EPA/ESD/E2007010001530
2007

EPA Superfund
Explanation of Significant Differences:

WINTHROP LANDFILL
EPA ID: MED980504435
OU 01
WINTHROP, ME
02/14/2007

DECLARATION FOR THE
EXPLANATION OF SIGNIFICANT DIFFERENCES
WINTHROP LANDFILL SUPERFUND SITE
WINTHROP, MAINE
February 2007

Site Name and Location

The Winthrop Landfill Superfund Site is located in Winthrop, Maine.

Lead Agency

United States Environmental Protection Agency

Support Agency

Maine Department of Environmental Protection

Statement of Purpose

This decision document sets forth the basis for the determination to issue the attached Explanation of Significant Differences (ESD) for the Winthrop Landfill Superfund Site. The U.S. Environmental Protection Agency (EPA) developed this decision document after consulting with the Maine Department of Environmental Protection (ME DEP), and ME DEP's letter of concurrence is provided as Attachment A to this ESD.

Statutory Basis for Issuance of the ESD

Pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and the rule at 40 C.F.R. § 300.435(c)(2)(i), if EPA determines that the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that site, EPA shall publish an explanation of the significant differences and the reasons such changes are being made. According to 40 C.F.R. § 300.435(c)(2)(i), and EPA guidance (Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-23-P, July 1999), an Explanation of Significant Differences, rather than a ROD amendment, is appropriate where the adjustments being made to the ROD are significant but do not fundamentally alter the remedy with respect to scope, performance or cost. EPA has determined that the adjustments to the ROD provided in this ESD are significant but do not fundamentally alter the overall remedy for the Winthrop Landfill Superfund Site with respect to scope, performance, or cost. Therefore, this ESD is being properly issued.

In accordance with Section 117(d) of CERCLA, 42 U.S.C. § 9617(d), and the rules at 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2), this ESD will be available for public review at the EPA Records Center in Boston, Massachusetts and the public information

repository located at the Winthrop Landfill Superfund Site, in the groundwater extraction and treatment system building. The ESD will also be available at ME DEP's offices in Augusta, Maine.

Background

The 1985 ROD for this Site required measures to limit exposure to groundwater contamination as well as measures to address contaminant sources. Among other things, the ROD called for the extension of an alternate water supply to area residents, and institutional controls to prevent excavation and/or groundwater use in the vicinity of the Winthrop landfill. The ROD also required construction of a cap over the landfill, and, if contaminants in groundwater exceeded levels termed Alternate Concentration Limits (ACLs), the construction and operation of a groundwater extraction and treatment system (GWETS) to reduce contaminant levels to below ACLs. The contingency for construction and operation of a GWETS was subsequently triggered, and the GWETS was built and operated from March 1995 to November 2002. In November of 2002, the GWETS was temporarily shut down to allow for a rebound evaluation to determine whether the GWETS had succeeded in achieving a lasting reduction of groundwater contaminant concentrations.

During the same timeframe, levels of contamination at points of exposure, including area sediments, were periodically monitored. A review of this monitoring data indicated that arsenic and other metals were accumulating in area sediments at concentrations that exceeded the protective levels developed for this Site. As a result, excavation of sediment was conducted at two points of exposure in 1996 and 1997.

Although not originally addressed in the 1985 ROD, EPA and ME DEP (collectively the Agencies) also reviewed conditions at this Site to determine whether or not an unacceptable risk is posed to occupants of buildings via a vapor intrusion pathway. Elevated concentrations of certain VOCs (vinyl chloride in particular, within the contaminated groundwater plume) prompted an evaluation of the potential vapor intrusion pathway. Based on groundwater and soil gas data to date, collected as part of a vinyl chloride contingency plan and the regular groundwater monitoring plan, the Agencies concluded that vapor intrusion of vinyl chloride or other VOCs into area buildings is currently not occurring. Monitoring of VOCs will continue at the Site, including monitoring of vinyl chloride in groundwater and soil gas.

Overview of the ESD

This ESD has three major components:

- a decision requiring the decommissioning of the GWETS and attainment of the arsenic ACL through natural processes
- a requirement to monitor and evaluate contaminants at points of exposure and, if warranted, remediation of contaminants that pose an unacceptable risk, and

- a requirement to continue monitoring and, as necessary, evaluation and remediation of the risk posed by potential vapor intrusion.

Data gathered during the GWETS rebound evaluation indicate that in fact the combination of the landfill cap and the GWETS has succeeded in reducing concentrations of all groundwater contaminants, except arsenic, to the point that they are, or will soon be, below ACLs. The data also indicate that continued operation of the GWETS is not necessary to achieve ACLs for those contaminants, nor would ACL attainment be expedited by continued operation of the GWETS. The data also show that arsenic concentrations remain significantly above the ACL. It appears that this is the result of mobilization of naturally occurring arsenic, a source which is not amenable to treatment by the GWETS. For these reasons, the contingency in the ROD for operation of the GWETS until ACLs are met for all contaminants is being modified to allow the GWETS to be permanently decommissioned. Although the GWETS System will be decommissioned, arsenic levels will continue to decrease over time such that the ACL for arsenic will be met in a reasonable time frame.

Because arsenic is being addressed through natural processes over an extended period of time, additional measures are presented in this ESD to address the ongoing discharge of arsenic in groundwater to the points of exposure, or discharge of any other potential Site contaminants that may present an unacceptable risk at points of exposure. These measures will ensure that human health and the environment are being protected at potential points of exposure through continued monitoring and evaluation and, if necessary, remediation.

Finally, the Agencies have determined that while conditions currently at the Site do not present an unacceptable risk via the vapor intrusion pathway, the Agencies are requiring continued monitoring and, if necessary, evaluation and/or remediation to ensure that changes in conditions do not present an unacceptable risk in the future.

Declaration

For the foregoing reasons and as explained herein, by my signature below, I approve the issuance of an Explanation of Significant Differences for the Winthrop Landfill Superfund Site in Winthrop, Maine, and the changes stated therein.

2/14/07

James T. Owens, III, Director
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency – New England

Date

EXPLANATION OF SIGNIFICANT DIFFERENCES
WINTHROP LANDFILL SUPERFUND SITE
WINTHROP, MAINE
February 2007

Site Name: Winthrop Landfill Superfund Site

Site Location: Winthrop, Maine

Lead Agency: United States Environmental Protection Agency (EPA)

Support Agency: Maine Department of Environmental Protection (ME DEP)

I. INTRODUCTION

This Explanation of Significant Differences (ESD) is being issued for the Winthrop Landfill Superfund Site to address differences between the remedial action being undertaken there and the remedy that was set forth in the Record of Decision (ROD) for the Site on November 22, 1985. EPA is required to publish this ESD by Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and the rule at 40 C.F.R. § 300.435(c)(2)(i).

This ESD has three major components:

- a decision requiring the decommissioning of the GWETS and attainment of the arsenic Alternate Concentration Limit (ACL) through natural processes
- a requirement to monitor and evaluate contaminants at points of exposure and, if warranted, remediation of contaminants that pose an unacceptable risk, and
