Maine DEP performed a removal action to stabilize the Site. Maine DEP removed approximately 120 transformers, 4.650 gallons of waste oil, 2400 gallons of PCB oil, and fenced the northern area of the Site. In 1986, EPA took over the removal actions. EPA's removal involved the inspection, evaluation, sampling (if necessary) of 312 fifty-five gallon drums, 24 thirty gallon cans, 1,226 five gallon cans, 168 one hundred pound containers of calcium

carbide, 1,182 miscellaneous containers, 10 cubic yards of asbestos, and 2,674 compressed gas cylinders. EPA also provided oversight of DOD's removal of several thousand more compressed gas cylinders. An EPA time-critical removal action was completed in 1990.

The Site was proposed for inclusion on the National Priorities List (NPL) on October 2, 1995. The Site was listed for final inclusion on the NPL on June 17, 1996.

3.5 Basis for Taking Action

In response to a release or a substantial threat of a release of a hazardous substance(s) at or from the Site, EPA began the RI/FS in 1996. EPA completed the RI in 1998 and the FS in 1999.

Several thousand surficial and sub-surface soil samples were collected as part of the RI from September 1996 to July 1999 and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals and cyanide, pesticides, PCBs, and dioxin. This comprehensive sampling indicated widespread distribution of soil contamination in the northern area of the Site, including the riverbank leading down to the Dennys River, just upstream of the former hydroelectric station. Excavation and off-site disposal of all soils with contamination above cleanup levels was completed by November 1999. Figure 2 (figure 8 of the 2000 ROD shows the soil sampling locations.

Seventy-four sediment samples were collected over the period 1996 to 1999, with the sampling locations ranging from Meddybemps Lake along the northern boundary of the Site, throughout the Dennys River to approximately 150 feet downstream of Route 191. Low levels of VOC were fairly well distributed in the sediments south of the dam. Low levels of SVOCs were also detected, with the highest detections found at locations just below the Route 191 bridge and adjacent to the Town of Meddybemps boat ramp which is located farther east along the southern shore of Meddybemps Lake and not hydraulically connected with the Site. Several metals were detected in the sediments but consistent patterns of elevated metals were not evident. PCBs were extensively detected in the sediments. While most concentrations were quite low, elevated levels were found in the sediments just north of the former hydroelectric station. These sediments were removed along with the soils as part of the 1999 NTCRA. Figure 3 (figure 13 of the ROD) shows the sediment sampling locations.

Forty-six surface water samples were collected during the same timeframe, with the locations similar to the sediment locations. No VOCs were detected in the surface water. There were only two detections of a SVOC in surface water; resampling targeting the same area in 1999 did not detect this SVOC, bis 2-ethylhexl phthalate (BEHP), and it was concluded that BEHP did not represent a significant site contaminant. Several metals were detected in the surface water. Similar to the sediment data, no patterns of elevated metals were evident as the frequency of detection was quite low (one or two detects in the sampling program).

The groundwater in the Meddybemps area, including the area surrounding the Site, is used as the primary drinking water resource. While there are some dug wells that use the overburden groundwater as a drinking water source, most of the drinking water supply wells are in the bedrock. Six groundwater monitoring events were completed during the RI/FS and further sampling was performed during the pump tests and SVE pilot test. A complete set of analytical

parameters were included in the first several sampling events (VOCs, SVOCs, metals, pesticides, and PCBs).

The RI identified two distinct plumes, one area in the northern end of the Site, and the second, starting just north of Route 191 and continuing south beneath the highway. Figure 4 (figure18 of the ROD) shows a plan view of the two plumes. The majority of the contamination in the northern plume was located in the bedrock with DNAPL possible, whereas the RI/FS results indicated the major contamination in the southern plume was located in the overburden and shallow bedrock. Sampling of monitoring wells east of the river showed sporadic and low levels (single digit ppb) of PCE across from the northern plume, suggesting a possible bedrock pathway.

In the northern plume, sampling results indicated tetrachloroethene (also known as perchloroethene, PCE) was the major contaminant in the northern plume, both in terms of frequency of detection and maximum concentrations. PCE was detected in 20 of 22 locations during the RI/FS with a maximum concentration of 6,700 ppb. Other VOCs detected above federal drinking water standards, MCLs or MEGs in the northern plume included trichloroethene (TCE), 1,2-dichloroethene (DCE), 1,1,2-trichloroethane, xylene, and methylene chloride. Much of the contamination was believed to be discharging to the Dennys River.

In the southern plume, sampling results were generally of lower concentration than the northern plume. However, in addition to VOCs, PCBs were also detected in the groundwater beneath, and downgradient of, the soil PCB "hot spot." PCE was detected at a maximum concentration of 1,100 ppb and PCBs were detected at a concentration of 3 ppb. The southern plume was also believed to be discharging to the Dennys River. Tables 2 and 3 (tables 4 and 5 of the ROD) present a summary of groundwater results.

Three ambient air monitoring events were performed at the Site. No significant emissions of VOCs were detected outside the work zones for the NTCRA. In addition, regular monitoring of the ambient air was performed during the NTCRA and no elevated levels of contaminants were detected.

The U.S. Fish & Wildlife Services (US F&WS) performed a fish and mussel sampling event in 1997 to support the human health and ecological risk assessments. Mercury was detected in sediment collected at all locations, including background, not inconsistent with the statewide fishing advisory. PCBs were also detected at all sediment locations, with elevated concentrations detected adjacent to the Site. Arsenic, chromium, and copper were detected adjacent to the Site above background concentrations as well.

US F&WS collected 71 fish from three locations in Meddybemps Lake, three reaches of the Dennys River, and from several areas within the East Machias River (the latter serving as a reference location). Thirty mussels were collected from the same lake locations, two of the Dennys River locations, and in one location in the Machias River.

US F&WS concluded that when compared to national, regional, and other Maine contaminant studies, highly elevated levels of metals or PCBs were not detected in the fish and mussel tissue from Meddybemps Lake or Dennys River. Comparison to the reference location did not suggest major site-related impacts to fish or mussels.

The Site was found to contain prehistoric Native American artifacts in the soils dating back several thousand years. These archaeological resources made a portion of the Site (at the northern end of the Site, near the lake outlet) eligible for listing on the National Register of Historic Places. Accordingly, EPA followed National Historic Preservation Act requirements during the implementation of the NTCRA. Because some archaeological resources were unavoidably affected as part of the excavation and off-site disposal of contaminated soils, EPA was required to perform mitigation activities as part of the ROD remedy.

In August 1999, EPA published notice of the completion of the FS and the proposed plan for remedial action in the Bangor News, Calais Advertiser, and Quoddy Times, the major local newspapers of general circulation. EPA provided a thirty-day opportunity for written and oral comments from the public on the proposed plan for remedial action. An extension to the public comment period was requested and as a result, it was extended to December 20, 1999.

Based on the results of the investigations, ARARs and other guidance, cleanup goals for groundwater were established to protect human health from the identified risks (the ecological risk assessment concluded that the contaminant levels in surface waters, sediment, and fish and mussel tissue were not sufficiently elevated to pose an unacceptable risk to ecological receptors). On September 28, 2000, with concurrence from Maine DEP, EPA issued the Record of Decision. The ROD set forth a remedy for the Site that combined extraction and treatment of groundwater; enhancements for this system using in-situ oxidation and flushing with clean water; institutional controls; long-term monitoring of groundwater, surface water, sediments (and possibly biota sampling); archaeological mitigation activities; and five-year reviews.

4.0 REMEDIAL ACTION

This section describes the remedial action selected for and implemented at the Site.

4.1 Remedy Selection

The September 28, 2000 ROD for the Site specified a multi-component remedy to address groundwater contamination. Based on the RI, remedial action objectives were identified for the Site:

- Prevent the ingestion of groundwater contaminants that exceed federal MCLs, MCLGs, Maine MEGs, or in their absence, an excess cancer risk of $1x10^{-6}$ or a hazard quotient of one per contaminant;
- Prevent, to the extent practicable, off-site migration of groundwater with contamination above cleanup levels;
- Restore groundwater to meet federal or state standards, or in their absence, an excess cancer risk of $1x10^{-6}$ or a hazard quotient of one per contaminant; and
- Provide long-term monitoring of surface water, sediments, groundwater, and fish to verify that the cleanup actions are protective of human health and the environment.

The remedy selected in the ROD included:

- Perform extraction and treatment of contaminated groundwater from both plumes. The extraction systems were to be designed to prevent off-site migration of contaminated groundwater and restore the aquifer to drinking water standards;
- Enhance the extraction system by flushing with treated water and/or injection of a chemical reagent to facilitate the removal of contamination;
- Place land-use restrictions on the two parcels north of Route 191 to prevent ingestion of groundwater and disturbance of archaeological resources. Institutional controls were also to be implemented on properties south of Route 191 where groundwater contamination is located, until the groundwater meets cleanup levels;
- Perform long-term monitoring of groundwater, surface water, sediments (and possibly biota sampling) on a regular basis to evaluate changes in site conditions over time;
- Perform archaeological mitigation activities; and
- Perform a review of the Site every five years, if hazardous substances, pollutants, or contaminants remain on Site above levels that allow for unlimited use and unrestricted exposure, to ensure that the remedy remains protective of human health and the environment.

More specifically, the remedial action activities of the ROD included:

- The groundwater extraction system that was installed during the NTCRA would be expanded. The new extraction wells would be located to maximize the withdrawal of contaminated groundwater to restore the groundwater as soon as possible. The treated water would be re-injected into an on-site infiltration gallery located between the two plumes.
- The treatment system would be monitored on a regular basis to ensure its continuing effectiveness. Influent and effluent monitoring would be performed to evaluate the removal effectiveness of the treatment system. Potentiometric data would be used to evaluate the capture zone of the extraction system.
- With the goal of reducing the timeframe for restoring the aquifer, enhanced flushing and/or chemical oxidation of the aquifer would be performed. The rate of injection of treated water and/or chemical reagent would be determined through pilot tests. As part of the chemical reagent pilot study, it would be designed to prevent groundwater discharge into the Dennys River that would violate State Water Quality Standards.
- Land-use restrictions would be implemented. Under the 1999 Consent Decree, the owners of the properties north of Route 191 would transfer ownership to Maine DEP. Then, Maine DEP would implement institutional controls to prevent use of the contaminated groundwater on these parcels as well as prevent excavation or any other unauthorized disturbance of the archaeological resources. Institutional controls would also be implemented on those other site properties upon which groundwater contamination is located until the groundwater meets cleanup levels.
- Mitigation of the adverse impact on the archaeological resources during the NTCRA would be completed in the ROD remedy. Mitigation efforts would

include archaeological excavations, reports addressing the scientific and cultural value of the recovered materials, and generation of reports to transmit the findings to the general public.

- Groundwater monitoring would be performed to demonstrate that the contamination is not migrating offsite and that concentrations within the plume are decreasing. The groundwater monitoring program would include sampling and analytical methods that were appropriate for groundwater sampling and that accurately measure hazardous constituents in the samples.

The primary expected outcome of the selected remedy was that the entire Site would no longer present an unacceptable risk to future users of the groundwater via ingestion and inhalation of the groundwater and the Site would be suitable for unrestricted use. The 2000 ROD estimated it would take approximately five to ten years to achieve the goals consistent with future residential land use. Additionally, the selected remedy would also prevent the flux of VOCs into the Dennys River.

4.2 Remedy Implementation

This section describes the implementation of the components of the remedy specified in the 2000 ROD.

4.2.1 Extraction Systems

During the summer of 2001, the interim groundwater extraction system (constructed during the NTCRA) was upgraded to a 30 gallons-per-minute treatment capacity.

Groundwater is extracted from a series of shallow bedrock and overburden wells using bladderless, pneumatically operated pumps. Each pump is installed in a below-ground, concrete wall vault that provides security. Compressed air supply pipelines and groundwater discharge lines are either buried approximately six feet below ground to prevent freezing and damage, or are heat traced and insulated and enclosed in polymer enclosures installed at grade. See Figure 5 for a depiction of the extraction systems.

The groundwater from the northern and southern extraction wells is pumped to the treatment building. The treatment system process flow diagram is presented in Figure 6. Groundwater treatment consists of the following processes:

- Equalization to blend the groundwater from the extraction wells and to allow a steady flowrate through the treatment system;
- Filtration to remove suspended solid particles that might otherwise interfere with the treatment processes;
- Liquid-phase granular activated carbon (GAC) to remove dissolved VOCs of concern (predominantly PCE and TCE); and
- Ion exchange to remove dissolved metals of concern (primarily manganese).

The treated groundwater is finally pumped to a discharge pipeline that conveys it to an infiltration gallery located between the northern plume and the treatment building where it is reintroduced into

the overburden aquifer.

The full-scale system was activated in August 2001 and was operated for a two-month period as part of its start-up process. The extraction wells and treatment system operated from August 2001 until January 2003 when it was shut down to allow for a rebound assessment from the full-scale oxidation addition (see below for a summary on this activity). The extraction system was reactivated in August 2003 after the April 2003 sampling data were evaluated. Based on the April 2003 results, EPA and Maine DEP determined that the extraction system should be reactivated to reestablish hydraulic capture of the two plumes. The extraction system has continued to operate continuously since then other than periods when system maintenance was being performed. As presently operated, the extraction systems for the northern and southern plumes consist of 8 – 10, and 4 - 6 extraction wells, respectively (not all of the wells operate full-time).

4.2.2 Enhancement by In-Situ Chemical Oxidation

A two-phase pilot study was conducted to assess the potential application and effectiveness of in-situ chemical oxidation of residual VOCs in the core portions of the two groundwater plumes. Phase 1 was initiated in July 2000 and concluded in April 2001. Phase 2 ran from April to June 2001. The pilot study was followed by a full-scale application from August 2002 through January 2003.

Phase 1 consisted of adding sodium permanganate of varying volume and concentration (from 1 to 40% solution) into the bedrock in the northern plume and into the overburden and bedrock in the southern plume. The northern plume received three permanganate additions during Phase 1 while the southern plume received only one addition. Concentrations of PCE increased in the core of the northern plume after the first two additions and declined slightly after the third addition (from a maximum concentration of 12,000 ppb prior to permanganate application to 16,000 ppb then to 22,000 ppb then back to 9,700 ppb after the third addition). Concentrations in the southern plume decreased from maximum concentrations of 570 ppb in the overburden and 200 ppb in bedrock prior to permanganate application to 160 ppb and 77 ppb, respectively. Since the concentrations continued to decrease in the southern plume to 11 ppb in the overburden and 46 ppb in the bedrock, no Phase 2 additions were made into the southern plume.

Phase 2 of the in-situ chemical oxidation for the northern plume began in April 2001. Using a grid pattern of direct push wells in order to create a more widespread application, 1440 gallons of permanganate solution were added to 73 direct push wells. Sampling of wells immediately following the Phase 2 application indicated decreases in most of the wells (generally a 50 to 80% decrease) with a couple low-yield wells showing marked increases. Sampling performed six months after the permanganate application found that some wells showed significant rebound, essentially back to pre-Phase 1 PCE concentrations whereas other wells continued to decline.

The persistence of PCE suggested the presence of PCE residuals in the core area of the northern plume, and that this residual may in part be located in dead-end fractures that act as long-term sources. In addition, the permanganate may have oxidized the materials to which PCE was adsorbed, thereby causing the PCE to become mobile and partition into the aqueous phase.

A full-scale in-situ chemical oxidation program was implemented from August 2002 to January

2003. As part of this full-scale program, five open-hole bedrock wells were installed in the northern plume as supplemental oxidant application wells, and four new overburden application wells were installed in the southern plume to supplement the existing wells. The in-situ chemical oxidation consisted of establishing a groundwater recirculation system in each plume so that contaminated groundwater could be extracted and treated, then amended with sodium permanganate oxidizer and injected back into the plumes.

In the northern plume, the full-scale permanganate addition was conducted in two stages. The first stage targeted the plume core by extracting from MW-35B (highest concentration have typically been detected in this well) while adding permanganate to surrounding wells. The second stage distributed permanganate throughout the entire plume, switching MW-35B from extraction well into an addition well. Over the five months of the full-scale program, PCE concentrations decreased in 7 of 11 extraction wells. Upon conclusion of the full-scale program, rebounding of concentrations occurred in some wells, again suggesting there is a residual source of PCE within the bedrock.

In the southern plume, the full-scale in-situ treatment was directed at the entire plume. Over the five months of operation, PCE concentrations did not significantly decrease. Analytical data suggested that much of the permanganate was expended in metal oxidation reactions, as evidenced by the temporary increases in concentrations of several metals.

4.2.3 Land-Use Restrictions

In order to comply with the 1999 Consent Decree, the owners of the Site properties north of Route 191 transferred title of their properties to Maine DEP. Since then, Maine DEP has sought to identify a suitable third-party entity to which Maine DEP could transfer the properties, while maintaining enforcement rights for Maine DEP and EPA. Prior to the signing of the Consent Decree, in a February 1999 fact sheet, EPA identified the Maine Atlantic Salmon Authority as a possible entity that might accept ownership of the properties, but this entity declined the opportunity. A national archaeological organization was initially receptive to obtaining title to the properties in order to ensure protection of the archaeological resources, but then backed off. Efforts continue to identify a suitable party for final ownership, but for now Maine DEP holds title to the properties and participates in the cleanup efforts of the groundwater. Because Maine DEP holds the complete fee simple property interest of the properties north of Route 191, Maine DEP is capable of ensuring the restricted groundwater and archaeological uses are prohibited. When the properties ultimately are transferred to a third party, the State must require the retention of environmental covenants, enforceable under Maine's recently adopted Uniform Environmental Covenants Act (UECA), that will permit Maine DEP and EPA to have enforcement rights.

Land-use restrictions have not yet been obtained for the property south of Route 191. The 2000 ROD (pages 56, 60, and 63) acknowledged that the ability to secure deed restrictions may be difficult since the owners of the property were not parties to the 1999 Consent Decree. This has proven to be the situation, as even getting access for installing and maintaining the southern groundwater extraction system required many requests, and ultimately, a unilateral administrative order for access was prepared before the land owners signed a notice to comply. However, in the intervening timeframe, the quality of the groundwater beneath this property improved significantly through the extraction system and application of in-situ chemical oxidation, such that currently, all

drinking water standards, except for PCE, are being met. Since the PCE concentrations have decreased to just above its standard in the past three years, the need for restrictions on this property has greatly diminished. EPA will continue to monitor the groundwater beneath this property and will sample the new seasonal well installed in the southern portion of this property.

4.2.4 Long-Term Monitoring

Long-term monitoring began with the collection of baseline samples in June and July 2001, prior to the full start of the expanded groundwater extraction and treatment system. Since this sampling event, groundwater samples have been collected and analyzed on a semi-annual basis for VOCs and metals. In addition, samples have been separately analyzed for 1,4-dioxane and PCBs on two and four occasions, respectively.

The northern plume occurs in a thin overburden unit and in fractured bedrock. Groundwater data collected over time has shown that the PCE concentrations in groundwater have been relatively lower in the overburden unit than in the bedrock unit. Monitoring and extraction wells are located in both overburden and bedrock.

The southern plume occurs primarily in the overburden unit. Historically, PCE concentrations have been higher in the overburden unit than in the bedrock unit (it is noted that the overburden thickness is greater in the southern plume than in the northern plume). Monitoring and extraction wells are located in both overburden and bedrock.

A limited number of residential wells have been sampled semi-annually.

Surface water and sediment samples have been collected annually in the summer since 2001. Surface water has been sampled only for metals, whereas sediment samples were analyzed for SVOCs, total PCBs, and metals.

A biota sampling event of fish and mussels was conducted in July 2003; this provided an update from the 1997 sampling event performed by US F&WS. These samples were analyzed for metals and PCBs.

4.2.5 Archaeological Mitigation

The 2000 ROD required completion of the mitigation of adverse effects upon the archaeological resources at the Site caused by the removal of soils and sediment as part of the 1999 NTCRA. These mitigation activities included the archaeological investigation of approximately 200 square meters performed over two field seasons in 2000 and 2001, development of a report documenting the findings of the field work, and development of a cultural study (including a video spanning each of the four seasons) and displays to be permanently placed at the Site as well as mobile displays for use in educational and tribal settings.

5.0 PROGRESS SINCE LAST FIVE-YEAR REVIEW

This is the first five-year review for the Site.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components

EPA, the lead agency for this five-year review, notified Maine DEP in the spring of 2006 that the five-year review would be completed. Rebecca Hewett of Maine DEP was part of the review team.

The schedule established by EPA included completion of the review by September 2006.

6.2 Community Notification and Involvement

EPA prepared a public notice announcing the five-year review and requesting public participation. The notice was published in June 2006 in the Calais Advertiser and Quoddy Times, the major local newspapers of general circulation. Additionally, in July 2006, EPA sent a letter to stakeholders announcing the five-year review. These stakeholders included representatives from the Town of Meddybemps, Passamaquoddy Tribe, Meddybemps Lake Association, Atlantic Salmon Commission, and other parties. Since the publication of the public notice and distribution of the stakeholders letter, there has been no response from the public to either Maine DEP or EPA regarding the five-year review.

As a follow-up to the letter to the stakeholders, EPA contacted each by phone or email. No concerns or questions were raised by the stakeholders.

6.3 Document Review

This five-year review included a review of relevant documents including decision documents, annual data summary reports, operation and maintenance monthly reports, and draft institutional control agreements. See Appendix A for a list of documents.

6.4 Data Review

A review was completed of the monitoring reports. A summary of relevant data regarding the components of the Site remedy is presented below.

6.4.1 Groundwater Monitoring

The 2000 ROD specified that long-term monitoring of groundwater, surface water, and sediments would be performed to evaluate the success of the remedial action. Additionally, the ROD allowed additional biota sampling to be performed, as necessary (see Section 4.1 above, the ROD did not state the frequency that the long-term monitoring was to be performed). Six groundwater monitoring events were completed during the RI/FS, beginning in 1996. Additional sampling was performed during aquifer stress tests and the pilot oxidation tests. Since the 2000 ROD, a sampling event was performed in June and July 2001 to establish baseline conditions prior to the initiation of the ROD-designated response actions in August 2001. Subsequently, monitoring has been

performed semi-annually in the spring and fall, except for fall 2002 when the full-scale permanganate addition was underway.

Northern Plume

Since the long-term monitoring began in 2001, nine groundwater sampling events have been completed. These sampling events have consisted of upwards of 13 overburden wells and 49 bedrock wells in the northern plume. The data set consists of monitoring wells completed in the overburden or bedrock units, and extraction wells completed across both units. Extraction wells were included with the list of bedrock wells because the overburden unit is relatively thin and unsaturated in the vicinity of the extraction wells while the extraction system is operating.

The northern plume occurs in the thin overburden unit and in fractured bedrock. Historically, PCE concentrations in the overburden unit groundwater have been relatively lower than in the bedrock unit. Figure 7 presents the most recent PCE data collected from the overburden wells. Comparison with figures presenting data from previous sampling events shows that the lateral extent of the northern plume has not varied appreciably. (While some previous figures suggest a smaller footprint for the overburden plume, in reality these figures represent when the overburden has been dewatered and there are fewer data points to construct the isopachs. Thus, the apparent fluctuation of the extent of the plume is an artifact of the sampling conditions). This indicates that the overburden component of the northern plume has stabilized and is not migrating beyond the extraction system.

As seen in Table 4, VOCs in the northern overburden plume, other than PCE, have fluctuated from non-detect to slightly above the applicable performance standard since the baseline sampling event in 2001. PCE concentrations in the overburden groundwater appeared to be declining from 2001 through April 2005, only to see increases in the next two sampling events to its highest level. The cause of this apparent increase is not known; it may reflect the variability associated with a rising water table (water level measurements have shown the potentiometric surface varies by as much as six feet in the northern plume) or that several of the extraction wells are screened across the overburden/bedrock contact. As these two sampling events occurred three years or more after the full-scale in-situ oxidation, the increased PCE levels are not considered related to that activity.

Data collected from the bedrock indicates that the mass of the residual PCE is located in the upper fifty feet of the bedrock and is centered around MW-35B. Figure 8 presents the most recent PCE data collected from bedrock wells. As with the overburden, comparison to isopach figures from previous sampling events shows that the lateral extent of the northern bedrock plume has not varied appreciably since the start up of the extraction system.

An overview of the bedrock sampling data is presented in Table 4 and figures 9 and 10, providing a statistical summary and the trends for PCE and median VOC concentrations from 1998 (pre-NTCRA) through April 2006.

The bedrock plume appears to have a core of contamination that is centered around MW-35B and within the upper fifty feet of the bedrock that has been resistant to in-situ oxidation and flushing while the concentrations in the rest of the northern plume have decreased. These differing trends are illustrated in Figure 9. First, it shows that the recent maximum PCE concentrations within the

northern plume are at concentrations similar to pre-ROD concentrations, suggesting a residual source. Yet the box plots that represent the middle fifty percent of the post-ROD PCE concentrations show that for the rest of the plume, the levels have decreased. The range of the middle fifty percent has not only decreased significantly in actual concentrations, it also narrowed considerably after Phase 2 of the permanganate pilot study. This suggests that the concentrations beyond the core of the plume have been beneficially affected by the in-situ oxidation and ongoing extraction. This interpretation extends beyond PCE to other tracked VOCs. Figure 10 presents the median concentrations of five VOCs. The median, representing the middle value of all the sampling results, shows a significant decrease in PCE following the in-situ pilot study and a further decrease following the full-scale in-situ application. The decreases in the median concentration of TCE and cis-1,2-dichloroethene follow the same pattern.

The continued presence of PCE in the core of the bedrock plume after the oxidation programs and groundwater flushing suggests that a residual PCE mass remains within the fractured bedrock and will continue to contribute to the groundwater contamination for an extended period of time.

In addition to sampling and analysis for VOCS, the monitoring program has also included sampling and analysis of metals. The 2002 ROD provided cleanup levels for manganese, antimony, cadmium, and lead. Arsenic and chromium were evaluated as contaminants of concern in the risk assessment performed during the FS, but were not retained as final contaminants of concern in the ROD, and therefore cleanup levels were not established for these metals. Arsenic and chromium were eliminated as site-specific contaminants of concern because the levels detected within the site groundwater were below the federal MCLs. In addition, arsenic and chromium concentrations were within the range found in local groundwater as background levels.

There is more uncertainty with the metal concentration results than with the VOCs. Metal concentrations have fluctuated in the individual extraction wells, at times well above their respective performance standards, yet the treatment system influent concentrations have consistently been below the respective performance standards. Turbidity data indicates (at values up to 731 NTUs when the sampling methodology seeks to collect samples with a value of less than 10 NTUs) that the individual well concentrations could be artifacts of suspended solids rather than representing actual dissolved metal concentrations in the groundwater. Other factors that could also affect the fluctuations include suspended solids entering into the extraction wells in response to variations in recharge, rise and fall of the water table in response to infiltration, and changes in the groundwater geochemistry (i.e., pH, Eh, etc.).

Table 4: Summary Statistics, Northern Plume

Northern Overburden Plume									
Date	**Cis-1,2-Dichloroethene Performance Std 70 µg/L**			**Tetrachloroethene Performance Std 3 µg/L**			**Trichloroethene Performance Std 5 µg/L**		
	Max	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**
All concentrations in µg/L									
June 01	ND			100	50	2/2	ND		
Nov 01	Overburden unit dry, not sampled								
Apr 02	ND			180	58	6/6	1	1	1/6
Apr 03	ND			30	16	10/11	ND		

Oct 03	Overburden unit dry, not sampled								
Apr 04	1	0.6	2/8	27	9	7/8	2	0.6	4/8
Oct 04	1	1	1/3	28	16	2/3	1	0.6	2/3
Apr 05	0.3	0.2	3/13	16	4	12/13	0.2	0.2	3/13
Oct 05	ND			110	55	4/5	2	2	2/5
Apr 06	5	2	3/11	370	86	10/11	14	6	3/11
Northern Bedrock Plume									
Date	**Cis-1,2-Dichloroethene Performance Std 70 µg/L**			**Tetrachloroethene Performance Std 3 µg/L**			**Trichloroethene Performance Std 5 µg/L**		
	Max	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**
All concentrations in µg/L									
June 01	25	2	9/29	3900	630	28/29	29	3	14/29
Nov 01	1200	120	19/37	9100	950	36/37	99	16	23/37
Apr 02	480	73	8/38	6000	480	38/38	74	7	18/38
Apr 03	1400	170	13/49	6100	530	47/49	21	5	15/49
Oct 03	1400	59	29/42	10000	370	40/42	43	10	34/42
Apr 04	480	19	31/48	2000	160	46/48	65	7	33/48
Oct 04	300	16	23/24	330	53	34/34	32	4	28/34
Apr 05	160	13	15/47	2900	170	47/47	23	3	26/47
Oct 05	170	13	20/46	1700	100	43/46	38	6	31/46
Apr 06	11	4	14/47	2600	340	39/47	49	5	22/47

Southern Plume

Over the period of long-term monitoring, upwards of 24 overburden wells and 7 bedrock wells have been sampled in the southern plume. The data set consists of monitoring wells completed in the overburden or bedrock units, and extraction wells completed across both units. Extraction wells were included with the list of overburden wells because the overburden unit contributes the majority of the groundwater extracted.

Historically, PCE concentrations in the overburden aquifer unit have been higher than in the bedrock unit. This may be due to the increased thickness of the overburden in the southern portion of the Site compared to the northern plume. The sand and gravel unit ranges in thickness from approximately 10 to 30 feet, with a saturated thickness of 0 to 8 feet (compared to a thickness of 5 to 25 feet and saturated thickness of 0 to 5 feet in the northern plume). Depth to groundwater in the southern plume ranges from 12 to 20 feet below the ground surface.

Figure 7 presents the most recent PCE data collected from the overburden wells. Comparison with figures presenting data from previous sampling events shows that the lateral extent of the southern plume has not varied appreciably. This indicates that the overburden component of the southern plume has stabilized and is not migrating beyond the extraction system.

A statistical summary is presented in Table 5. Figures 11 and 12 show the trends for PCE and median VOC concentrations trend from 1998 (pre-NTCRA) through April 2006 for the overburden plume. As seen in Table 5, PCE is the only VOC that has been consistently detected in the southern overburden plume. The PCE concentrations within the southern overburden plume have decreased in a similar manner as the northern bedrock plume. The mean, median, and middle

fifty percent have followed an overall decreasing trend, other than a temporary increase after the pilot study and full-scale permanganate additions. Since April 2004, the average PCE concentration has been 5 to 6 µg/L (the MEG value is 3 µg/L while the MCL value is 5 µg/L).

Figure 8 presents the most recent PCE data collected from the southern bedrock wells. The remaining locations above MEGs south of Route 191 are RWS-3, RWS-4, and RWS-5. As with the overburden, comparison to isopach figures from previous sampling events shows that the lateral extent of the southern bedrock plume has not varied appreciably since the start up of the extraction system.

Data collected from the bedrock (Table5) indicates that the average PCE concentration increased following the pilot study permanganate addition and has fluctuated between 3 and 6 µg/L since April 2004. Maximum PCE concentrations have declined for five consecutive sampling events after the rebound period following the full-scale permanganate addition.

Whereas a limited number of metals have periodically exceeded MEGs or MCLs in the northern plume, there have been more metals detected above their respective standards in the southern plume. However, almost all of the elevated metals in 2006 were detected in one well, RWS6, and elevated suspended solids were noted in that sample. Manganese in the overburden unit, while still pervasive in that it was detected in all 22 samples, only 3 of the 22 samples were above the MEG. The levels of manganese are expected to continue to decrease as the residual from the full-scale permanganate completely dissipates. Further, as noted regarding the northern plume, metal concentrations in the influent samples in the treatment system were below their respective standards. This indicates that what is detected in individual well samples is, at least partially, attributed to suspended solids in the sample and not representative of actual dissolved metal concentrations in the groundwater.

In the southern bedrock samples, only manganese was detected in excess of the MEG. This is attributed to the past applications of permanganate in the southern plume. In general, the metals in the southern plume do not appear to pose threats to groundwater quality.

Table 5: Summary Statistics, Southern Plume

Southern Overburden Plume									
Date	**1,1,1-Trichloroethane Performance Std 200 µg/L**			**Tetrachloroethene Performance Std 3 µg/L**			**Trichloroethene Performance Std 5 µg/L**		
	Max	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**
All concentrations in µg/L									
June 01	ND			55	26	13/14	ND		
Nov 01	2	2	1/14	46	13	14/14	ND		
Apr 02	ND			42	15	23/23	ND		
Apr 03	ND			14	6	21/23	ND		
Oct 03	2	2	2/18	25	10	17/18	ND		
Apr 04	0.1	0.1	4/22	16	6	22/22	0.5	0.3	12/22
Oct 04	0.3	0.2	4/11	12	6	11/11	0.5	0.3	10/11
Apr 05	0.1	0.1	1/24	9	5	23/24	0.3	0.2	12/24
Oct 05	ND			10	6	21/22	ND		
Apr 06	ND			9	6	20/22	ND		

Southern Bedrock Plume									
Date	**1,1,1-Trichloroethane Performance Std 200 µg/L**			**Tetrachloroethene Performance Std 3 µg/L**			**Trichloroethene Performance Std 5 µg/L**		
	Max	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**	**Max**	**Mean**	**Frequency**
All concentrations in µg/L									
June 01	ND			21	5	3/6	0.7	0.5	1/6
Nov 01	2	2	1/6	19	11	6/6	2	2	2/6
Apr 02	ND			17	14	3/3	2	2	1/3
Apr 03	ND			9	9	1/7	ND		
Oct 03	1	1	1/3	22	16	3/3	1	1	1/3
Apr 04	0.6	0.4	2/7	17	5	7/7	0.5	0.2	5/7
Oct 04	0.3	0.3	1/3	11	6	3/3	0.3	0.2	3/3
Apr 05	0.3	0.3	1/6	8	3	6/6	0.5	0.2	4/6
Oct 05	ND			7	6	3/4	0.7	0.7	1/4
Apr 06	ND			5	3	6/7	ND		

Non-plume wells

In addition to the samples collected from the two plumes, samples were collected from wells upgradient of the Site, downgradient from the infiltration gallery where the treated groundwater is released back into the subsurface, between the two plumes, and east of the river in monitoring wells and three residential wells. Overall, site-related VOCs were not detected in these wells (there have been sporadic detections near the detection limit, i.e., the concentration that laboratory analysis can measure. The highest concentration of PCE in these wells in the April 2006 samples was 0.2 µg/L). Metal concentrations also are generally below their respective standards. There have been sporadic exceedances of standards, for example, arsenic slightly above the MCL has been detected in an upgradient bedrock well. This is considered to be associated with naturally occurring arsenic in the bedrock, and therefore migration of metals from the Site does not appear to pose threats to groundwater quality. Hence, these wells are not considered to be affected by site-related contamination and are meeting MCLs and MEGs. The locations of the non-plume wells are shown on Figure 5.

Figures 13 and 14 present the potentiometric data for the overburden and bedrock units, respectively. These figures illustrate the direction of groundwater flow toward the Dennys River from both sides of the river and the capture zones created by the pumping of the extraction systems in both plumes.

Post-full-scale in-situ chemical oxidation

PCE concentrations in the northern plume core, as represented by MW-35B, increased from 170 to 2,600 µg/L (was at 2200 µg/L prior to in-situ oxidation program) following the termination of the full-scale in-situ chemical oxidation program. PCE concentrations in the remainder of the northern plume remained unchanged or increased slightly. Manganese increased in extraction wells downgradient of the injection areas, and then decreased after the conclusion of the in-situ program. There did not appear to be any significant changes in either lead or arsenic concentrations as a result of the permanganate additions, and exceedances in extraction wells remained infrequent for these metals.

PCE concentrations in the southern plume increased slightly following the permanganate application, though it must be remembered that the concentrations were relatively low prior to the in-situ oxidation. The maximum PCE concentration recorded in the rebound period was 20 µg/L. Similar to the northern plume, manganese concentrations increased during the permanganate additions, then decreased after the conclusion of the additions.

There was no evidence of permanganate migrating into the Dennys River during either the pilot program or the five months of full-scale in-situ chemical oxidation.

6.4.2 Surface Water Monitoring

Surface water samples were collected in October 2002, August 2003, August 2004, August 2005, and June 2006. In accordance with the approved work plan, surface water samples were analyzed for metals only. Sample locations are shown on Figure 15 and 16.

Analytical results were compared to MCLs and 1992 MEGs (these standards are used since while they generally are not directly applicable to surface water, it has been reported, but not verified, that Meddybemps Lake is used as a drinking water source by summer residents), Maine Ambient Water Quality Criteria, and the protective levels selected in the 2000 ROD. The last two are criteria for aquatic organism protection, which is the primary purpose for the long-term monitoring of surface water.

Of the four ROD-designated contaminants of concern (COCs) for surface water, aluminum, barium, and lead have occasionally been detected at higher concentrations than the ROD protective levels after the 1999 NTCRA while silver has not. Concentrations of aluminum, barium, and lead have varied since 1999. The exceedances include aluminum detected in samples from Meddybemps Lake, beyond the influence of the Site. Overall then, these metals do not appear to represent a threat to surface water quality.

6.4.3 Sediment Monitoring

Sediment sampling occurred at the same time and generally the same locations as the surface water sampling. In accordance with the approved work plan, sediment samples were analyzed for SVOCs, total PCBs, and metals.

Analytical results were compared with the ROD protective levels and the Ontario Ministry of the Environment's Lowest Effect Levels (LEL) guidelines. These levels are criteria for aquatic organism protection, which is the primary purpose for the long-term sediment monitoring.

Bis(2-ethylhexyl)phthalate (BEHP) has been frequently detected in sediment collected from the banks of Meddybemps Lake and the Dennys River adjacent to the Site (in all four samples from the lake in 2006; one of seven samples in 2006 and all five samples in 2005 from the mill pond – the local name for the reach of the river between the dam and Route 191). BEHP is a commonly used plasticizer, used in manufacturing of plastics, and is pervasive in the environment. BEHP has also been detected in the field blanks, the quality control samples used to track sampling methodology. There are no benchmarks or ROD protective levels for BEHP. Low levels of PAHs

have been detected in locations adjacent to Route 191, and may be a result of road surface runoff from the asphalt pavement. The detected PAHs have not exceeded the ROD protective levels or the LEL values.

PCBs sediment samples have been collected from Meddybemps Lake, the mill pond, and the upper Dennys River just downstream of Route 191. Overall, PCBs in Meddybemps Lake have been well below the ROD level of 190 µg/Kg and the OME LEL of 70 µg/Kg. There were no values above either criteria in 2005 and only one in the 2006 sampling event. Total PCBs have been detected in the majority of sediment samples collected from the upper portion of the river. The median concentration has been below the ROD protective level. PCBs presence in pond and river sediments appears to be limited, and are likely attributable, in part, to past releases from the Site (though as found in the 2003 biota sampling, PCBs were found in mussel tissue collected near Fowler Point in Meddybemps Lake, which is about four miles north of the Site, thereby suggesting that the Site may not be the only source of PCBs in the river sediments).

Concentrations of arsenic, chromium, copper, lead, manganese, and nickel have been detected in levels exceeding the ROD protective levels or the OME LELs throughout the long-term sediment sampling program. An evaluation of the data leads to the following observations:

- ROD protective levels for arsenic, chromium, copper, lead, and nickel were all set below the ROD-identified background levels;
- Several of the metals showed decreases from 1999 to 2001 (the NTCRA removal of soils and sediments occurred after the 1999 sampling event), then increased slightly in 2002, and have appeared consistent since then;
- Arsenic concentrations in lake sediments have been higher than both samples collected from mill pond from 1999 through 2006, and higher than the samples from the upper river from 1999 through 2004, with results from nearly all sample locations between the ROD protective levels and the background concentration (6 mg/Kg to 19 mg/Kg);
- Chromium concentrations have remained relatively consistent since 1999, with median concentrations, and generally the 75th quartile below the protective level;
- Maximum copper concentrations were above both the ROD protective level and background level in 2002 and 2003 in the mill pond and 2004 in the upper river samples. The median and 75th quartile have been bracketed between the two criteria;
- Maximum lead concentrations were similar to copper, above the protective level in the mill pond in 2002, 2003, and 2004, and above the protective level in 2004 in the upper river samples. Overall, the median and 75th quartile have remained below the protective level since 1999;
- Manganese concentrations appear to have slightly decreased in all sampling locations since 1999, with the median and 75th quartile below the protective level since 2001. Maximum concentrations in Meddybemps Lake samples have exceeded the protective level in all seven years of monitoring, suggesting sources beyond the Site; and
- Median and 75th quartile nickel concentrations have been consistently above the protective level of 16 mg/Kg, fluctuating around the background level of 26 mg/Kg.

Overall, sediment metal concentrations appear to either slightly decreased or remained stable since

2002, and at levels below the pre-NTCRA 1999 samples. As the 2000 ROD concluded that the 1999 sediment concentrations did not pose an unacceptable risk, the current levels are not considered to pose an unacceptable risk to aquatic organisms.

6.4.4 Biota Monitoring

The remedy selected in the 2000 ROD included biota sampling, as necessary, to evaluate the protectiveness of the remedy.

An initial biota sampling event had been performed by US F&WS in 1997. That study concluded that there were no major site-related impacts of metals to fish and mussels in Meddybemps Lake and in the Dennys River. Polychlorinated biphenyls (PCBs) detected in fish samples collected from and adjacent to and downstream from the Site were higher in concentrations than in fish samples obtained from the reference locations on the Dennys River. Mean PCB levels however were not highly elevated when compared to regional data from other lakes and streams in Maine.

In 1997 and 1999, Maine DEP performed benthic invertebrate assessments in the river just downstream of the Site. Both assessments indicated that the water quality in the river was Class C, which is the lowest surface water classification in Maine. However, the Dennys River has been designated a Class AA (highest classification) because it is one of seven rivers in Maine designated for the restoration of Atlantic salmon. Since it was not clear whether the Site was contributing to the Class C designation of the river, it was decided to conduct a benthic study after the completion of the NTCRA and start-up of the groundwater extraction and treatment system.

The ecological risk assessment completed during the RI/FS concluded that there were no substantial risks to ecological receptors posed by site-related contaminants of concern. Nonetheless, the ROD identified fish and mussels as media of potential concern and designated PCBs, several polynuclear aromatic hydrocarbon compounds (PAHs) and several metals as COCs in surface water and sediments.

As a result, EPA conducted a three-part biota sampling program: in October 2002, intertidal clams were collected in Dennys Bay, near the mouth of the Dennys River; in July 2003, fish and mussels were collected from Meddybemps Lake and Dennys River; and a benthic study was performed during the summer of 2003.

Intertidal Clam Study

The intertidal clam study was conducted at three stations in Dennys Bay, which is located approximately 20 miles downstream of the Site. The stations were selected by a member of the Sipayik Environmental Department, Pleasant Point Passamaquoddy Tribal Government as these were areas of active soft-shell clam ("steamers") harvesting. Ten clams were collected at each station and the tissue was analyzed for metals and PCBs. Results of the analyses indicated that PCB concentrations in the clam samples were low, generally less than seven percent of the Maine Fish Tissue Action Levels (FTALs) values. Of the metals, only arsenic and lead concentrations in the clam samples exceed the FTALS. While there are no specific guidelines or action levels for clams, Maine Bureau of Health and Maine DEP use the FTALs to screen clam tissue data. See Figure 17 for sampling locations in Dennys Bay.

With the available information, it is unknown how much, if any, of the arsenic and lead present in the clam tissue samples can be attributed to the Site. The flow from Meddybemps Lake at the dam is approximately 9.3 cubic feet second (cfs, or about 70 gallons per second), while the flow at Dennysville, about 18 miles downstream from the Site, is 203 cfs (about 1500 gallons per second) indicating that the river receives considerable contribution from numerous tributaries and groundwater discharge downstream of the Site. Dennys Bay also receives other surface water than from Dennys River, such as from Hardscrabble River. And finally, Dennys Bay is tidally influenced, and therefore there could be additional sources of PCBs and metals beyond the freshwater sources. Sediment metal concentrations from samples that were previously collected in Dennys Bay were comparable to the concentration ranges observed in background locations (five samples obtained from Meddybemps Lake not affected by past activities or releases from the Site).

2003 Biota Study

During the July 2003 sampling round, 58 fish and 28 freshwater mussels were collected from two locations in Meddybemps Lake and two reaches in the Dennys River for mussels and five reaches in the river for fish. The 2003 samples were analyzed for metals, total PCBs, and PCB congeners. The results of the analyses indicate a general decline in metals and PCB median concentrations per sampling location for fish and mussel tissue between 1997 and 2003. See Figure 18 for the general locations of the biota sampling stations

For smallmouth bass, the median concentrations for metals and PCBs were below the FTALs at all locations except in the deadwater reach south of Route 191 and the wholebody median metals concentration did not exceed the wildlife protection criteria at any location. Pumpkinseed sunfish also showed a general decrease in metals and PCBs from 1997 to 2003. Mercury concentrations in the fillet median value of both species exceeded the FTAL, a result not inconsistent with the state-wide advisory for mercury for fish consumption.

For freshwater mussels, the median values for PCBs and mussels were generally lower in 2003 than in 1997 (though neither was elevated when compared to criteria). Mercury median values were slightly higher in mussels collected from Meddybemps Lake than from the Dennys River

2003 Benthic Study

From July 18 through August 15, 2003, sampling of the river bottom adjacent to and downriver of the Site was conducted using various collection devices in accordance with Maine DEP methodology and guidance. The classification determination for the river remained Class C, the same result as the 1997 and 1999 Maine DEP results. This determination however, was biased by two factors that prevented an assessment of whether the Site was contributing to the classification. The presence of the dam upstream of the sample stations creates a condition where the river in the vicinity of the Site cannot meet either Class AA or Class A of the State's surface water quality designations. Second, use of the rock bag sampling devices, one of the state sampling methods selectively favors the dominance of filter feeders and this also contributes to the lowered water quality classification. Therefore, it appears that current conditions and the required sampling methods prevent the possibility of the river attaining a higher water quality classification, irrespective of any possible contribution from the Site.

6.4.5 Treatment System Monitoring

The treatment system constructed as part of the 1999 NTCRA was upgraded to 30 gpm and reactivated on August 25, 2001. EPA and Maine DEP conducted a pre-final inspection. The system underwent a two-month start-up period where weekly system sampling was conducted for eight weeks beginning August 26. During this start-up period, the pumping rates for each plume ranged from 3.3 to 5.2 gpm, or far below the 30 gpm available. Punch list items identified in the pre-final inspection were completed in November 2001.

Influent PCE concentrations from the northern plume were fairly stable during 2001, ranging from 1100 to 1500 µg/L, whereas as the southern plume concentrations decreased from 29 µg/L at the startup to 16 µg/L during this period. PCB analysis results were non-detect in influent samples from both plumes, and manganese influent were below the MEG of 200 µg/L and lead influent levels were below the goal of 15 µg/L.

In 2002, modifications were made to the treatment system as operating data was compiled. In April, the filter bags were changed from mesh sizes of 25 and 5 µm in BF1 and BF2 to 10 and 1 µm, respectively, since it appeared fine particles were clogging the granulated active carbon (GAC) resulting in early failure. In August, two temporary treatment systems were set up for use with the full-scale permanganate oxidation program to avoid any potential damage to the permanent system from the permanganate. These temporary systems included a bag filter, and primary and secondary GAC. Maximum monthly flow rate from both plumes during this period was 15 gpm.

Influent PCE concentrations from the northern plume during 2002 decreased significantly from 1100-1500 µg/L to several hundred and the southern plume influent decreased from the teens to single digits. Initial PCE concentrations in the temporary systems were 1900 µg/L and 7 µg/L in the northern and southern plumes, respectively. Manganese concentrations were periodically above the MEG of 200 µg/L; whether these levels could be attributed to the 2000 – 2001 pilot in-situ chemical oxidation program is uncertain. Arsenic and lead influent concentrations continued to be below their respective standards.

In August 2003, the permanent treatment system was reactivated. In September, the bag filters were replaced with 10 and 5 µm mesh size as the data indicated that the 10 and 1 µm did not extend the life of the GAC units. Because of the fouling of the carbon units, the treatment system could not keep up with the influent flow so the flow from the southern extraction wells was cut back. The flow from the northern extraction wells was then decreased on October 31 since the treatment system could not keep up with the volume being pumped. In December, the system operated intermittently as several extraction pumps were experiencing problems connected with heavy rain and snowmelt.

Influent PCE concentration from the northern plume in 2003 after the reactivation decreased from 600 to 320 µg/L; influent PCE concentrations from the southern plume remained in the single digits. Influent metal concentrations continued to generally be below MCLs and MEGs.

Review of the 2004 progress reports found that the system operated at reduced capacity for about five months because of problems with the two compressors. When one of the compressors was shut down, the southern extraction system was taken offline in order that the more highly contaminated northern plume could continue to be extracted. Potentiometric figures demonstrated

that the northern plume remained captured throughout the year. The extraction volume, when both extraction systems have been operating, has averaged approximately 375,000 gallons per month, with the southern extraction system contributing slightly over half of the flow. Influent concentrations generally decreased through 2004. As would be expected, given the discrepancy between PCE concentrations in the two plumes (as discussed above), the influent concentrations from the northern plume have been consistently higher than the influent concentrations from the southern plume.

Influent data consistently showed that manganese, lead, and arsenic were meeting their respective performance standards even while several individual wells in the northern plume would exceed the standards, and at times, by considerable levels. While elevated concentrations of aluminum have been attributed to elevated turbidity levels, the continued presence of silt in some of the extraction wells and the suspended solids within the bedrock samples, the discrepancy between individual extraction well data and the plume influent appears to be that the former data may also be artifacts of the sampling process. Consequently, the individual well data may not represent actual aquifer conditions.

During the year 2004, the system operated at reduced capacity because one of the compressors was offline for about five months, awaiting replacement parts. In addition, on several occasions, alarms were triggered for the equalization tank. The ion exchange system remained offline for much of 2004, yet metals effluent data indicated that the discharged groundwater generally met MCLs/MEGs.

Similarly, while the treatment system was expanded in 2001 to manage a greater flowrate, up to 30 gpm, a review of the monthly operating reports from 2001 through 2004 found the highest flow to be approximately 15 gpm. Nonetheless, the field records indicate several times when it was necessary to reduce the influent flow since the system was not able to handle the flow. Consequently, now that over five years of maintenance data have been collected, a value engineering study or an optimization study would seem to be warranted as the system enters the next five years of operation.

Effluent data throughout the operation of the system from August 2001 to the latest data available indicated that the treatment system was effective in removing VOCs from the pumped water such that the system effluent consistently met the drinking water standards.
Operating data for 2005 and 2006 were not available at the time of this review.

6.4.6 Archaeological Mitigation

As part of the 1999 NTCRA, EPA conducted Phase I and Phase II archaeological investigations and made the determination that 1) portions of the Site met the criteria for listing on the National Register of Historic Places and 2) the environmental cleanup activities at the Site will have unavoidable adverse effects upon the archaeological resources at the Site. In August 2000, a Memorandum of Agreement (MOA) for Recovery of Significant Information and Mitigation of Adverse Effects was entered into by EPA, State of Maine Historic Preservation Officer (Maine Historic Preservation Commission), Passamaquoddy Tribe (Pleasant Point Reservation and Indian Township Reservation), and Advisory Council on Historic Preservation. In the MOA, EPA agreed to do the following:

a. Conduct additional archaeological field investigations, extending over approximately 200 square meters,

b. Generate reports addressing the scientific and cultural value of the recovered material,

c. Transmit the findings to the general public through education and outreach,

d. Install an educational exhibit on site, and

e. Implement land use restrictions that will prevent development and any other ground disturbance (except those related to environmental cleanup) that would adversely affect the cultural or historical resources at the Site.

EPA has undertaken the following activities to meet its obligations in the MOA. Much of the work was conducted by the Archaeology Research Center/University of Maine at Farmington (ARC/UMF) under an EPA contract with Tetra Tech NUS. Donald Soctomah, Tribal Historic Preservation Officer for the Passamaquoddy Tribe, was a consultant to ARC/UMF.

Archaeological Field Investigations. Phase III data recovery excavations were conducted by ARC/UMF during 2000 and 2001. Field work included the hand excavation of 228 square meters. Over 80,000 artifacts including stone tools and pottery were recovered, as well as copious amounts of animal bones and plant remains. Other features identified at the Site include hearths, house pits, and storage and refuse pits. Artifact analysis, radiocarbon dating of 39 carbon samples, and analysis of floral and faunal remains document a long sequence of human occupation at N'tolonapemk[1] beginning in the Early Archaic period, ca. 7000 B.C. The Site is centrally located within ancestral Passamaquoddy territory. The Passamaquoddy Tribe was involved during the entire duration of field work. Some tribal members were trained as archaeological interns and took part in the data recovery excavations. Figure 19 is a photograph showing the excavation in progress.

Scientific and Cultural Reports. Two reports addressing the scientific and cultural value of the recovered material have been generated. In October 2005, ARC/UMF circulated for peer review a four-volume draft scientific report entitled *The Archaeology of N'tolonapemk (96.02 ME), "Our Ancestor's Place"*. ARC/UMF has received comments and is revising the report accordingly. The final report is expected in October 2006.

A companion piece to the archaeological work is a cultural study produced in 2005. The report is entitled *A Visit to Our Ancestor's Place: Meddybemps – N'tolonapemk Village,* by Donald Soctomah, Passamaquoddy Tribal Historic Preservation Officer. Drawing from traditional Passamaquoddy stories, oral history and interviews with tribal elders, it describes life at N'tolonapemk across the four seasons and at four different points in time: early winter 4000 years ago, springtime during 1800, summer of 1930, and fall of 2003. The cultural study is available as a link from the EPA website at www.epa.gov/ne/superfund/sites (search for Eastern Surplus).

Education and Outreach to the General Public. A variety of materials have been produced to facilitate education and outreach to general public. A 50-minute documentary (*N'tolonapemk: Our Relatives' Place*

[1] The Site was named this by the Passamaquoddy Tribe and means "Our Ancestors' Place"

by Gunnar Hansen, Bing Miller and Jeff Dobbs, 2006) uses an animal effigy found during the archaeological excavation as a point of departure to tell the story of N'tolonapemk as a hub for travel throughout the St. Croix watershed for 9000 years (see Figure 20). ARC/UMF, with consultation from Donald Soctomah, has created two four-panel mobile displays – one geared towards an adult reader, the second for children. There are five copies of each display – three for the Passamaquoddy, one for EPA and one for ARC/UMF. ARC/UMF also created a set of casts of selected artifacts to accompany the mobile displays. Finally, one thousand copies of a 32-page booklet - based on the scientific and cultural reports – are expected to be printed and available for wide-spread distribution by the end of October 2006.

On-Site Display. A wayside exhibit consisting of four enamel signs was installed at the Eastern Surplus Site on August 24 – 25, 2006. ARC/UMF created the display, drawing information from both the scientific study and cultural report. The Site remains closed while groundwater remediation continues, however, the expectation is that in the future, the Site will be open to the general public. In the meantime, limited access for tribal or other important municipal events can be arranged by contacting EPA or Maine DEP.

Land Use Restrictions. The ROD calls for the implementation of land use restrictions to prevent the disturbance of archaeological resources for the properties north of Route 191. In compliance with the 1999 Consent Decree, the property owners transferred ownership of these properties to Maine DEP in September 2000 and October 2002. At the present time, Maine DEP is capable of ensuring that Site's archaeological resources are not disturbed. When the properties ultimately are transferred to a third party, the State must require the retention of environmental covenants, enforceable under Maine's recently adopted Uniform Environmental Covenants Act (UECA), that will permit Maine DEP and EPA to have enforcement rights against the disturbance of archaeological resources.

In March 2003, a second agreement concerning the archaeological resources at the Site was reached. Parties to the Agreement for the Curation of Federally-Administered Archaeological Collection and Records from the Eastern Surplus Company Superfund Site, a.k.a. Ntolonapemk, Located within Maine Archaeological Survey Site 96.02 were EPA, State of Maine Historic Preservation Officer (Maine Historic Preservation Commission), Passamaquoddy Tribe (Pleasant Point Reservation and Indian Township Reservation), and the Robert Abbe Museum of Stone Age Antiquities. This agreement outlines how artifacts and other materials collected during archaeological investigations at the Site are to be housed and treated. In November 2004, ARC/UMF transferred 177 archival storage boxes containing stone tools, flakes, floral and faunal remains, feature fill and other materials collected from the Site to the Abbe Museum in Bar Harbor, Maine for a one-time fee of $300 per box. The Abbe Museum shall house and treat the collection for permanent collection according to its Collections Management Policy, except that the deaccession of any individual item or class of items from the collection shall be done with the consent of the Passamaquoddy Tribe in accordance with the Agreement and Quitclaim Deed of Conveyance (which was made effective on August 25, 2000).

6.5 Site Inspection

A site inspection specifically for the five-year review was performed on June 27, 2006. The inspection was performed by EPA with its contractor, TetraTech NUS.

The inspection included a site walkover, inspection of the extraction and treatment system, monitoring wells both on the Site and those east of the Dennys River, the site fence, the restored

riverbank (location of the PCB hot spot), and former hydroelectric station. Following the site inspection, the EPA representative drove around the roads contiguous to the Site to check for new homes and developments.

The Site north of Route 191 is fenced on three sides; along Route 191 on the south, and separating the Site from private property on the west and north (the mill pond of Dennys River forms the eastern boundary of this portion of the Site and this boundary is not fenced). This portion of the Site is accessed through a gate in the fence along Route 191, and there are two additional gates located in the western side of the fence. The fence is in good condition, though it shows sign of being pushed backwards along the highway, likely the result of snow being plowed off the highway. The majority of the Site north of Route 191 is now a field that is periodically mowed. Trees are limited to the western fenceline and along the bank of the mill pond.

The portion of the Site south of Route 191 is not restricted; there is no fence, and a roadway runs through the property back to a seasonal home currently being constructed. Compared to the northern portion of the Site, much of the southern portion is overgrown with vegetation. In addition to the seasonal home, a barn structure with concrete floor stands nearer to the road.

On the day of the site inspection for this five-year review, there was no indication of any disturbance of the fence, grounds, or any erosion along the riverbank. Each of the monitoring wells currently in use as part of the monitoring program was located and inspected. All appeared to be in acceptable condition with no indication of frost displacement and all riser caps were secured.

The roads in the area surrounding the Site were driven to check for new development/new use. The area remains predominantly rural residential interspersed with agricultural properties. There did not appear to be any significant changes on Route 191 either west or east of the property (in fact, the only noticed change was the closure of the general store, the only commercial property in the vicinity of the Site, to the east of the Site). Stone Road, the private road immediately to the west of the Site leads to a few homes along Meddybemps Lake; all of these homes are located hydraulically upgradient of the Site. Along the next road farther to the west along Route 191, there were some clearings along the road, likely to be residential lots for new homes. This road also leads to the southwestern shore of Meddybemps Lake and is upgradient from the Site.

No new construction or clearing, with the exception of the seasonal home on the southern portion of the Site, were observed south of Route 191 in the area of the Site.

See Appendix B for photographs taken during the site inspection.

6.6 Interviews

EPA conducted interviews with Maine DEP and the reference librarian at the Calais Free Library (which serves as the site repository) via telephone. EPA visited the office of the Town of Meddybemps clerk who provided an updated property owners' list and provided EPA with the name of the person who was constructing the seasonal home on the southern end of the southern portion of the Site (not one of the owners). The town clerk did not raise any issues or concerns with the Site.

Rebecca Hewett has been the Maine DEP project manager since 1996, and she has provided Maine DEP's comments on the site reports. Maine DEP has been actively involved with the conceptual site model, the implementation of the in-situ oxidation efforts, the efforts at further delineating the bedrock in the northern plume, the archaeological mitigation, as well as the institutional control issues.

Ms. Hewett noted that the MEGs have been updated in 2006, but that the 1992 MEGs remain as the Site's ARARs, as they are the edition that has been referenced in state regulations. In addition, Maine has adopted the Uniform Environmental Covenants Act (UECA), which pertains to environmental restrictive covenants placed on deeds of properties.

Regarding the ongoing remediation activities and the Site itself, Maine DEP had several observations. Even though Maine DEP holds the complete fee simple interest in the Site properties north of Route 191, Maine DEP and EPA have had several discussions regarding recording a notice of restrictions, but have not decided to do so yet, pending the identification of a third party, to whom Maine DEP would transfer the properties. There have been reports of occasional vandalism (also reported by EPA's contractor). The delay in getting site reports, particularly the monthly operations reports for the extraction and treatment system, has made it difficult for Maine DEP to comment on them. A decision on bedrock blasting to enhance the effectiveness of in-situ oxidation in the northern plume should be reached as soon as practicable once EPA's new contract with a new contractor is set in place.

In addition to the above-described site concerns, in 2005, Maine DEP performed an off-site removal action at the dwelling immediately east of the river, on the north side of Route 191. During this removal, several containers, including some that were leaking, were removed from the basement. Maine DEP found containers holding acid, bases, pesticides, PCBs, reactive and flammable metals, 2000 gallons of a leather cleanser that was 60% PCE, and other materials. The concrete floor was in poor shape, with visible stains throughout the concrete. These containers held compounds similar to those found on the Site (the dwelling was owned and occupied by a relative of the facility owners). As a part of the removal action, Maine DEP constructed a fence around the structure to minimize access.

The comments of Maine DEP on the draft Five-Year Review Report are included in Appendix C.

The site file at the Calais Free Library was reviewed during a site visit on May 12, 2006. The site files include the administrative records compiled for the 1999 NTCRA (volumes I – VI) and for the remedial action (volumes I –IV). The reference librarian noted that the record is not often accessed but that it is appreciated by the community members who are interested in the Site.

7.0 TECHNICAL ASSESSMENT

7.1 Question A: Is The Remedy Functioning As Intended By The Decision Documents?

Remedial action performance. The remedial action objectives (RAOs) were noted above (see

Section 4.1). The first RAO, to prevent ingestion of contaminated groundwater, is being met by the groundwater extraction systems and the ownership by Maine DEP of the properties north of Route 191. Ongoing semi-annual sampling, including residential well sampling, supports the conceptual site model that off-site migration is not occurring and thereby the second RAO is also being met. Thus, the threat posed to human health is being addressed.

The third RAO, to restore contaminated groundwater to drinking water standards, has not been achieved at the time of this five-year review. Application of sodium permanganate had initial positive results in both plumes, but concentrations rebounded in the core of the northern plume to pre-application levels. Groundwater concentrations, as measured by the influent concentrations to the extraction system, declined over the first three years of operation (2005-2006 data were not available at the time of this review), suggesting that the overall plumes are attenuating, though there remains a core PCE residual in the northern plume.

The fourth RAO, long-term monitoring to verify the protectiveness of the remedy, is being met. The threat posed to the environment through exposure to contaminated groundwater has not occurred because the groundwater extraction system prevents discharge of the contaminated groundwater into the Dennys River. Surface water and sediment samples collected from the Dennys River show that metal concentrations are generally decreasing since the ROD. Additionally, the elevated metal concentrations are not significantly above background concentrations. Biota sampling in 2003 showed tissue PCB levels have decreased since the 1997 levels. Again, the 2000 ROD did not find any unacceptable environmental risk, so the decrease in surface water, sediment, and biota concentrations provide further evidence that there is no unacceptable risk to the environment. The sampling results also demonstrate that off-site migration is not occurring.

Operations and Maintenance. The ROD specified that the extraction system would be operated and maintained to ensure the continuing effectiveness of the treatment system. The system has been operating since before the ROD was signed; the treatment process has been modified (for example, change in mesh size of the bag filters, change from oil-less compressors to oil-lubricated compressors) in the ensuing years based on the maintenance data collected and the reliability and effectiveness of different components.

Opportunities for Optimization. Based on the extensive monitoring data collected during the RI/FS and post-ROD (six comprehensive sampling events in the RI/FS and nine comprehensive sampling events post-ROD), it may be possible to reduce the number and frequency of monitoring locations. Review of the monthly system reports finds that treatment components have been offline for extensive periods, such as the ion exchange units, yet the performance standards for the effluent are being met. This suggests that some of the treatment components may be redundant, and perhaps that the overall system could be reassessed for opportunities to optimize its operation.

Indicators of Remedy Problems. There are no indicators of remedy problems. System influent data indicate that metal concentrations, such as manganese, lead, and arsenic, with sporadic exceptions, are meeting their respective performance standards. This suggests that the reported concentrations in the individual extraction wells may be an artifact of suspended solids, and perhaps periodic redevelopment of the wells should be scheduled.

Implementation of Institutional Controls. The institutional controls required by the 2000 ROD have not been completed. Fortunately, titles to the properties north of Route 191 are now held by Maine DEP, thereby ensuring that the site groundwater will not be used. There have been efforts to identify a suitable third party to whom the properties can be transferred, but until that occurs, Maine DEP controls the use of the Site north of Route 191. The ROD acknowledged the difficulty of obtaining institutional controls on the property south of Route 191, and this has proven to be the case. However, since the extraction system and the in-situ oxidation have essentially reduced the contamination in the southern plume to drinking water standards such that all VOC standards are being met except for PCE (in the latest sampling event, the average PCE concentration is 6 ppb; MCL is 5 ppb and MEG is 3 ppb), the need for institutional controls on this property has been diminished.

7.2 Question B: Are The Exposure Assumptions, Toxicity Data, Cleanup Levels And Remedial Action Objectives (RAOs) Used At The Time Of Remedy Selection Still Valid?

Changes in Standards and TBCs. As part of this five-year review, Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBC) guidance for the Site presented in the ROD were reviewed, and a review of current ARARs was conducted. There have been no changes in the chemical-specific ARARs (MCLs[2] or Maine MEGs[3]) for the contaminants identified in the 2000 ROD, nor any location or action-specific ARARs. ARARs identified in the ROD and current ARARs and TBCs applicable to this five-year review are included in Appendix B of this report for reference.

Changes in Exposure Pathways. Potential exposure pathways were quantitatively assessed as part of the risk assessment during the RI/FS. As the ROD indicated (page 23 of the ROD) with the 1999 NTCRA excavation and off-site disposal of contaminated soils and sediments, only those soils outside the excavation areas were considered in the risk evaluation performed during the RI/FS. The exposure pathways that were found to present a significant risk were ingestion and dermal contact with groundwater from both plumes for potential future residential use. These risks have been addressed by the extraction well and treatment system and ownership of the northern properties by Maine DEP.

In November 2002, two years after the ROD was signed, EPA issued a draft guidance that pertained to the vapor intrusion pathway, where dissolved VOCs could partition from the contaminated groundwater and migrate possibly into indoor air. This exposure pathway, while not quantitatively assessed in the 2000 ROD, is not considered a potential pathway at the Eastern Surplus Site for several reasons. First, no buildings exist on the northern portion of the Site (beyond the site trailer used by EPA's contractor and that is located upgradient of the plume), so there are no current receptors for possible vapors. Second, the home being constructed at the southern end of the southern portion of the Site, is a seasonal home with no basement or enclosed

[2] The MCL for arsenic was lowered in January 2001 from 50 µg/L to 10 µg/L. As noted earlier, the 2000 ROD specifically excluded arsenic as a contaminant of concern, yet with the new MCL, arsenic concentrations have been tracked in the plumes and extraction and treatment system.

[3] Maine MEGs have been updated since the 2000 ROD; however, the 1992 MEGs remain the only values that have been referenced in State regulations, and therefore they remain as ARARs whereas the updates are TBCs.

crawl space. It is also located about 600 feet south of the farthest southerly extraction well, and that well is meeting the groundwater performance standards. Third, off-site groundwater sampling of both monitoring and residential wells has shown no evidence that site contaminants have migrated underneath the Dennys River – the river functions as a groundwater discharge zone with groundwater (and if present, vapors) flowing toward it from both east and west. Consequently, a vapor intrusion pathway is not considered a viable pathway for the Site.

Land use around at the Site has not changed appreciably since the 2000 ROD, and is not expected to significantly change. EPA will continue to inspect the area on a regular basis to assure that should there be any changes in the land use that it will not affect the plume configuration.

Changes in Toxicity and Other Contaminant Characteristics. Since the ROD there have been changes in the oral cancer slope and the dermal cancer slope for PCE and TCE. These changes in toxicity do not affect the protectiveness of the remedy as the extraction system prevents offsite migration and Maine DEP, through its ownership of the properties north of Route 191, prevents the use of the contaminated groundwater onsite.

Changes in Risk Assessment Methods. The human health risks discussed in the ROD have been eliminated by the implementation of the groundwater extraction and treatment system and institutional controls. Groundwater monitoring has demonstrated that the contaminant plume has not migrated offsite. There are no changes that affect the protectiveness of the remedy. Since the cleanup levels for groundwater are the MCLs or MEGs rather than site-specific risk-based concentrations, changes in risk assessment methods would not affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs. The first two RAOs have been met. The third one has not been met, although it is close to being met in the southern plume. Site-wide monitoring is still ongoing, and overall, groundwater contaminant levels as measured by the median and mean, have been decreasing within both plumes. Because of the likely presence of residual DNAPL within the core of the northern plume, it is difficult to project when the performance standards will be attained throughout the entire northern plume. PCE remains the only VOC above its performance standard in the southern plume. Its statistical measurements for the past three years fluctuate just above its standard, indicating that the PCE may be approaching an asymptotic level. Consequently, it may be several more years before the PCE standard is met and sustained throughout the entire southern plume.

7.3 Question C: Has Any Other Information Come To Light That Could Call Into Question The Protectiveness Of The Remedy?

Since the 2000 ROD, new information has come to light regarding the chemical compound 1,4-dioxane. This compound is used as both a solvent and a stabilizer for other solvents; it has been found associated with 1,1,1-TCA at many other Superfund sites. EPA has classified 1,4-dioxane as a Probable Human Carcinogen, recognizing the possibility that repeated exposure may increase the risk of developing cancer if contact rates are too high and occur for too long. A number of states have set drinking water guidelines ranging from 3 to 85 μg/L; no federal drinking water standard has been set. EPA Region 9's Preliminary Remediation Goal (PRG) for drinking water ingestion is 6.1 μg/L. This is a risk-based number for an exposure duration of 30 years. EPA's

database has no information to evaluate risk via inhalation or dermal contact. Sampling results from the northern plume had a few detections in 2003 above the laboratory detection limit of 100 μg/L. Sampling results did not detect 1,4-dioxane beyond the northern portion of the Site and therefore, this compound is not considered to affect the protectiveness of the remedy.

No other information has been discovered that would call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

Based on the data reviewed, observations from the site inspection, and interviews, the remedy is functioning as intended by the ROD. The groundwater extraction and treatment system has been constructed, maintained and operated in order to meet the intended goal of preventing off-site migration. While final resolution of the institutional controls has not been achieved, Maine DEP holds the titles to the northern properties and the contaminant levels in the southern plume have been significantly diminished, reducing the need for institutional controls for the southern property. The groundwater monitoring has demonstrated that contaminants are not migrating offsite. Therefore, the remedy is functioning as designed and remains protective of human health and the environment. Groundwater monitoring continues and maintenance of the extraction and treatment system and the monitoring wells is performed as necessary.

The primary ARARs for groundwater at the TI zone boundary are the MCLs and the Maine MEGs. These continue to be met offsite as well as downgradient of the extraction systems. Treatment system effluent has consistently met these standards. Groundwater contamination levels within both plumes have shown an overall decrease.

Land use at the Site and surrounding area has not changed appreciably (there are new seasonal homes upgradient of the site on the southwestern shore of Meddybemps Lake and the seasonal home being constructed on the southernmost portion of the Site south of Route 191) and is not expected to change significantly.

8.0 ISSUES

This five-year review identified one issue. Concentration levels have decreased in the southern plume following the application of sodium permanganate such that the average PCE concentrations are essentially at cleanup levels (average is 6 ppb; MCL is 5 ppb, and MEG is 3 ppb) while other VOCs are meeting their respective cleanup levels. While there has been a decrease in maximum and average PCE concentrations in the northern plume (currently at 2900 and 170 ppb, respectively), it does not appear that the northern plume will be restored in the five to ten years that the 2000 ROD projected. The likely explanation for this is that the majority of the contamination in the southern plume was in the overburden sand and gravel unit with much higher transmissivity that could be effectively addressed through extraction and in-situ oxidation whereas the majority of the northern plume is located in the bedrock unit with its correspondingly lower transmissivity. It is believed that there is residual PCE adsorbed in low-flow fractures and on the bedrock matrix that will act as a long-term source. Unless the transmissivity of the bedrock unit is improved, then it is unlikely that the northern plume will be restored in the near future, and the timeframe to achieve the cleanup may be several decades.

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Evaluation of a program to blast the bedrock in the northern plume to enhance transmissivity was begun during the timeframe of EPA's last contract. With the termination of that contract, EPA recommends that the evaluation of a bedrock blasting program be resumed under the new contract that is expected to be in place by the end of 2006.

The groundwater extraction and treatment system has now been operating for six years. As a result, there is now sufficient maintenance data that could be assessed in a standard practice of a value engineering study perspective with a view toward optimizing the operation of the system. EPA recommends that an optimization study be performed under the new contract to ensure that the system is efficient as practicable.

Comprehensive groundwater sampling has been performed since 2001 with typically over 100 wells being sampled semi-annually for VOCs and metals.EPA recommends that the monitoring program be reviewed with the goal being to optimize the monitoring efforts, including the surface water and sediment sampling. This is a routine practice carried out when sufficient site data is collected.

The final institutional controls for the northern properties have not yet been implemented; the imposition of these restrictions may have to wait for the transfer of the properties by the State to a third party. The inter-agency discussions should be resumed to reach a final resolution.

Contamination levels beneath the southern property have decreased below their respective standards with the exception of PCE, and its concentrations are just above the MEG. It is anticipated that unlimited use and unrestricted exposure will soon be allowed. As noted, the 2000 ROD stated that institutional controls needed to be placed on this property only until the groundwater met the cleanup levels. Consequently, the need for establishing institutional controls on this property has greatly been diminished, though EPA will continue to monitor the progress of the PCE levels toward its cleanup goal and will sample the new seasonal drinking water well installed on the southern portion of the property.

These recommendations should be accomplished as soon as practicable within the next fiscal year, with involvement of EPA and Maine DEP. The table below provides a summary of the recommendations, including the timeframe for their implementation.

Table 6: Issues and Recommendations

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Bedrock Blasting evaluation	Agencies to review all data with contractor and decide whether to implement blasting and additional in-situ chemical oxidation	EPA	EPA/State	Prior to summer 2007	N	N
	Optimize O&M of groundwater treatment and extraction system	EPA	EPA/State	In FY 2007	N	N
	Optimize long-term monitoring	EPA	EPA/State	In FY 2007	N	N
	Resolution of institutional controls	EPA	EPA/State	In FY 2007	N	N

10.0 PROTECTIVENESS STATEMENTS

Because the remedial actions implemented for the Site are protective, the Site is protective of human health and the environment. The groundwater extraction and treatment system is preventing off-site migration of contaminants from the northern plume and has reduced concentration levels in the southern plume to cleanup levels. The properties north of Route 191 are owned by Maine DEP assuring that the groundwater will not be used prior to its attaining the cleanup levels and thereby ensuring the Site remains protective of human health. Concentration levels in surface water, sediment, and biota sampling data have shown reductions in concentrations of contaminants of concern from the pre-ROD levels. As the 2000 ROD determined that those levels did not pose an unacceptable risk, the current data confirm that the Site is not posing an unacceptable risk to ecological receptors. Sampling results of monitoring wells and residential water wells have demonstrated that there is no off-site contaminant migration to the east of the Dennys River. The monitoring program will continue to ensure that migration from the Site does not occur.

11.0 NEXT REVIEW

The next five-year review for the Eastern Surplus Company Superfund Site will be conducted in 2011. This review is required since hazardous contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

TABLES

EASTERN SURPLUS COMPANY SUPERFUND SITE
FIVE-YEAR REVIEW
September 2006

(Tables 1, 4, 5, and 6 embedded in text)

FIVE-YEAR REVIEW TABLE 2
SUMMARY OF NORTHERN PLUME GROUNDWATER DATA, PRE-2000 ROD
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemcial	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
NORTHERN PLUME - OVERBURDEN AQUIFER					
VOCs					
1,2-Dichloroethene (total)	UG/L	5 / 6	14	3 J	26
2-Butanone	UG/L	1 / 8	5	5 J	5 J
Acetone	UG/L	4 / 8	14	1 JB	34
Chloromethane	UG/L	1 / 8	1	1 J	1 J
cis-1,2-Dichloroethene	UG/L	2 / 2	0.75	0.6 J	0.9 J
Methylene Chloride	UG/L	4 / 8	2.1	0.5 JB	4 JB
Tetrachloroethene	UG/L	8 / 8	560	29	2000 *
Trichloroethene	UG/L	8 / 8	6.9	0.5 J	17
SVOCs					
bis(2-Ethylhexyl)phthalate	UG/L	1 / 2	1	1 J	1 J
Butylbenzylphthalate	UG/L	1 / 2	1	1 J	1 J
Di-n-Butylphthalate	UG/L	1 / 2	8	8 J	8 J
PCBs					
Sum of PCB Homologs	NG/L	1 / 1	20	20.09	20.09
METALS					
Aluminum	UG/L	4 / 6	294	21.9 B	787
Arsenic	UG/L	2 / 6	9	8.7 B	9.3 B
Barium	UG/L	3 / 6	7.9	4.1 B	10.7
Calcium	UG/L	6 / 6	6270	4640	7940
Chromium	UG/L	2 / 6	10.2	9.2 B	11.2
Cobalt	UG/L	5 / 6	5.5	3.5 B	8.1
Copper	UG/L	2 / 6	2.9	2.7 B	3 B
Iron	UG/L	5 / 6	796	84.3 B	1160
Lead	UG/L	1 / 6	5.4	5.4	5.4
Magnesium	UG/L	6 / 6	1490	971	1940 B
Manganese	UG/L	6 / 6	852	60.9	1510
Nickel	UG/L	3 / 6	8.7	2.7 B	12.8 B
Potassium	UG/L	4 / 6	1120	803 B	1420 B
Selenium	UG/L	1 / 6	6.1	6.1	6.1
Sodium	UG/L	6 / 6	4340	2810	5900
Zinc	UG/L	2 / 6	31.6	27.6	35.6
NORTHERN PLUME - BEDROCK AQUIFER					
VOCs					
1,1,2,2-Tetrachloroethane	UG/L	3 / 105	47	6.1 J	110 J
1,1,2-Trichloroethane	UG/L	1 / 105	11	11	11
1,1-Dichloroethane	UG/L	1 / 125	9	9 J	9 J
1,1-Dichloroethene	UG/L	2 / 125	1.5	1 J	2 J
1,2,3-Trichlorobenzene	UG/L	1 / 1	0.6	0.6 J	0.6 J
1,2-Dichloroethane	UG/L	1 / 125	3.4	3.4 J	3.4 J
1,2-Dichloroethene (total)	UG/L	34 / 87	45	0.86 J	380 *
1,2-Dichloropropane	UG/L	1 / 105	1.6	1.6 J	1.6 J
2-Butanone	UG/L	2 / 105	44	31 J	58
2-Hexanone	UG/L	2 / 104	36	2 J	71 J
4-Methyl-2-Pentanone	UG/L	5 / 105	11	0.64 J	49 J
Acetone	UG/L	34 / 105	66	1 JB	470 J
Benzene	UG/L	5 / 125	30	0.17 J	96
Bromodichloromethane	UG/L	1 / 105	0.99	0.99 J	0.99 J
Bromoform	UG/L	1 / 105	2.6	2.6 J	2.6 J
Carbon Disulfide	UG/L	2 / 105	3.5	2 J	5 J
Chlorobenzene	UG/L	1 / 125	3.5	3.5 J	3.5 J

FIVE-YEAR REVIEW TABLE 2 (cont)
SUMMARY OF NORTHERN PLUME GROUNDWATER DATA, PRE-2000 ROD
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemcial	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
NORTHERN PLUME - BEDROCK AQUIFER					
VOCs (cont.)					
Chloroform	UG/L	6 / 105	0.69	0.085 J	3 J
Chloromethane	UG/L	1 / 105	0.091	0.091 J	0.091 J
cis-1,2-Dichloroethene	UG/L	8 / 37	7	1 J	18 J
cis-1,3-Dichloropropene	UG/L	1 / 105	2.2	2.2 J	2.2 J
Dibromochloromethane	UG/L	1 / 105	6.9	6.9 J	6.9 J
Ethylbenzene	UG/L	8 / 125	8.9	0.05 J	34 J
Methyl tert-Butyl Ether	UG/L	1 / 18	1	1 J	1 J
Methylene Chloride	UG/L	28 / 125	36	0.11 J	440
Tetrachloroethene	UG/L	115 / 125	1200	0.4 J	12000
Toluene	UG/L	46 / 125	40	0.075 J	330
Total Xylenes	UG/L	5 / 125	55	1 JB	140
trans-1,3-Dichloropropene	UG/L	1 / 105	1.9	1.9 J	1.9 J
Trichloroethene	UG/L	82 / 124	25	0.18 J	380
Vinyl Chloride	UG/L	1 / 110	0.9	0.9 J	0.9 J
SVOCs					
2,4-Dinitrotoluene	UG/L	1 / 18	7	7 J	7 J
bis(2-Ethylhexyl)phthalate	UG/L	5 / 18	3	1 J	5 J
Butylbenzylphthalate	UG/L	2 / 18	2	2 J	2 J
Di-n-Butylphthalate	UG/L	1 / 18	3	3 J	3 J
PCBs					
Sum of PCB Homologs	NG/L	1 / 10	7.6	7.6	7.6
PEST					
Aldrin	UG/L	1 / 8	0.0024	0.0024 J	0.0024 J
METALS					
Aluminum	UG/L	52 / 56	542	6.3 B	11600
Antimony	UG/L	5 / 55	8.2	1.5 B	30
Arsenic	UG/L	17 / 56	5.6	2.4 B	12.7
Barium	UG/L	41 / 55	24.6	1.4 J	228
Beryllium	UG/L	9 / 55	0.38	0.24 B	0.72 B
Cadmium	UG/L	6 / 55	1	0.33 B	1.8
Calcium	UG/L	56 / 56	15200	4650 B	40500
Chromium	UG/L	32 / 55	7	0.75 B	61.3
Cobalt	UG/L	37 / 56	4.7	0.59 B	16.3
Copper	UG/L	38 / 55	4.6	0.95 B	34
Iron	UG/L	89 / 92	3630	4 B	67800 N
Lead	UG/L	32 / 56	5	1	10.7
Magnesium	UG/L	56 / 56	3660	1360 B	7210
Manganese	UG/L	92 / 92	430	1.6 B	2820 J
Mercury	UG/L	8 / 55	0.1	0.1 B, BN	0.11 B
Nickel	UG/L	50 / 55	8.5	0.83 B	56.5
Potassium	UG/L	55 / 56	1140	315 B	5640
Selenium	UG/L	3 / 55	4.1	2.6 B	6.4
Silver	UG/L	3 / 55	0.86	0.62 B	1.3 B
Sodium	UG/L	56 / 56	8040	3250 B	30600
Vanadium	UG/L	19 / 55	2.3	0.61 B	7.1 B
Zinc	UG/L	46 / 56	229	1.3 B	2230

Notes:

1. Frequency of detects represent number of positive detects out of total number of non-rejected, analyzed results.
2. Statistical summary data for sampling conducted between 1996 through 2000 under Remedial Investigation and NTCRA

FIVE-YEAR REVIEW TABLE 3
SUMMARY OF SOUTHERN PLUME GROUNDWATER DATA, PRE-2000 ROD
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
SOUTHERN PLUME - OVERBURDEN AQUIFER					
VOCs					
Acetone	UG/L	13 / 35	18	3 J	46
Methylene Chloride	UG/L	6 / 35	6.2	1 J	26 J
Tetrachloroethene	UG/L	35 / 35	390	4	1100
Toluene	UG/L	4 / 35	29	1 J	110
Total Xylenes	UG/L	1 / 35	3	3 J	3 J
Trichloroethene	UG/L	5 / 35	0.54	0.4 J	1
SVOCs					
1,2,4-Trichlorobenzene	UG/L	6 / 16	8.7	5 J	16
bis(2-Ethylhexyl)phthalate	UG/L	5 / 15	50	1 J	190
Di-n-Butylphthalate	UG/L	5 / 15	3.6	0.9 J	8 J
PCBs					
Sum of PCB Homologs	NG/L	9 / 11	1500	0.22	4120.6
Pest					
4,4'-DDT	UG/L	1 / 3	0.0051	0.0051 J	0.0051 J
DDT, Total	UG/L	1 / 3	0.0051	0.0051	0.0051
METALS					
Aluminum	UG/L	13 / 27	1810	10.7 B	20100
Arsenic	UG/L	5 / 27	4.4	0.8	12.3
Barium	UG/L	23 / 27	10.6	2.3	103
Beryllium	UG/L	1 / 27	0.15	0.15 B	0.15 B
Cadmium	UG/L	7 / 27	3.5	0.43 B	15.6
Calcium	UG/L	25 / 27	10300	6830	20400 J
Chromium	UG/L	12 / 27	20	1.1	91.8
Cobalt	UG/L	15 / 27	20.6	0.65 B	77.7
Copper	UG/L	15 / 27	10.1	0.86 B	41.8
Iron	UG/L	20 / 27	1960	16.8 B	28900 J
Lead	UG/L	8 / 27	18.2	5	90
Magnesium	UG/L	26 / 27	3620	1820 B	22700
Manganese	UG/L	27 / 27	97.1	5.1 B	787 J
Nickel	UG/L	21 / 27	20.8	1.9 B	86.4
Potassium	UG/L	22 / 27	1380	658 B	3100
Silver	UG/L	1 / 27	1.4	1.4	1.4
Sodium	UG/L	26 / 27	4660	2100 B	11600
Thallium	UG/L	1 / 27	3.8	3.8 B	3.8 B
Vanadium	UG/L	4 / 27	8.2	1 B	28.8
Zinc	UG/L	19 / 27	512	3.3 B	7680
SOUTHERN PLUME - BEDROCK AQUIFER					
VOCs					
1,1,1-Trichloroethane	UG/L	19 / 64	8	0.3 J	100 J
1,1-Dichloroethane	UG/L	9 / 64	2.5	0.6 J	4 J
1,1-Dichloroethene	UG/L	7 / 64	1.7	0.8 J	3 J
1,2,3-Trichlorobenzene	UG/L	1 / 14	0.6	0.6 J	0.6 J
1,2-Dichloroethene (total)	UG/L	1 / 20	1	1 J	1 J

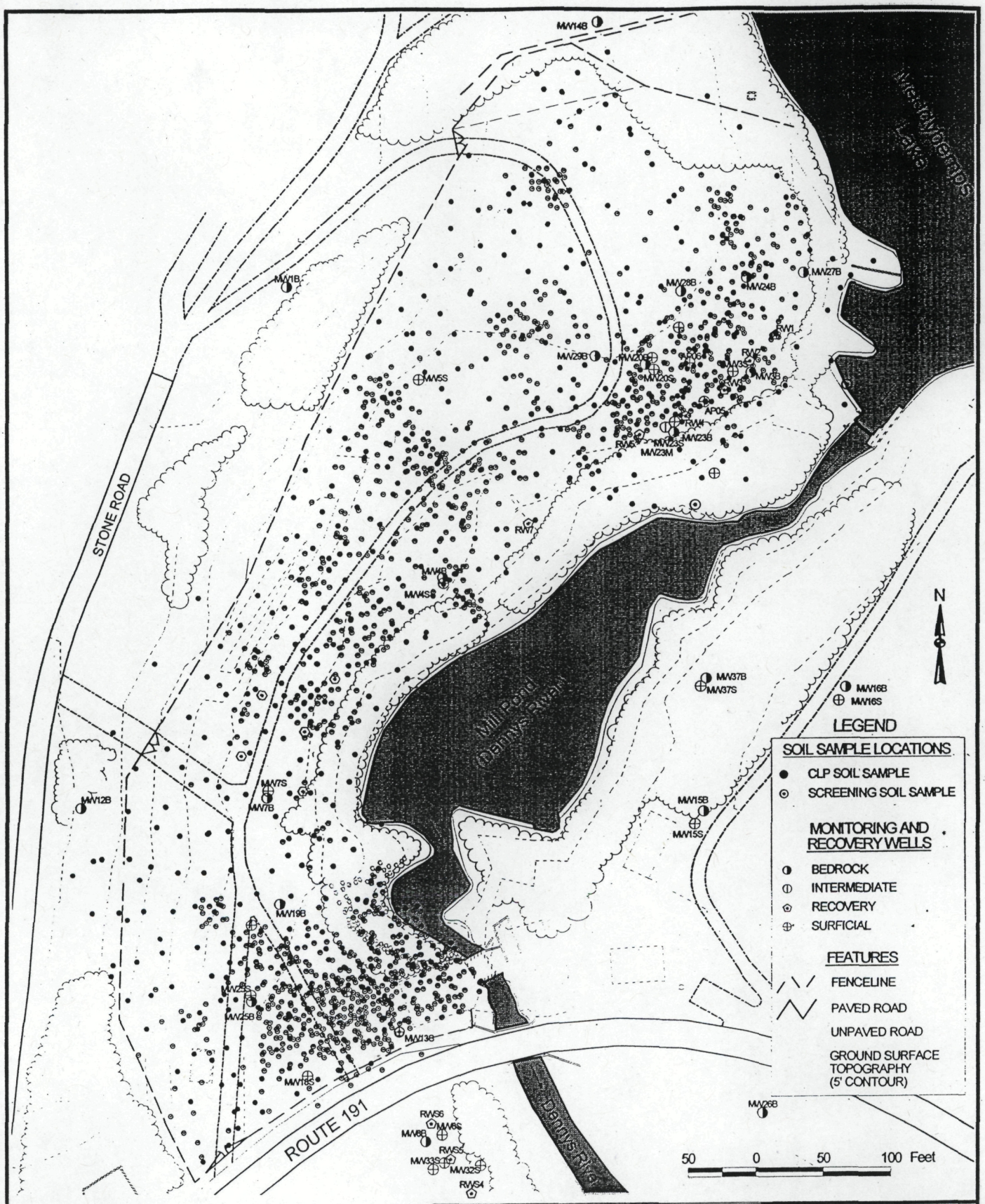
FIVE-YEAR REVIEW TABLE 3 (cont)
SUMMARY OF SOUTHERN PLUME GROUNDWATER DATA, PRE-2000 ROD
EASTERN SURPLUS COMPANY SUPERFUND SITE

Chemical	Units	Frequency of Detects	Average of Detects	Minimum Detected Value	Maximum Detected Value
SOUTHERN PLUME - BEDROCK AQUIFER					
VOCs (cont.)					
4-Methyl-2-Pentanone	UG/L	6 / 64	4.5	1 J	16
Acetone	UG/L	21 / 64	14	3 JB	120
Bromomethane	UG/L	1 / 64	4	4 JB	4 JB
cis-1,3-Dichloropropene	UG/L	1 / 64	0.3	0.3 J	0.3 J
Ethyl Ether	UG/L	2 / 11	0.55	0.5 J	0.6 J
Ethylbenzene	UG/L	1 / 64	2	2 J	2 J
Methylene Chloride	UG/L	13 / 64	3	0.5 J, JB	8 B
Tetrachloroethene	UG/L	63 / 64	130	0.8 J, JB	460 *
Toluene	UG/L	22 / 64	39	0.5 J	650 J
Total Xylenes	UG/L	1 / 61	0.4	0.4 JB	0.4 JB
Trichloroethene	UG/L	29 / 64	7.8	0.5 J	100 J
SVOCs					
1,2,4-Trichlorobenzene	UG/L	1 / 18	0.7	0.7 J	0.7 J
Butylbenzylphthalate	UG/L	1 / 15	5	5 J	5 J
Di-n-Butylphthalate	UG/L	2 / 15	6	6 J	6 J
Di-n-octylphthalate	UG/L	1 / 15	2	2 J	2 J
Phenol	UG/L	1 / 15	5	5 J	5 J
Pest					
Aldrin	UG/L	1 / 3	0.00092	0.00092 J	0.00092 J
METALS					
Aluminum	UG/L	20 / 33	1560	20.9 B	14100
Antimony	UG/L	1 / 33	2.3	2.3 B	2.3 B
Arsenic	UG/L	12 / 33	7.5	3 B	16.5
Barium	UG/L	18 / 33	7.7	1.5	50.6
Beryllium	UG/L	4 / 33	0.55	0.11 B	1.4
Cadmium	UG/L	6 / 33	1	0.63 B	1.6 J
Calcium	UG/L	33 / 33	11800	2780 B	26200
Chromium	UG/L	17 / 33	7.3	0.56 B	34.4
Cobalt	UG/L	14 / 33	5.9	0.82 B	20.6
Copper	UG/L	18 / 33	9.3	1 B	48.1
Iron	UG/L	31 / 33	2310	15 B	13700 J
Lead	UG/L	15 / 33	7.9	1.2 J	23.1
Magnesium	UG/L	33 / 33	6000	639 B	21900
Manganese	UG/L	32 / 33	57	0.6 B	277 J
Nickel	UG/L	16 / 33	12.1	0.76 B	55.5
Potassium	UG/L	29 / 33	1600	1200	2540 B
Selenium	UG/L	5 / 33	4.2	2.2 B	7.7
Silver	UG/L	4 / 33	3	0.66 B	7.2 B
Sodium	UG/L	33 / 33	14400	1870	36800
Thallium	UG/L	1 / 33	4	4 B	4 B
Vanadium	UG/L	13 / 33	3.1	0.76 B	9.9
Zinc	UG/L	20 / 33	659	3 B	4250

Notes:
1. Frequency of detects represent number of positive detects out of total number of non-rejected, analyzed results.
2. Statistical summary data for sampling conducted between 1996 through 2000 under RI and NTCRA.

FIGURES

EASTERN SURPLUS COMPANY SUPERFUND SITE
FIVE-YEAR REVIEW
September 2006



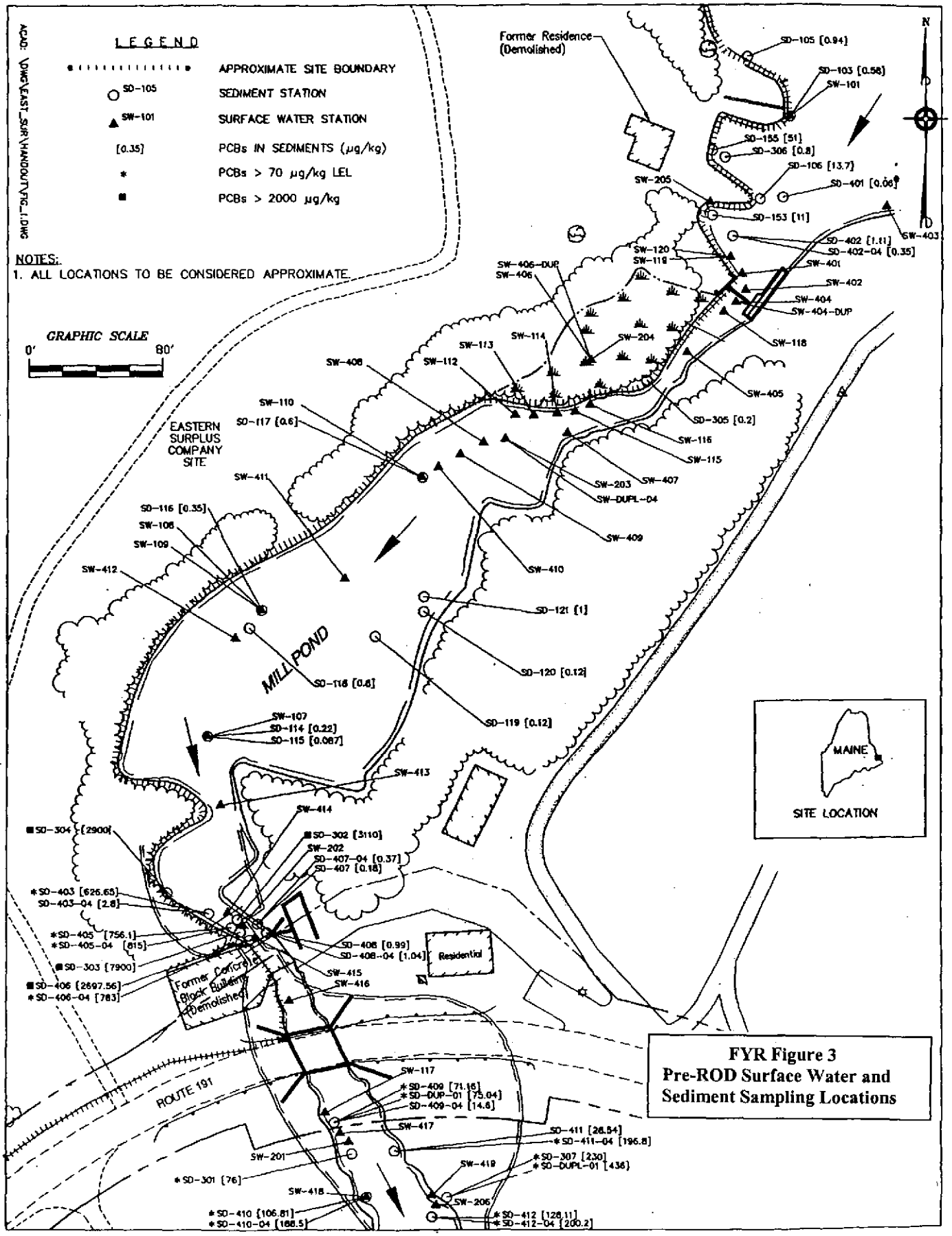
NOTES:
1. All locations to be considered approximate
2. Plan not to be used for design
3. Sample locations include:
1996 - 1997 Roy F. Weston, 1997 Brown & Root, and 1998-1999 Tetra Tech NUS investigations

FYR Figure 2

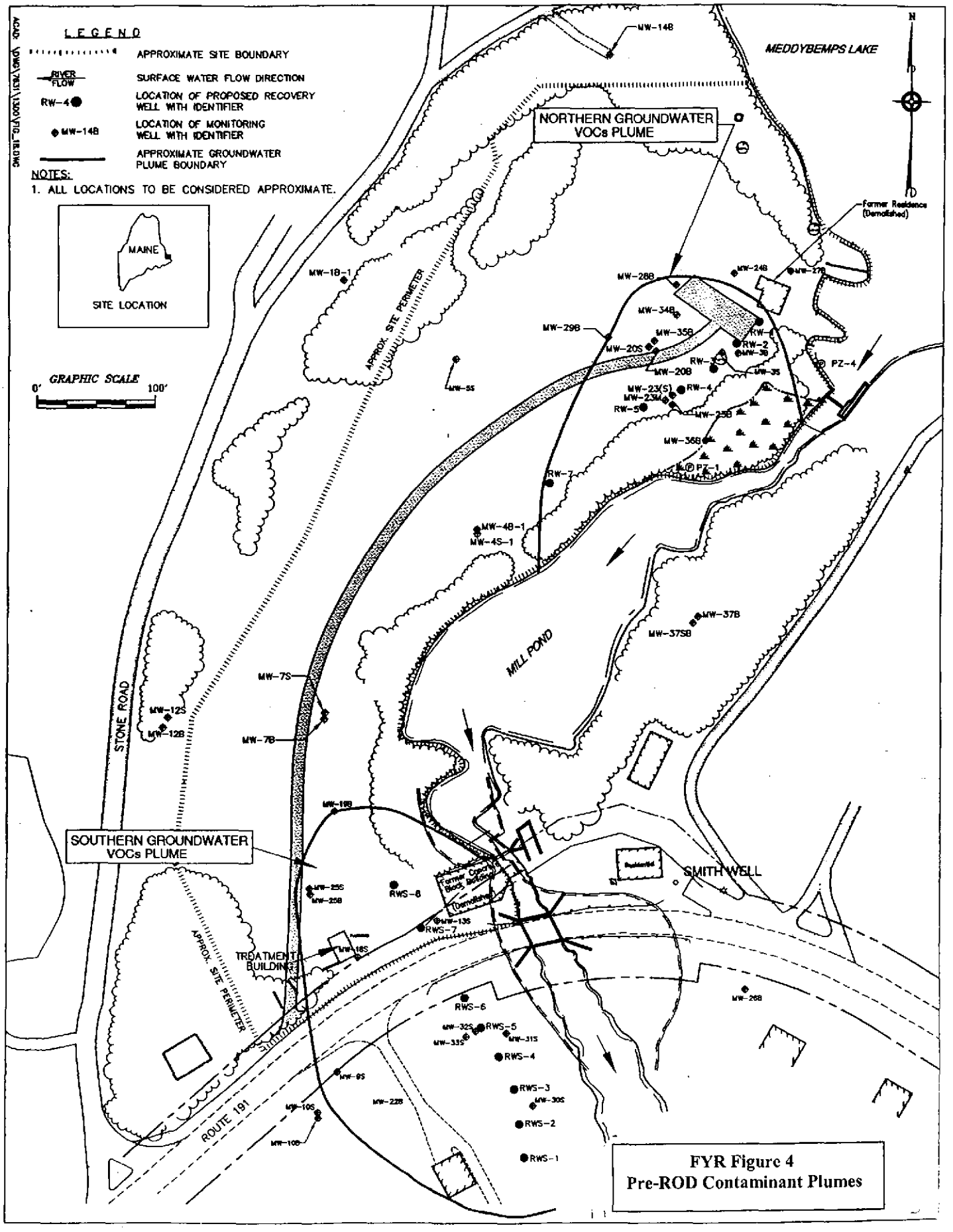
Pre-ROD Soil Sampling Locations

EASTERN SURPLUS CO. NPL SITE

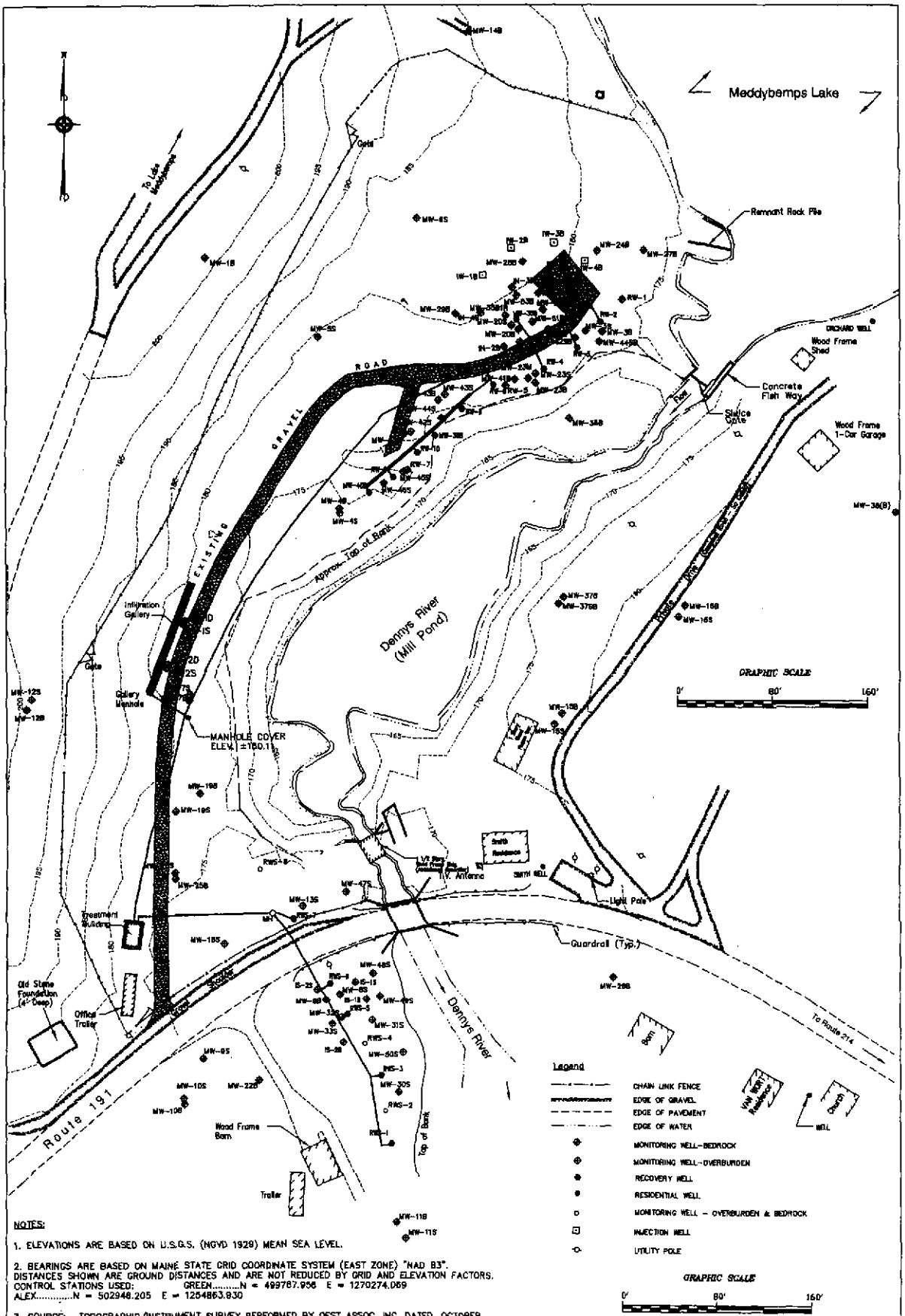
EPA



FYR Figure 3
Pre-ROD Surface Water and Sediment Sampling Locations



FYR Figure 4
Pre-ROD Contaminant Plumes



NOTES:

1. ELEVATIONS ARE BASED ON U.S.G.S. (NGVD 1929) MEAN SEA LEVEL.

2. BEARINGS ARE BASED ON MAINE STATE GRID COORDINATE SYSTEM (EAST ZONE) "NAD 83". DISTANCES SHOWN ARE GROUND DISTANCES AND ARE NOT REDUCED BY GRID AND ELEVATION FACTORS.
CONTROL STATIONS USED: GREEN.....N = 499787.956 E = 1270274.059
ALEX.....N = 502948.205 E = 1254863.930

3. SOURCE: TOPOGRAPHIC/INSTRUMENT SURVEY PERFORMED BY OEST ASSOC. INC. DATED, OCTOBER 1995; UPDATED: JAN. 2000, APR. 2001, OCT. 2001, AND AUG. 2006.

Site Plan View with Groundwater Extraction and Treatment System

FYR Figure 5

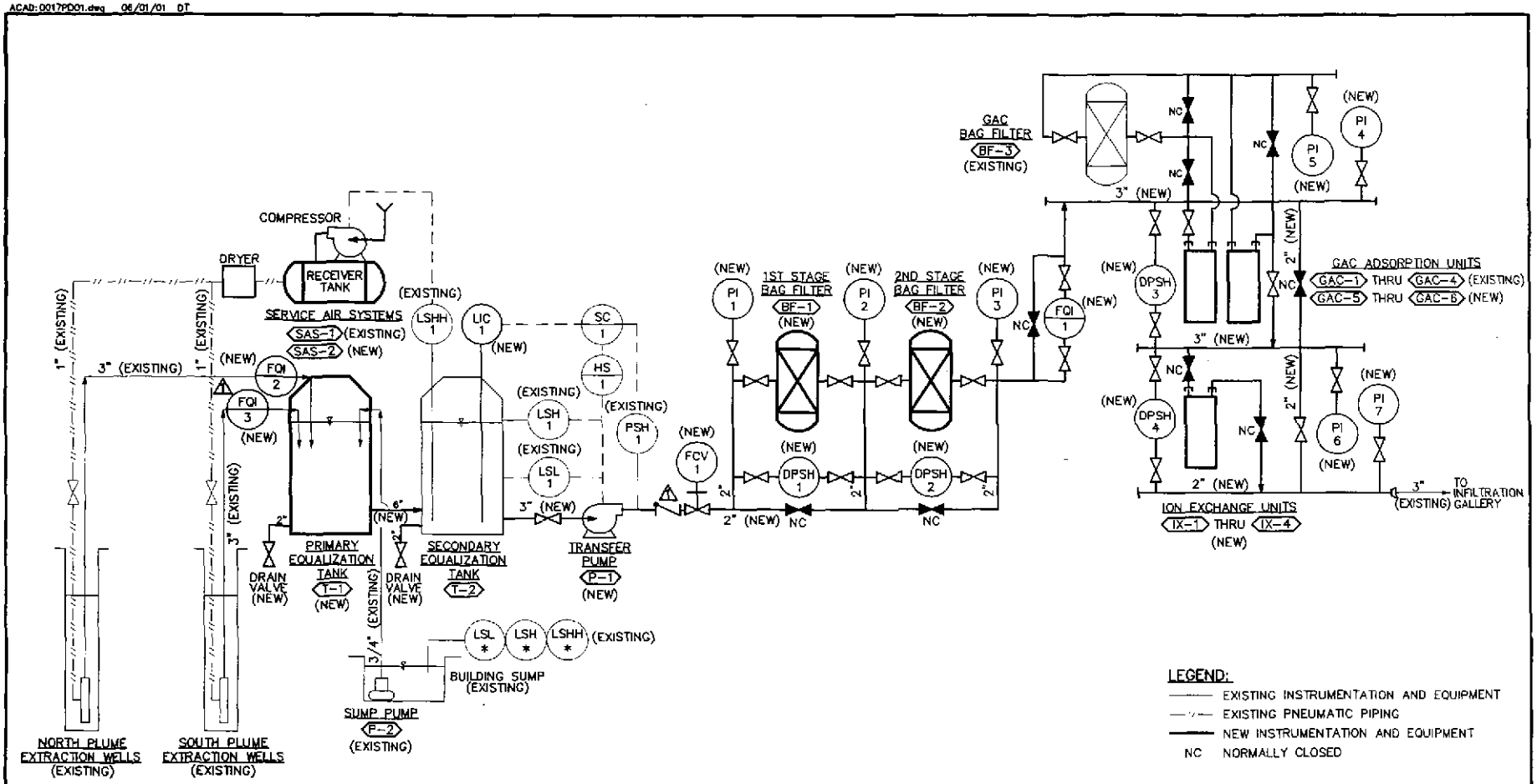
EASTERN SURPLUS COMPANY SITE

MEDDYBEMPS, MAINE

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	L. CHU	DATE:	AUGUST 24, 2006
SCALE:	AS NOTED	FILE NO.:	DWG\1477\0750\R0613780\FIG_1-2.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899

ACAD:0017PD01.dwg 06/01/01 DT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES
1	6/01/01	ADDED TWO NEW INSTRUMENTS AND MOVED A VALVE	DLT			

DRAWN BY MF DATE 4/18/01
CHECKED BY JLG DATE 4/23/01
COST/SCHED-AREA
SCALE NONE

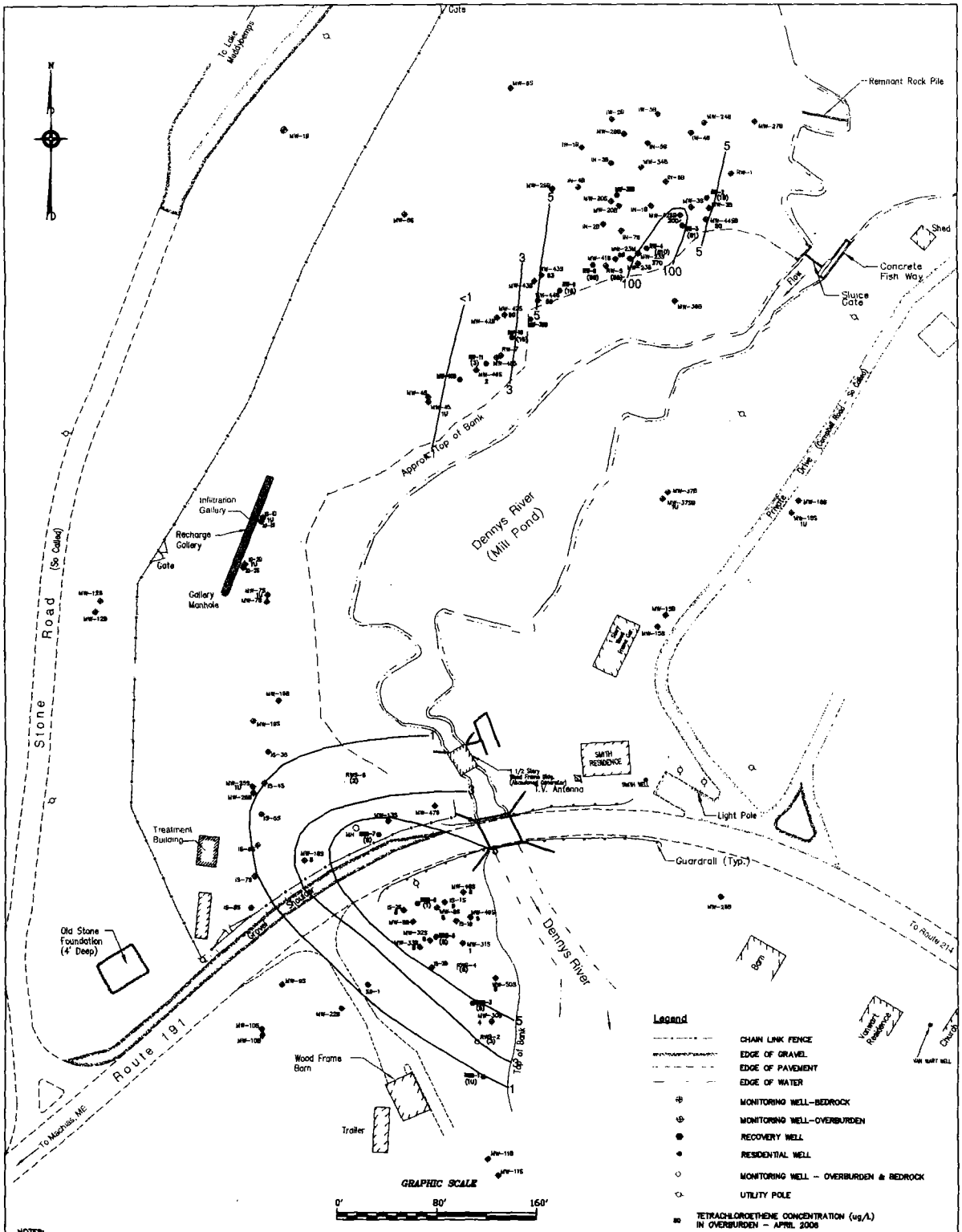
Tetra Tech NUS, Inc.

PROCESS FLOW DIAGRAM
GROUNDWATER EXTRACTION & TREATMENT SYSTEM
EASTERN SURPLUS SITE
USEPA RAC 1
MEDDYBEMPS, ME

CONTRACT NO. 0017 | OWNER NO.
APPROVED BY | DATE
APPROVED BY | DATE

FYR Figure 6 | REV. 1

FORM CADD NO. TtNUS_BHDGN - REV 0 - 1/20/98



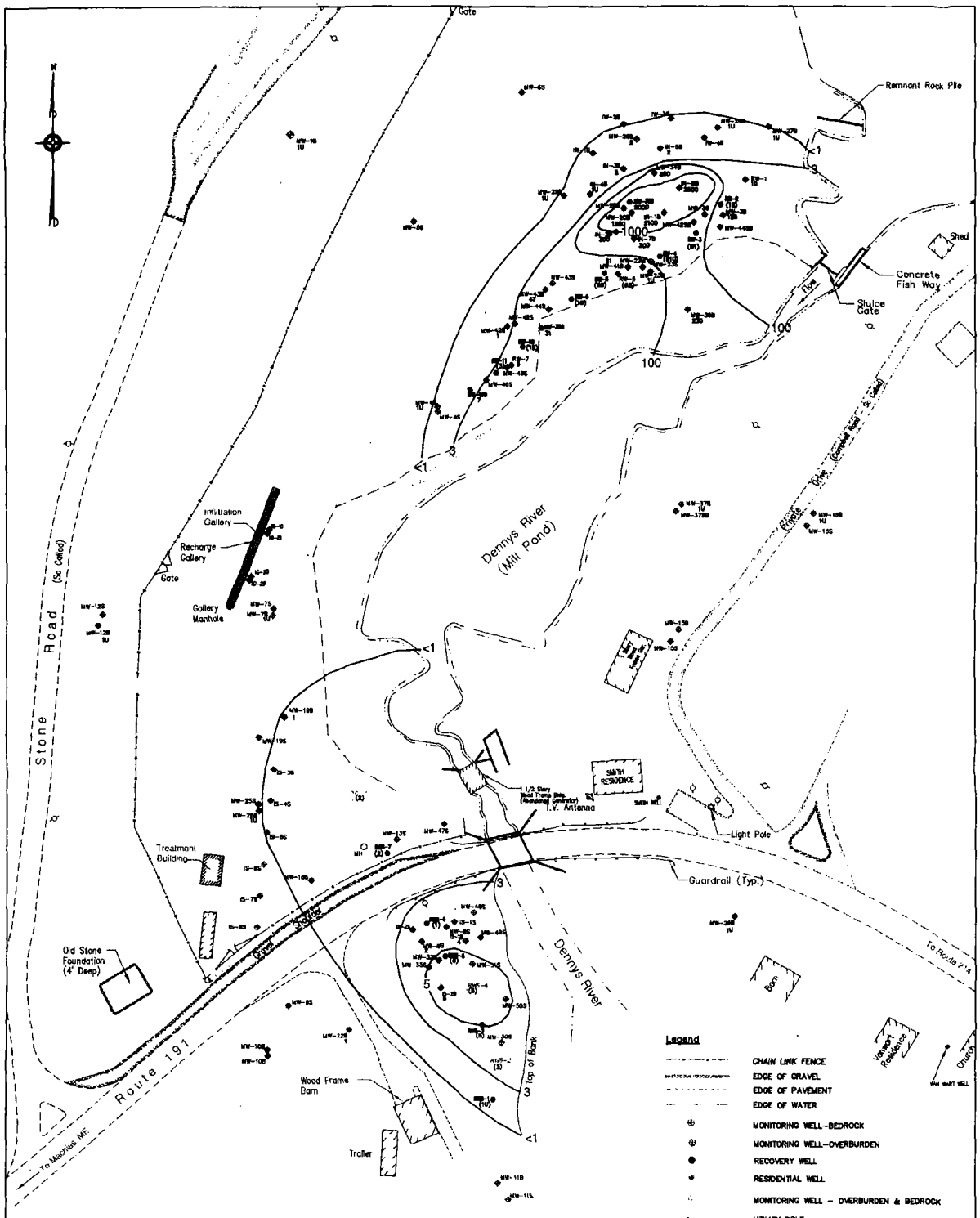
NOTES:

1. ELEVATIONS ARE BASED ON U.S.G.S. (NGVD 1929) MEAN SEA LEVEL.
2. BEARINGS ARE BASED ON MAINE STATE GRID COORDINATE SYSTEM (EAST ZONE) "NAD 83". DISTANCES SHOWN ARE GROUND DISTANCES AND ARE NOT REDUCED BY GRID AND ELEVATION FACTORS. CONTROL STATIONS USED:
   GREEN.....N = 499787.958 E = 1270274.099
3. WELLS MW-479 TO MW-505 LOCATIONS APPROXIMATE. ALL OTHER WELL LOCATIONS SURVEYED.
4. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.
5. PLAN NOT TO BE USED FOR DESIGN.

TOPOGRAPHIC/INSTRUMENT SURVEY PERFORMED BY OEST ASSOC. INC. DATED, OCTOBER 1998; UPDATED: JAN. 2000, APR. 2001, NOV. 2001

Tetrachloroethene in Overburden Aquifer, April 2006	**FYR Figure 7**
EASTERN SURPLUS CO. SITE	
MEDDYBEMPS MAINE	
DRAWN BY: D.W. MACDOUGALL	REV.: 0
CHECKED BY: A. CHIVERS	DATE: AUGUST 24, 2006
SCALE: AS NOTED	FILE NO.: \1477\0750\R10813370\FIG_3-1A.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



NOTES:

1. ELEVATIONS ARE BASED ON U.S.G.S. (NGVD 1929) MEAN SEA LEVEL.
2. BEARINGS ARE BASED ON MAINE STATE GRID COORDINATE SYSTEM (EAST ZONE) "NAD 83". DISTANCES SHOWN ARE GROUND DISTANCES AND ARE NOT REDUCED BY GRID AND ELEVATION FACTORS. CONTROL STATIONS USED: GREEN.....N = 499787.956 E = 1270274.069
3. WELLS MW-47S TO MW-50S LOCATIONS APPROXIMATE, ALL OTHER WELL LOCATIONS SURVEYED.
4. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.
5. PLAN NOT TO BE USED FOR DESIGN.

SOURCE:TOPOGRAPHIC/INSTRUMENT SURVEY PERFORMED BY OEST ASSOC. INC. DATED, OCTOBER 1998; UPDATED: JAN. 2000, APR. 2001, NOV. 2001

Tetrachloroethene in Bedrock Aquifer, April 2006

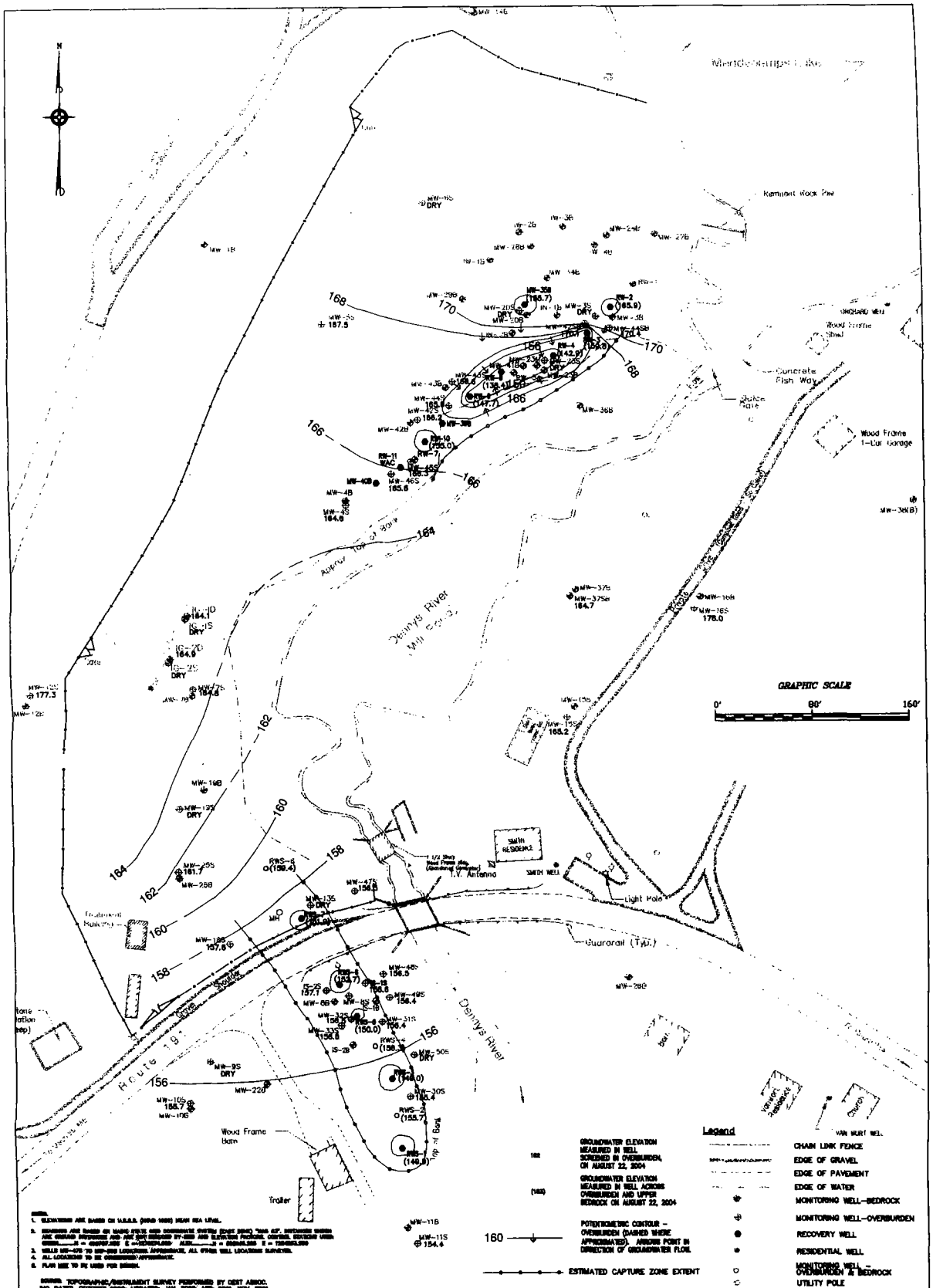
EASTERN SURPLUS CO. SITE

MEDDYBEMPS MAINE

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	A. CHIVERS	DATE:	AUGUST 24, 2006
SCALE:	AS NOTED	FILE NO.:	\1477\0750\RI061337D\FIG_3-2.DWG

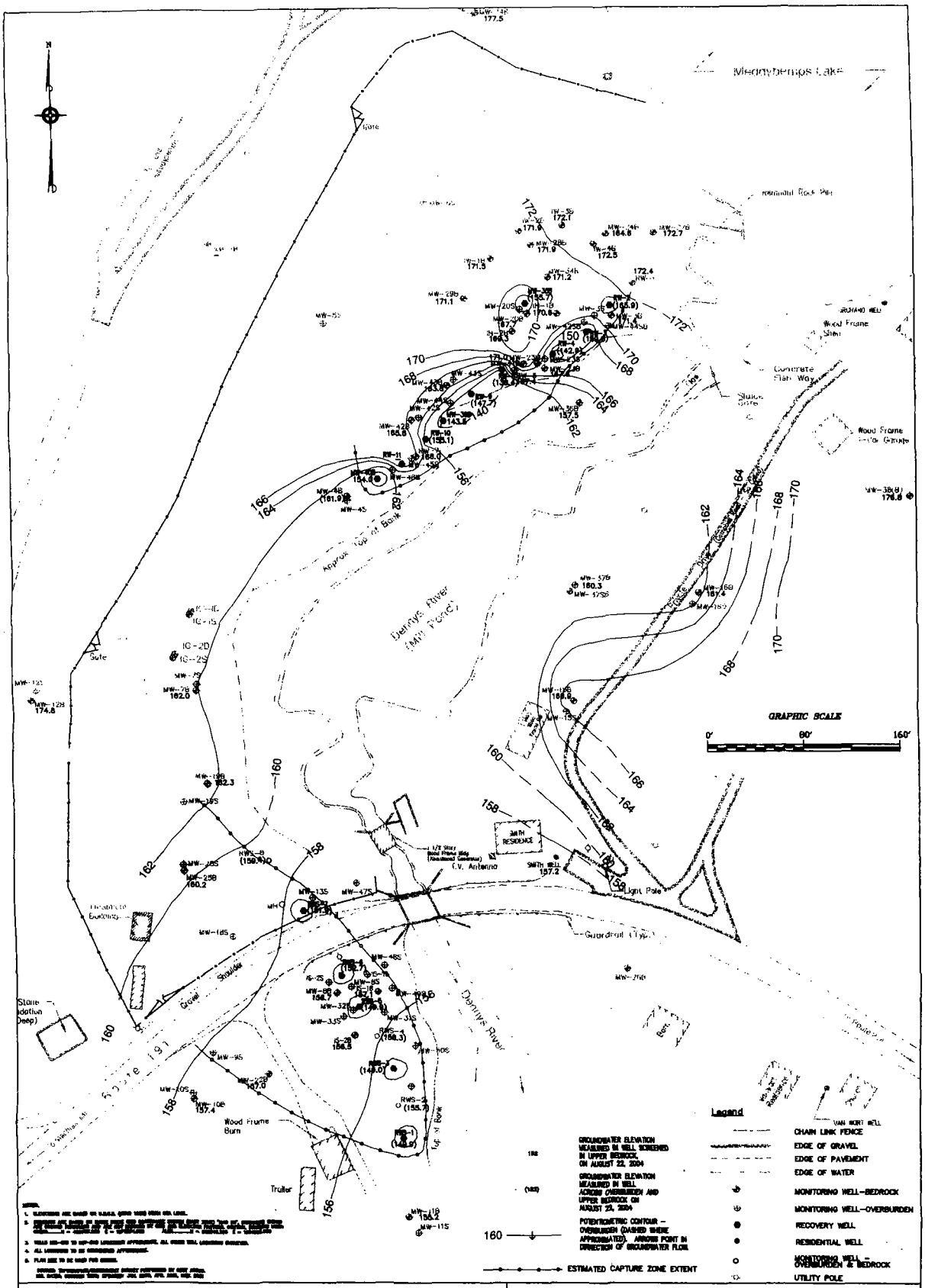
FYR Figure 8

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



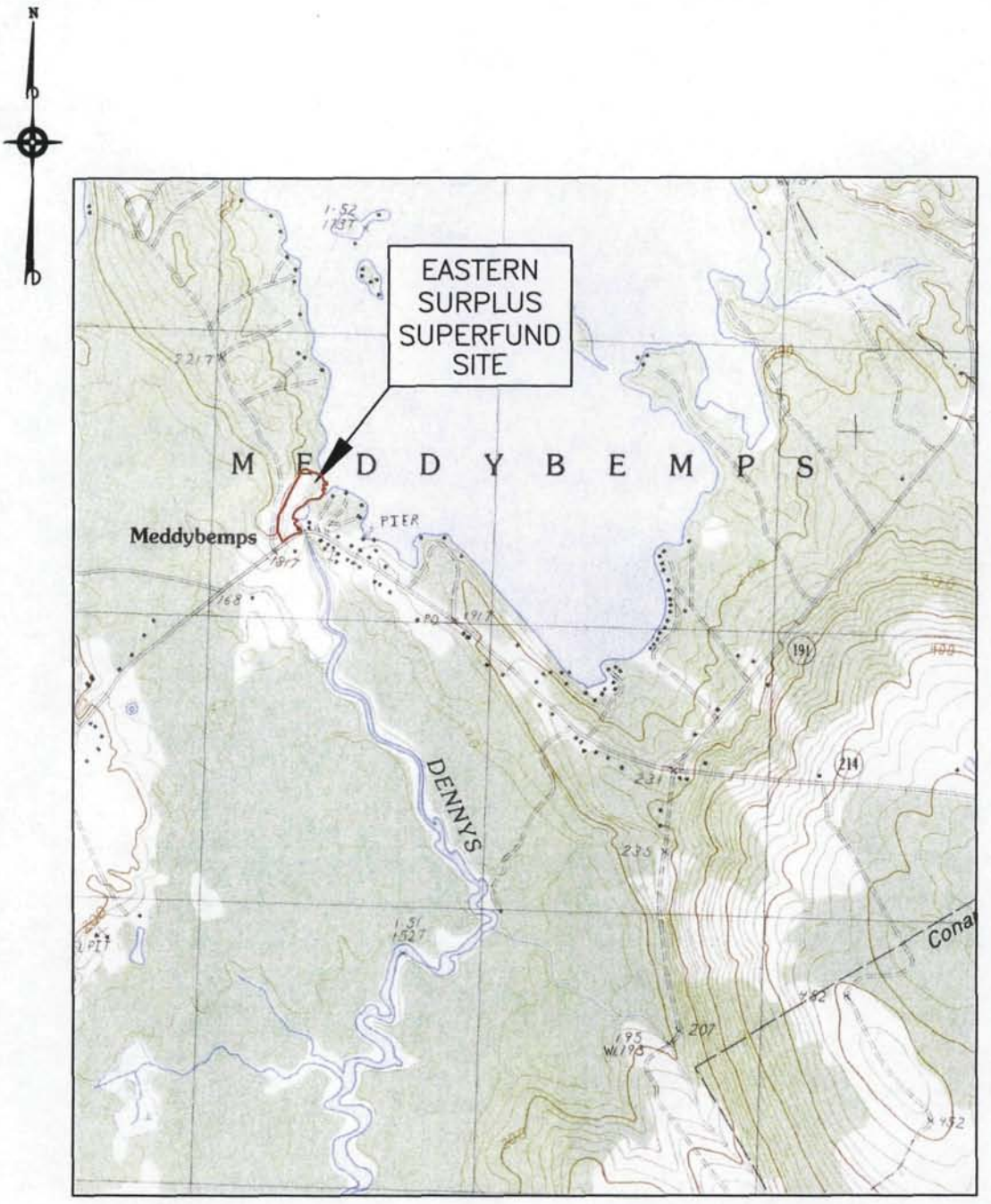
OVERBURDEN POTENTIOMETRIC SURFACE – APRIL 2004			FYR Figure 13
EASTERN SURPLUS CO. SITE			
MEDDYBEMPS MAINE			
DRAWN BY:	R.G. DEWSNAP	REV.:	0
CHECKED BY:	C. RACE	DATE:	NOVEMBER 1, 2005
SCALE:	AS SHOWN	FILE NO.: DWG\1477\0750\2004_ANNUAL_REPORT\FIG_2-5.DWG	

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



UPPER BEDROCK POTENTIOMETRIC SURFACE – APRIL 2004	FYR Figure 14
EASTERN SURPLUS CO. SITE	
MEDDYBEMPS MAINE	
DRAWN BY: R.G. DEWSNAP	REV.: 0
CHECKED BY: C. RACE	DATE: NOVEMBER 1, 2005
SCALE: AS SHOWN	FILE NO.: DWG\1477\0750\2004_ANNUAL_REPORT\FIG_2-3.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



BASEMAP: U.S.G.S. QUADRANGLE MAP: MEDDYBEMPS LAKE EAST, MAINE, PROVISIONAL EDITION, 1987

1/2 0 1/2 1 MILE

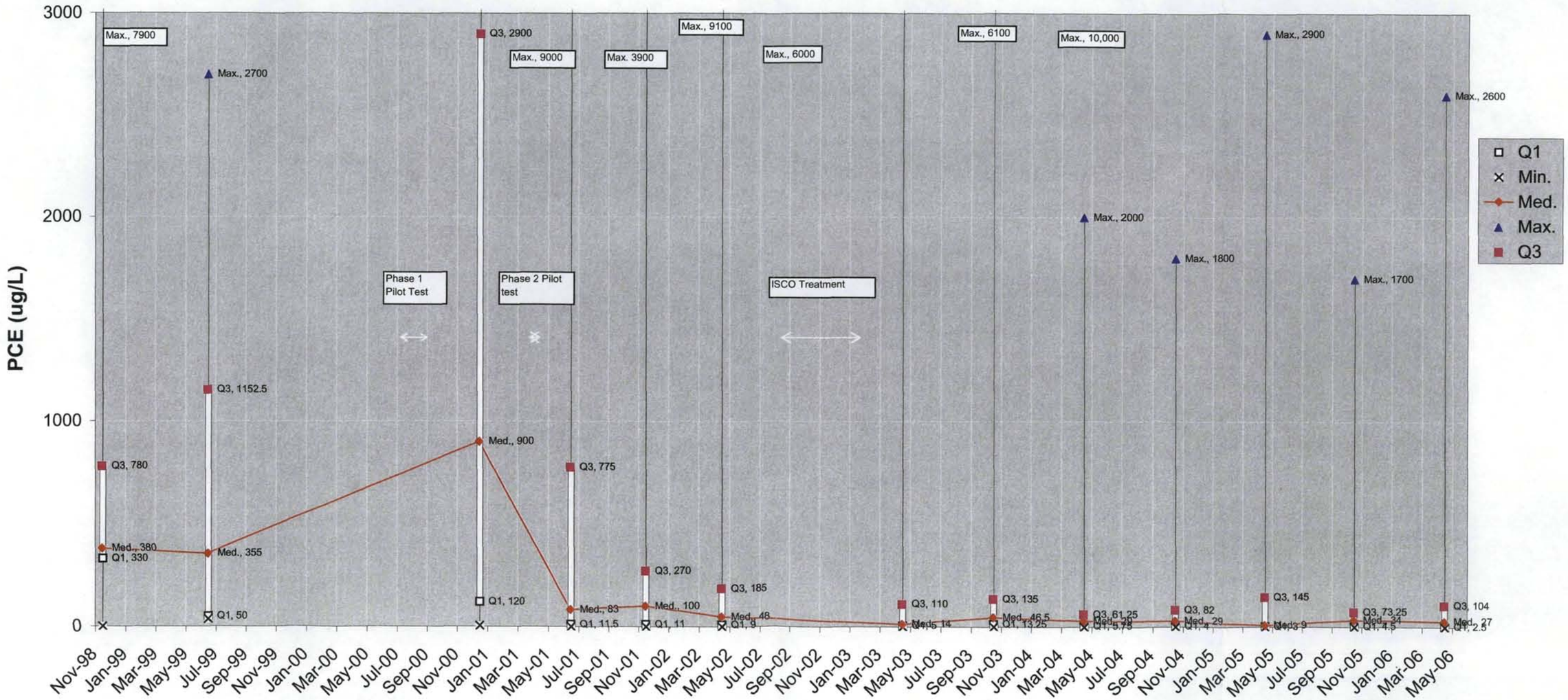
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

QUADRANGLE LOCATION

Site Location Map		FYR Figure 1	
EASTERN SURPLUS COMPANY SITE			
MEDDYBEMPS, MAINE			
DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	K. O'NEILL	DATE:	AUGUST 29, 2006
SCALE:	AS SHOWN	ACAD NAME:	\1477\0750\R0613780\FIG_1-1.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899

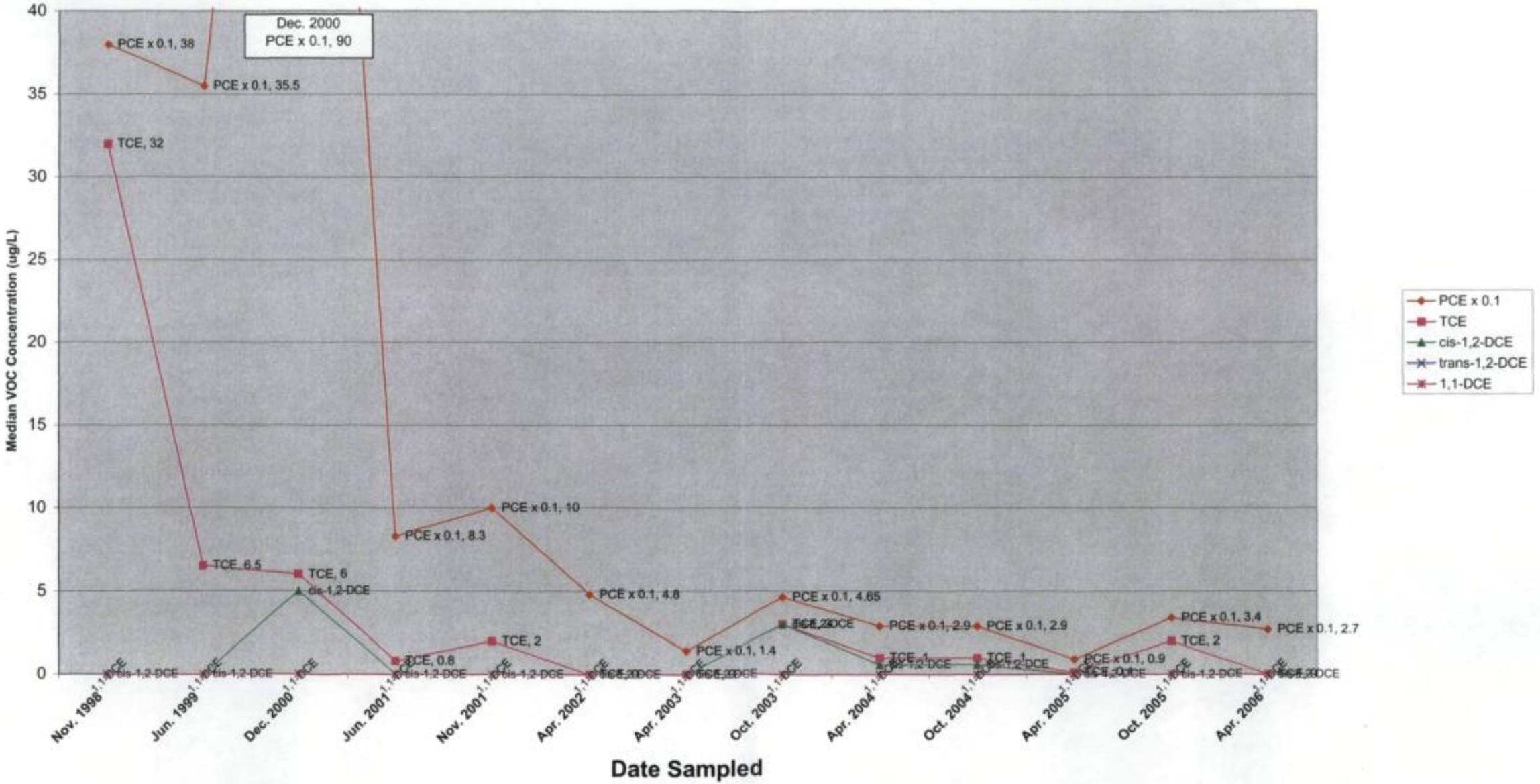
FYR FIGURE 9
PCE TRENDS IN NORTHERN BEDROCK PLUME, 1998 – 2006
DRAFT 2006 ANNUAL DATA SUMMARY
EASTERN SURPLUS COMPANY SITE
MEDDYBEMPS, MAINE



RI061378D

Tetra Tech NUS, Inc.

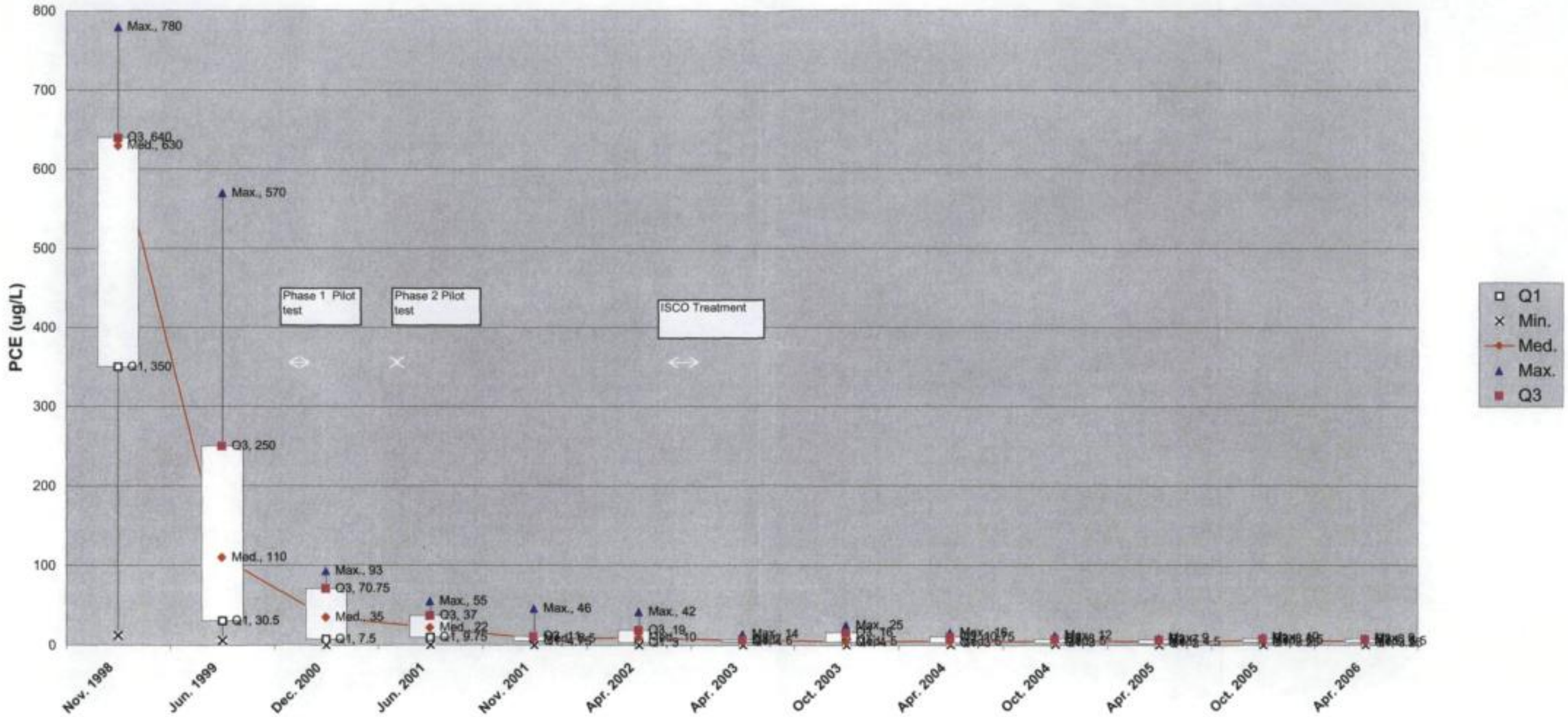
FYR FIGURE 10
MEDIAN VOCS CONCENTRATIONS IN NORTHERN PLUME , 1998 – 2006
DRAFT 2006 DATA SUMMARY
EASTERN SURPLUS COMPANY SITE
MEDDYBEMPS, MAINE



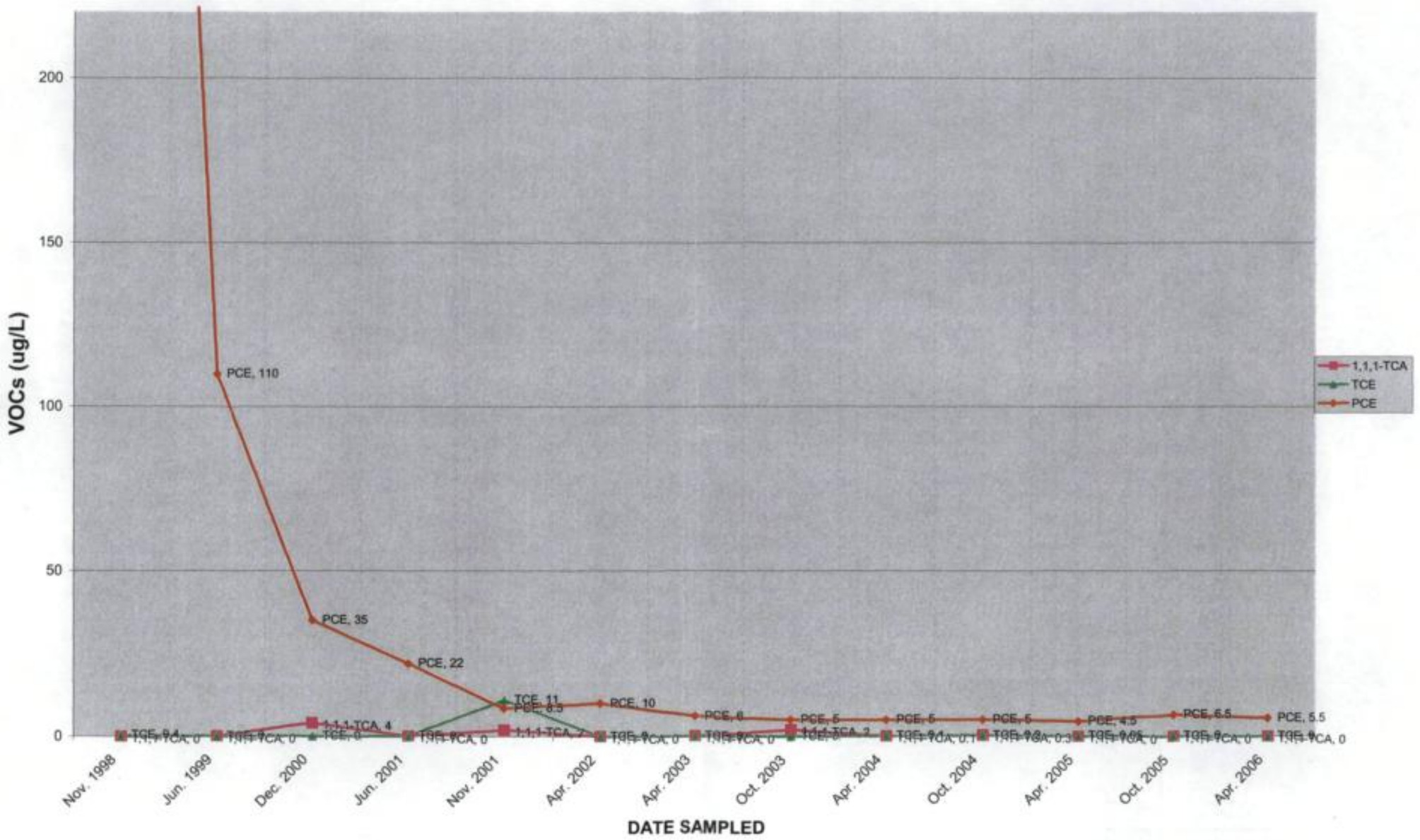
RI061378D

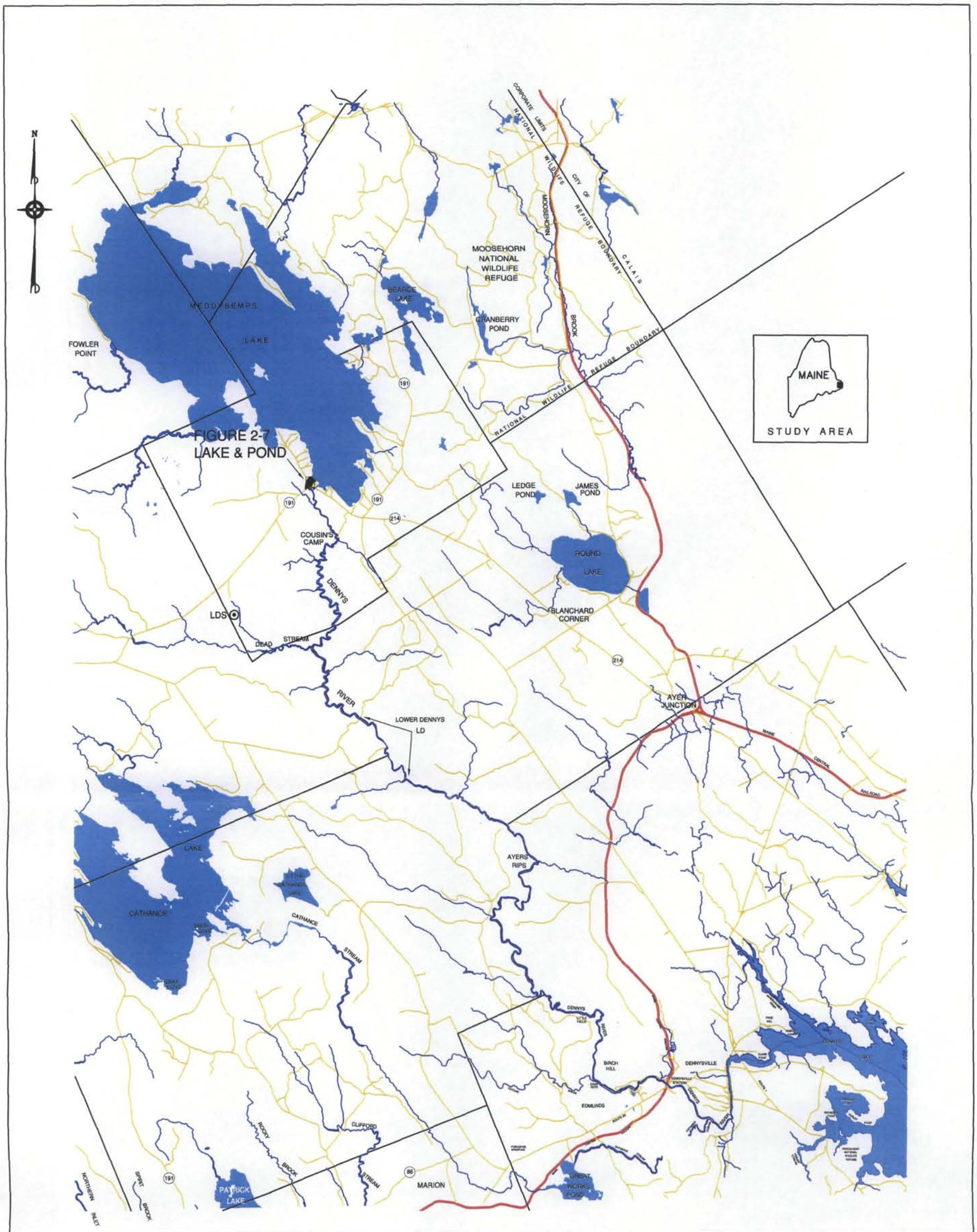
Tetra Tech NUS, Inc.

FYR FIGURE 11
PCE TRENDS IN SOUTHERN OVERBURDEN PLUME, 1998 – 2006
2006 ANNUAL DATA SUMMARY
EASTERN SURPLUS COMPANY SITE
MEDDYBEMPS, MAINE



FYR FIGURE 12
MEDIAN VOCS CONCENTRATIONS IN SOUTHERN PLUME, 1998 – 2006
DRAFT 2006 ANNUAL DATA SUMMARY
EASTERN SURPLUS COMPANY SITE
MEDDYBEMPS, MAINE





L E G E N D

- LAKES AND RIVERS
- RAILROAD
- ROAD WAY
- STREAM
- B51⊙ SEDIMENT/SURFACE WATER SAMPLING STATION

GRAPHIC SCALE

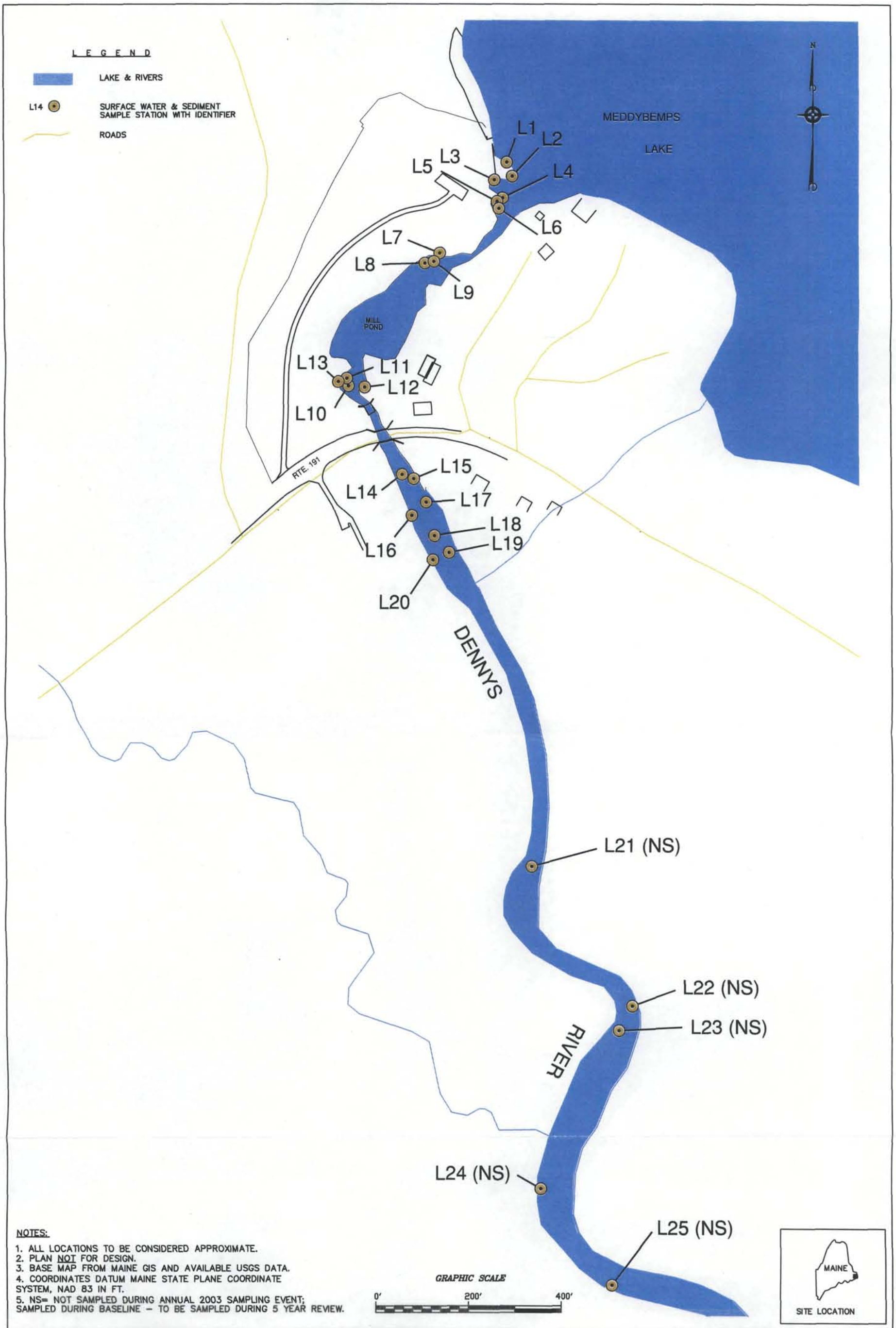
0′ 8000′ 1600′

NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.
2. PLAN NOT TO BE USED FOR DESIGN.
3. BASE MAP FROM MAINE GIS AND AVAILABLE USGS DATA.

SURFACE WATER/SEDIMENT SAMPLING LOCATIONS			FYR Figure 15
EASTERN SURPLUS COMPANY SITE			
MEDDYBEMPS, MAINE			
DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	L. CHU	DATE:	NOVEMBER 1, 2005
SCALE:	AS NOTED	FILE NO.:	DWG\1477\0750\2004_ANNUAL_REPORT\FIG_2-6.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



Surface Water and Sediment Sampling Locations, Lake and Upper Dennys River

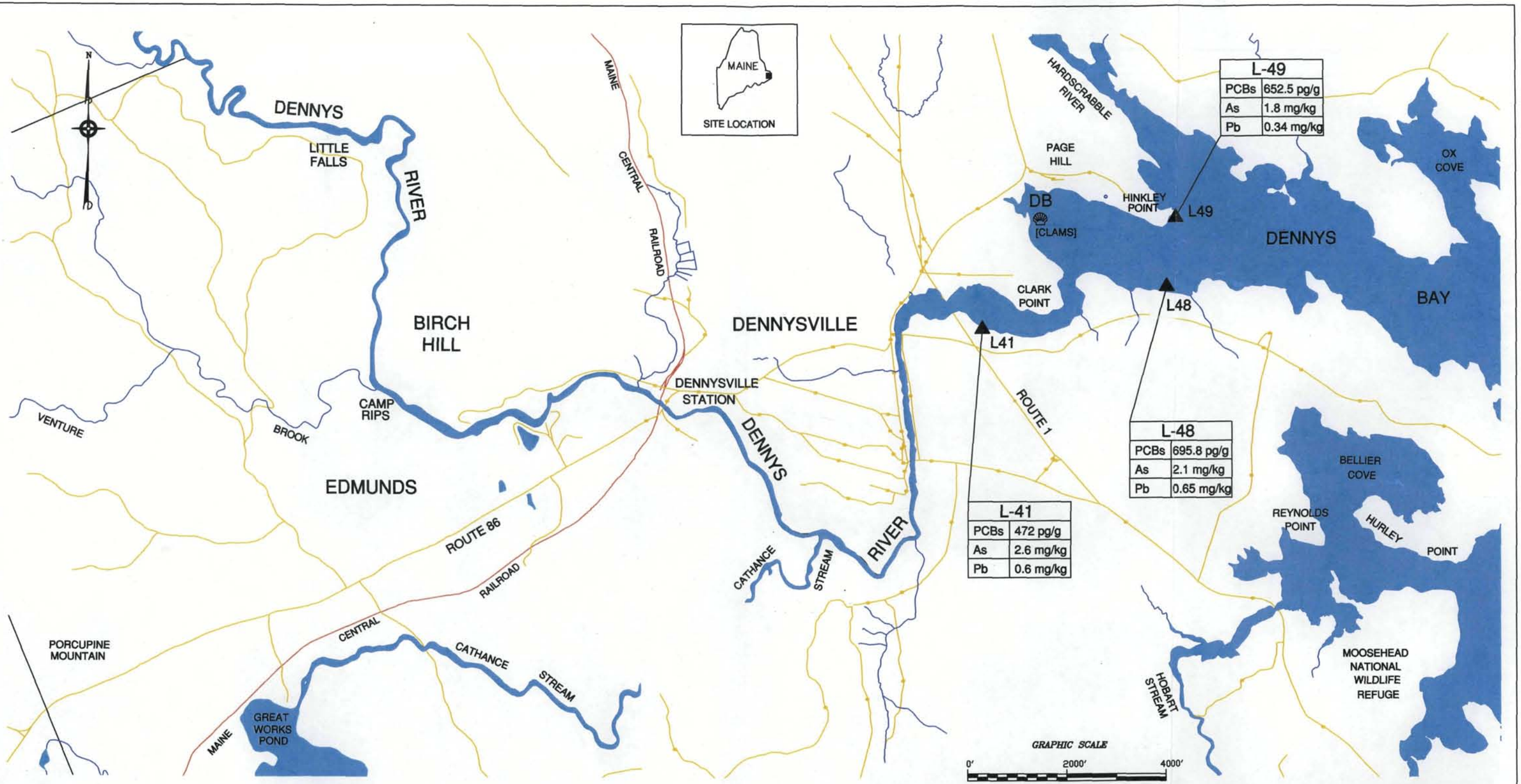
FYR Figure 16

EASTERN SURPLUS COMPANY SITE

MEDDYBEMPS, MAINE

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	L. CHU	DATE:	NOVEMBER 1, 2005
SCALE:	AS SHOWN	FILE NO.:	DWG\1477\0750\2004_ANNUAL_REPORT\FIG_2-7.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



LEGEND

LAKES AND RIVERS

DB — DENNYS BAY STATIONS

CLAM TISSUE DATA

L-41	
PCBs	472 pg/g
As	2.6 mg/kg
Pb	0.6 mg/kg

NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.
2. PLAN NOT TO BE USED FOR DESIGN.
3. BASE MAP FROM MAINE GIS AND AVAILABLE USGS DATA.
4. OCTOBER 2002 SAMPLING EVENT

October 2002 Dennys Bay Sampling Locations

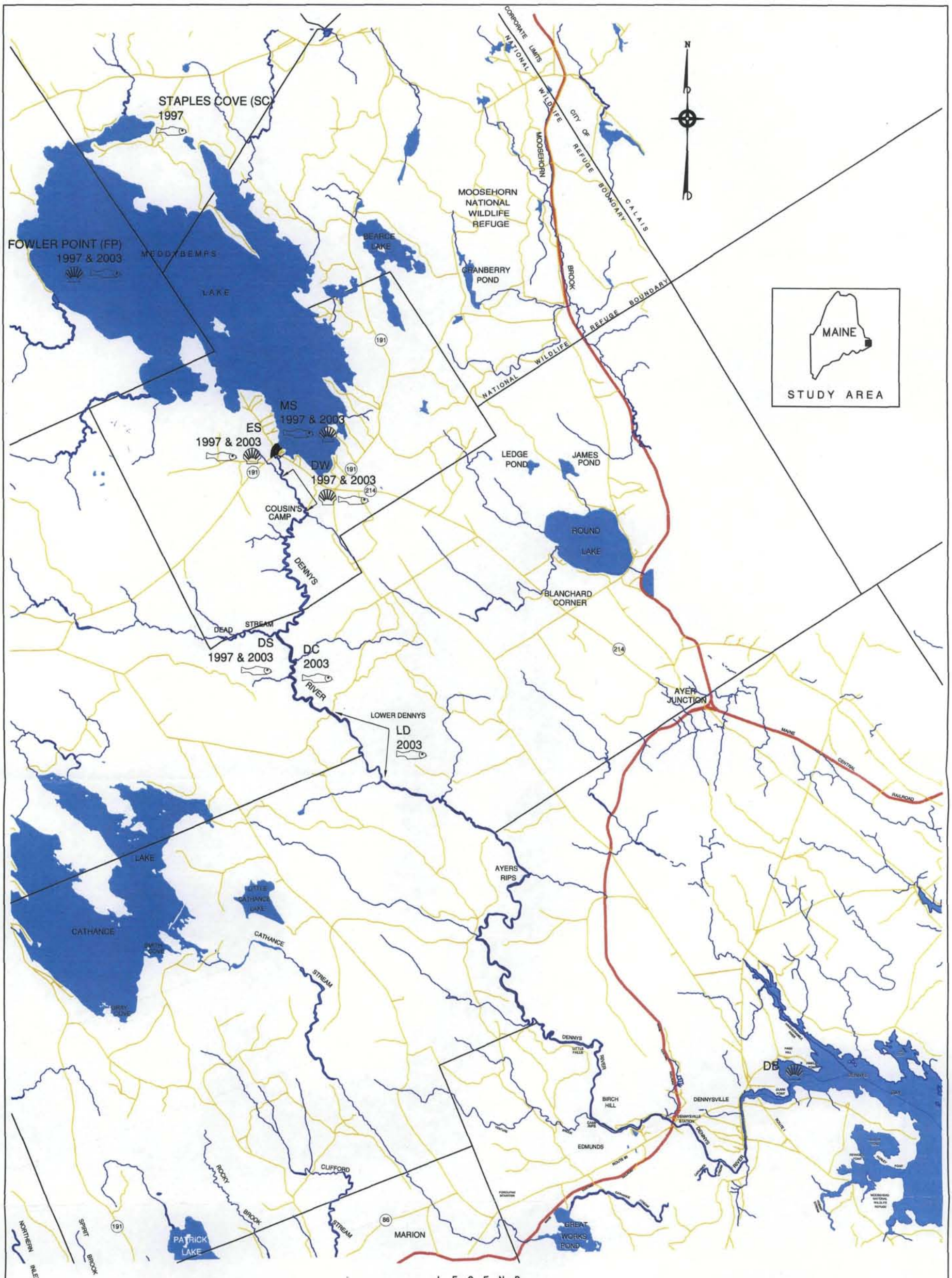
REMEDIAL ACTION

EASTERN SURPLUS COMPANY SITE

DRAWN BY:	DWM / RGD	REV.:	0
CHECKED BY:	L. CHU	DATE:	MAY 9, 2003
SCALE:	AS SHOWN	FILE NO.:	\DWG\4132\0750\FIG_3.DWG

FYR Figure 17

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899



NOTES:

1. ALL LOCATIONS TO BE CONSIDERED APPROXIMATE.
2. PLAN NOT TO BE USED FOR DESIGN.
3. BASE MAP FROM MAINE GIS AND AVAILABLE USGS DATA.

LEGEND

- LAKES AND RIVERS
- RAILROAD
- ROAD WAY
- STREAM
- MUSSEL SAMPLING STATION
- FISH SAMPLING STATION
- 1997 OR 2003 — YEAR SAMPLED

GRAPHIC SCALE

0′ 7000′ 1400′

July 2003 Biota Sampling Locations

FYR Figure 18

EASTERN SURPLUS COMPANY SITE

MEDDYBEMPS, MAINE

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	K. O'NEILL	DATE:	NOVEMBER 11, 2005
SCALE:	AS SHOWN	FILE NO.:	DWG\1477\0727\FIG_1-2.DWG

TETRA TECH NUS, INC.
55 Jonspin Road Wilmington, MA 01887
(978)658-7899

FYR Figure 19. Archaeological Excavation of N'tolonapemk

FYR Figure 20. Carved Animal Figure, or Effigy, Dating to 4200 Years Ago

APPENDIX A

DOCUMENT REVIEW LIST
EASTERN SURPLUS COMPANY SUPERFUND SITE
FIVE-YEAR REVIEW
September 2006

DOCUMENT REVIEW LIST
EASTERN SURPLUS COMPANY SUPERFUND SITE

EPA, 2000. *Record of Decision Summary for Eastern Surplus Company Superfund Site, Meddybemps, Maine* U.S. Environmental Protection Agency, Region 1, Boston, Massachusetts. September 28, 2000.

, and Maine Department of Environmental Protection, *Superfund State Contract, Eastern Surplus Company Site,* Meddybemps, Maine July 2001.

Tetra Tech NUS, Inc. *Draft In-Situ Oxidation Treatability Study, Remedial Design*, Eastern Surplus Company Site, Meddybemps, Maine, January 2003.

, *Draft Baseline Data Summary, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, January 2003.

, *Draft Full-Scale In-Situ Oxidation, Remedial Action,* Eastern Surplus Company Site, Meddybemps, Maine, April 2003.

, *System Inspection Log Summary, Groundwater Extraction and Treatment System*, Eastern Surplus Company Site, Meddybemps, Maine, March 2002 – December 2004.

, *Draft April 2003 Data Summary, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, March 2004.

, *Draft 2003 Annual Data Summary, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, May 2005.

, *Draft 2004 Annual Data Summary, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine.

, *Draft 2005 Annual Data Summary, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, April 2006.

, *Draft 2006 Annual Data Summary, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, August 2006.

, *Draft 2003 Source Delineation Investigation Report, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, August 2006.

, *Groundwater Extraction and Treatment System Operations and Maintenance Manual , Revision 1, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, August 2006.

, *Final Fish and Mussel Sampling Summary, Long-Term Response Action*, Eastern Surplus Company Site, Meddybemps, Maine, August 2006.

United States District Court for the District of Maine, 1999. Consent Decree, *United States of*

America, Plaintiff v. Harry J. Smith, Jr., Terrell L. Lord, and Lisa J. Lord, Defendants, and *State of Maine, Plaintiff v. Harry J. Smith, Jr., Terrell L. Lord, Lisa J. Lord, and United States of America, Defendants*. U.S. Environmental Protection Agency, Region 1, Boston, Massachusetts and Maine Department of Environmental Protection, Augusta, Maine. March 24, 1999.

APPENDIX B

SITE INSPECTION PHOTOGRAPHS FOR FIVE-YEAR REVIEW
EASTERN SURPLUS COMPANY SUPERFUND SITE
September 2006

2006 Site Inspection Photographs
Eastern Surplus Company Site
Meddybemps, Maine

Figure 1: Site Fence, looking east along Route 191

Figure 2: Treatment Building and Site Trailer

Figure 3: Bedrock Delineation Wells and Temporary Treatment Container

Figure 4: Back Gate, looking toward river. Containers with fire-cracked rock

2006 Site Inspection Photographs
Eastern Surplus Company Site
Meddybemps, Maine

Figure 5: Monitoring well, upgradient of the northern plume

Figure 6: Former Hydroelectric Building, looking east from the Treatment Plant

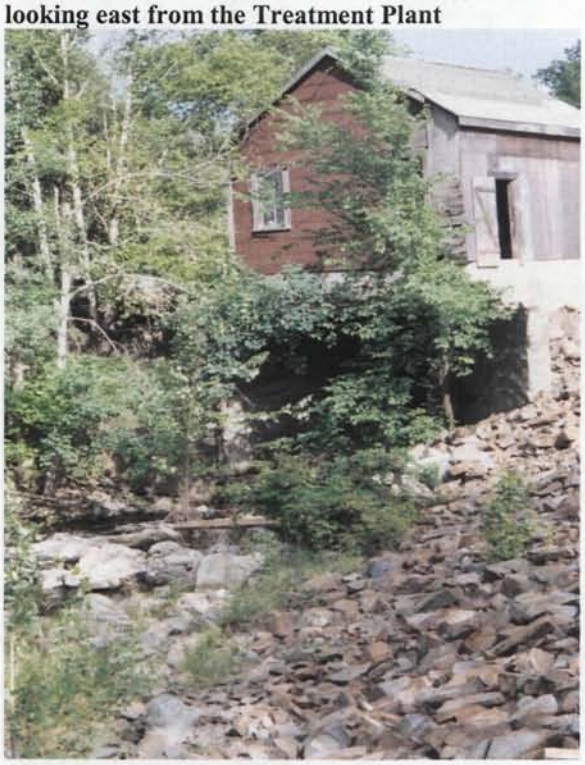


Figure 7: Post-excavation riverbank

2006 Site Inspection Photographs
Eastern Surplus Company Site
Meddybemps, Maine

Figure 8: Restored riverbank, looking north

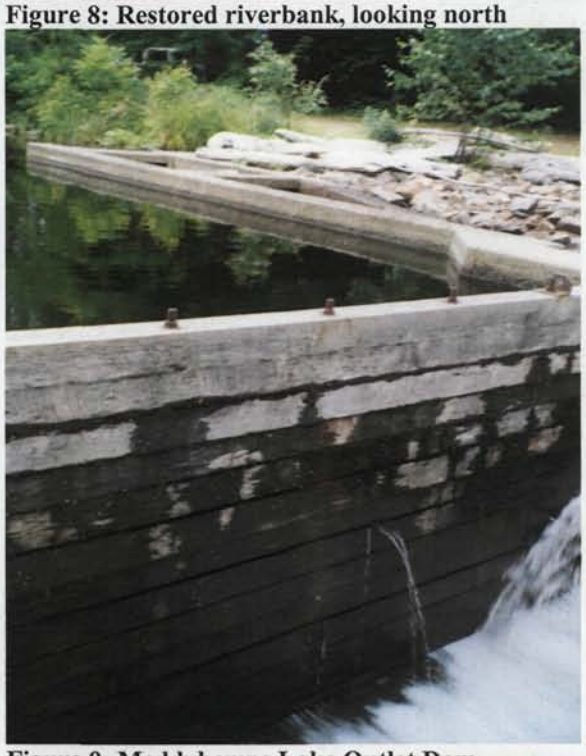


Figure 9: Meddybemps Lake Outlet Dam

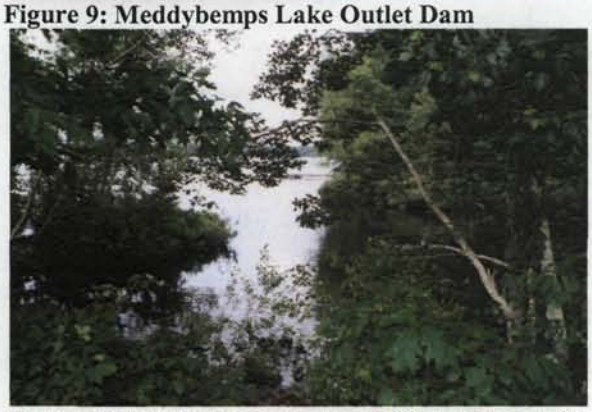


Figure 10: Meddybemps Lake, northern edge of Site

2006 Site Inspection Photographs
Eastern Surplus Company Site
Meddybemps, Maine

Figure 11: Mill Pond, looking south from dam

Figure 12: Extraction Wells, northern plume

Figure 13: Extraction Wells, northern plume

Figure 14: Southern property, looking north to Treatment Building

2006 Site Inspection Photographs
Eastern Surplus Company Site
Meddybemps, Maine

Figure 15: Installation of archaeological signs

Figure 16: Plaques in place, Meddybemps Lake in background

Figure 17: UMF Archaeology Research Center and TetraTech personnel

APPENDIX C

MAINE DEP COMMENTS ON DRAFT FIVE-YEAR REVIEW
EASTERN SURPLUS COMPANY SUPERFUND SITE
September 2006

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

September 29, 2006

Mr. Terrence Connelly
U.S. EPA, Reg. 1
1 Congress Street
Suite 1100 (HBT)
Boston, MA 02114-2023

Re: **Review Comments on "Draft Five-Year Review Report" for the Eastern Surplus Company Superfund Site, Meddybemps, Maine" dated August 2006**

Dear Terry Mr. Connelly:

The Maine Department of Environmental Protection (MEDEP) has reviewed the revised "Draft Five-Year Review" report text submitted to us on September 28, 2006, for the Eastern Surplus Company Superfund Site, Meddybemps, Maine. This report was prepared by the U.S. Environmental Protection Agency (EPA).

The MEDEP appreciates the opportunity to review the Draft Five-Year Review report and to be included on the review team. The MEDEP notes that because of EPA time constraints, our review has been rushed and limited only to the report text portion of the document. Also, as the version we reviewed is not the final version, and you and I have discussed the MEDEP's review comments on this version and a prior version in telephone conversations conducted yesterday and today, the MEDEP's written review comments are global/general in nature and not page specific.

The MEDEP's review comments on the text of the 2006 Draft Five-Year Review report submitted on September 28, 2006, are presented below:

1. Prior to EPA's "first removal action in the 1980's", the MEDEP conducted a removal in 1985-1986 that included fencing the site, stabilizing leaking containers, removal of ammunition and removal and disposal of 4,650 gals of waste oils, 2,400 gals of PBCs and 117 transformer bodies.

2. Additional remedial work conducted by the MEDEP in Meddybemps, Maine are a) the removal of PCB contaminated soils at the Green Hill Quarry Site located west of the Site (EPA involved in this removal; b) removal of hazardous materials from the trailers located on Greg Smith's property located south of Route 191 from the Site; c) removal of hazardous materials from the basement of Charlotte Smith's house located across the Dennys River from the Site and d) removal of hazardous materials from the Smith Junkyard Site locate a few miles west of the Site on Route 191.

3. In regards to covenants to restrict the Site groundwater use and disturbance of the archaeological artifacts, the MEDEP is willing to place these restrictions on the Site property on the north side of Route 191 that the MEDEP presently holds title to. The MEDEP began discussion with the EPA back in 2004 regarding

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769-2094
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

placing these restrictions on the Site property and would like these discussions to resume. The MEDEP is required to obtain these restrictions and would like to fulfill this requirement.

4. Several documents were mention in the Five-Year Review report that the MEDEP requests a copy of. Specifically, the MEDEP requests a copy of the following: a) EPA's July 2006 notice letter to stakeholders on the five-year review; b) the 'The Archaeology of N'tolonapemk (96.02 ME), "Our Ancestor's Place" (to be completed in 10/2006); c) "A Visit to Our Ancestor's Place: N'tolonapemk Village" by Donald Soctomah; d) the 50-minute documentary "N'tolonapemk: Our Relatives' Place" by Gunnar Hansen, Bing Miller and Jeff Dobbs, 2006; e) the March 2003 second agreement (for the curation of the collection) concerning the archaeological resources at the site.

5. The MEDEP is in agreement with the four action items listed in Section 9.0 Recommendations and Follow-up Actions. Specifically these items are a) evaluation of bedrock blasting (fracturing); b) an optimization study of the groundwater extraction and treatment system; c) optimization of the long-term monitoring program; and d) resolution of the institutional controls.

If you have any questions or concerns regarding this letter, please contact me directly at (207) 287-8554 or at (207) 287-2651.

Sincerely,

Rebecca L. Hewett

Rebecca L. Hewett, Project Coordinator
Division of Remediation
Bureau Remediation & Waste Management

pc: Mary Jane O'Donnell, EPA
Ted Wolfe, MEDEP

5-yrReview draft 9-2006.doc

APPENDIX D

ARARS AND TBCS FOR FIVE-YEAR REVIEW
EASTERN SURPLUS COMPANY SUPERFUND SITE
September 2006

1. CHEMICAL-SPECIFIC ARARS

Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), 40 CFR 141.11 - 141.16. The SDWA MCLs and non-zero MCLGs are relevant and appropriate because they are the basis for some of the interim cleanup levels (i.e., the Interim Groundwater Cleanup Levels) for the Site groundwater, which is a potential future drinking water source. MCLs were identified as a chemical specific standard in the FS. The Maine Department of Human Services Rule (10-144 CMR 231-233) standards are also chemical specific ARARs. The Maine primary drinking water standards are equivalent to MCLs. The selected remedy is expected to result in groundwater meeting the concentration requirements of the SDWA as specified as MCLs.

Maine Standards for Hazardous Waste Facilities, Miscellaneous Units (06-096 CMR Chapter 854, Section 15) Maximum Exposure Guidelines (MEGs). The Maine MEGs are the basis for some of the interim cleanup levels (i.e., the Interim Groundwater Cleanup Levels) for the Site groundwater. MEGs were identified as an action specific standard in the FS. The Maine Standards for Hazardous Waste Facilities require that a miscellaneous unit must be closed in a manner that will ensure that hazardous waste shall not appear in ground or surface waters above MEGs. MEGs are relevant and appropriate because the Site is considered analogous to a miscellaneous hazardous waste unit. The selected remedy is expected to result in groundwater meeting the concentration requirements of the Maine MEGs.

In addition, Cancer Slope Factors (CSFs) and Reference Doses (RFDs) were included as criteria "to be considered" in establishing cleanup levels in the absence of a SWDA MCL or Maine MEG. CSFs and RFDs are guidance values used to evaluate the potential respective carcinogenic and non-carcinogenic hazard caused by exposure to Site contaminants. The recently issued Maine Department of Human Services, Maximum Exposure Guidelines for Drinking Water (MEGs), dated January 20, 2000 will be used as guidance for establishing cleanup levels when MCLs, non-zero MCLGs, and promulgated MEGs (1992) are not available.

2. ACTION-SPECIFIC ARARS

Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), 40 CFR 141.11 - 141.16. The SDWA MCLs and non-zero MCLGs are relevant and appropriate as reinjection criteria because they define levels that would be protective to a future user of the groundwater. MCLs were identified as a action specific standard in the FS with respect to the reinjection/recharge limits for the treatment plant. The Maine Department of Human Services Rule (10-144 CMR 231-233) standards are also action specific ARARs. The Maine primary drinking water standards are equivalent to MCLs. The selected remedy is expected to result in extracted groundwater being treated such that the effluent does not exceed MCLs prior to reinjection into the ground.

Underground Injection Control Regulations (40 CFR Parts 144, 145, 146, and 147). These regulations are relevant and appropriate because they provide regulatory compliance standards for treatment facilities that inject wastes underground. These regulations prohibit the use of wells to dispose of wastes. Treatment of the extracted groundwater to meet MCLs will result in the groundwater no longer being considered a hazardous waste; therefore, the selected remedy will comply with this requirement. In-Situ injection of reagents is not considered to be classified as disposal of a waste.

RCRA Air Emission Standards for Equipment Leaks (40 CFR 264 Subpart BB). This regulation contains air pollutant emission standards for equipment leaks at hazardous waste treatment, storage, and disposal facilities. The rule is applicable when the waste stream has an organic concentration of at least 10 percent by weight. As it is unlikely that the trigger concentration will be exceeded by the selected remedy as maximum concentrations, these regulations are considered relevant and appropriate for the selected remedy. A leak detection and repair program will be implemented during groundwater treatment to comply with these standards.

RCRA Containment Building Requirements (40 CFR 264 Subpart DD). This regulation is relevant and appropriate because it contains design, operation, closure, and post-closure standards and requirements for the storage and treatment of hazardous waste in containment buildings. The design, operation, closure, and post-closure of the selected remedy's groundwater treatment building will comply with requirements.

Clean Air Act - National Emissions Standards for Vinyl Chloride (40 CFR 61 Subpart F). These regulations are relevant and appropriate because vinyl chloride was detected at the Site. Any air emissions from the groundwater treatment will be monitored to comply with the requirements of these regulations.

Maine Standards for Hazardous Waste Facilities, Miscellaneous Units (06-096 CMR Chapter 854, Section 15) Maximum Exposure Guidelines (MEGs). MEGs were identified as an action specific standard in the FS. The Maine Standards for Hazardous Waste Facilities require that a miscellaneous unit must be closed in a manner that will ensure that hazardous waste shall not appear in ground or surface waters above MEGs. MEGs are relevant and appropriate because the Site is considered analogous to a miscellaneous hazardous waste unit. The selected remedy's treatment of extracted groundwater will result in effluent that does not exceed MEGs prior to reinjection into the ground.

Maine Ambient Air Quality Standards (38 MRSA 584; 06-096 CMR Chapter 110). These regulations are relevant and appropriate because they establish ambient air quality standards for certain pollutants that have been detected at the Site. The emissions from the selected remedy will be monitored to ensure that the requirements in these regulations are met.

Maine Solid Waste Management Rules (06-096 CMR, Chapter 400.1). The regulations are applicable to the management of non-hazardous waste generated by the selected remedy. The spent carbon units may be managed under these requirements if they are determined to be non-hazardous.

Maine Air Pollution Control Laws - Maine Emissions License Regulations (38 MSRA 585, 590-591; 06-096 CMR Chapter 115). These regulations would be relevant and appropriate to the selected remedy if a technology employing air emissions is included in the treatment plant. At this time, no air emission technologies are planned for inclusion in the treatment plant.

Maine Rules to Control the Subsurface Discharge of Pollutants by Well Injection (06-096 CMR Chapter 543). These regulations are relevant and appropriate because they provide regulatory compliance standards for treatment facilities that inject wastes underground. The use of wells to dispose of wastes is prohibited. Treatment of the extracted groundwater to meet MCLs will result in the groundwater no longer being considered a hazardous waste; therefore, the selected action will comply with this requirement. In-Situ injection of reagents is not considered to be classified as the disposal of a waste.

Other criteria "to be considered" in the operation of the groundwater extraction and treatment system include:

Maine Department of Human Services, Interim Ambient Air Guidelines, Memorandum dated February 23, 1993. This memorandum provides a list of risk based criteria that apply to the ambient air as protective levels. The selected remedy is not expected to create an air emission release. Monitoring of the Site during the NTCRA has confirmed that there is not a concern regarding ambient air.

Maine Department of Human Services, Maximum Exposure Guidelines for Drinking Water (MEGs), Memorandum dated January 20, 2000. While not promulgated, these 2000 MEGs will be used to set treatment effluent levels when MCLs, non-zero MCLGs, and promulgated MEGs (1992) are not available.

3. LOCATION-SPECIFIC ARARS

Protection of Wetlands (Executive Order 11990, 40 CFR 6.302(a) and 40 CFR 6, App. A (Policy on Implementing E.O. 11990)). Federal agencies are required to avoid undertaking or providing assistance for new construction located in wetlands unless there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. There is a small wetland area in the northeast corner of the Site. There may be some unavoidable impacts to this wetland if monitoring wells or groundwater extraction wells must be located in this area to accomplish the remedial action. If any impacts occur, then all practical measures will be taken to minimize and mitigate any adverse effects.

Floodplain Management (Executive Order 11988, 40 CFR 6.302(b) and 40 CFR 6, App. A (Policy on Implementing E.O. 11988)). Federal agencies are required to avoid impacts associated with the occupancy and modification of a floodplain and avoid support of floodplain development wherever there is a practicable alternative. While there is no floodplain delineation for the area in which the Site is located, there may be limited activities associated with the installation of monitoring wells and sampling in the area that is seasonally flooded and is likely within the floodplain. The selected remedy will comply with these requirements by avoiding work in the potential floodplain to the extent practicable and minimizing the impacts to the function of the floodplain when impacts are unavoidable.

National Historic Preservation Act (16 USC 470 et seq; 40 CFR 800). These requirements are applicable because they contain provisions for the identification of and consideration of impacts on any historic properties prior to any federal undertaking. Previous work at the Site has identified historic properties (archaeological resources) that result in portions of the Site being deemed eligible for listing on the National Register of

Historic Places. EPA has followed the NHPA Section 106 procedures for consultation with the Maine Historic Preservation Commission (the State Historic Preservation Officer), the national Advisory Council on Historic Preservation, the Passamaquoddy Tribe, and other consulting parties. Because adverse effects resulting from the implementation of the NTCRA on the Site's archaeological resources were unavoidable, steps have been and will be taken to minimize and mitigate the adverse effects in accordance with the NHPA. An agreement regarding the scope of mitigation activities has been reached, and a Memorandum of Agreement has been executed to memorialize such agreement. The excavation portion of the mitigation requirements will be completed as part of the NTCRA. The long-term evaluation, documentation, and public outreach will be addressed as part of the selected remedy.

Endangered Species Act (16 USC 1531 et seq.; 40 CFR 6.302 (h)). This statute requires that federal agencies avoid activities that jeopardize threatened or endangered species or adversely modify habitats essential to their survival. One threatened species, the American Bald Eagle, inhabits the area in which the Site is located. No endangered or threatened species were identified on-site. In addition, the selected remedy is not anticipated to jeopardize or have an adverse effect on the American Bald Eagle or any other threatened or endangered species. Rather, the selected remedy combined with the NTCRA will reduce the levels of contamination in the habitat of the American Bald Eagle and the Atlantic Salmon (if listed).

Maine Wetlands Protection Rule (06-096 CMR Chapter 310, Section 1). This rule is applicable because activities adjacent to a freshwater wetland greater than 10 acres or with an associated stream, brook, or pond must not unreasonably interfere with certain natural features, such as natural flow, quality of waters, nor harm significant aquatic habitat, freshwater fisheries, or other aquatic life. The selected remedy will comply with this requirement through minimization of any impacts along the shoreline and river bank along with erosion and sediment control practices during any necessary activities within 100 feet of the surface water or wetland.

Maine Natural Resources Protection Act, Permit by Rule Standards (06-096 CMR Chapter 305). The rule is applicable because it prescribes standards for specific activities that may take place in or adjacent to wetlands or water bodies. The standards are designed to ensure that the disturbed soil material is stabilized to prevent erosion and siltation of the water. There will be minimal activities during the remedial action that cause a substantial disturbance of the soil. Erosion control and sediment control measures will be put in place to meet the requirements of this rule.

Maine Endangered Species Act and Regulations (12 MSRA Section 7751-7756; 09-137 CMR 008). The State of Maine determines the appropriate uses of habitat for species on the Maine Watch List, Special Concern List, and Indeterminate Category. A freshwater mussel, the brook floater, occurs in the vicinity of the Site and is a Special Concern species in Maine. The selected remedy is not expected to have an impact on this species. The injection of the chemical reagents into the groundwater will be under a controlled situation that will minimize the potential for discharge of any chemicals into the surface water. This regulation would only be applicable if such species are encountered.

Maine Site Location Law and Regulations (38 MRSA Sections 481-490; 06-096 CMR Chapter 375. These regulations are relevant and appropriate because they prescribe standards for specific activities that are considered to be a development. The selected

remedy will comply with these standards by preventing unreasonable adverse effects to: air quality; runoff/infiltration relationships and surface water quality; and alteration of climate or natural drainage-ways as well as implementing erosion, sediment, and noise controls.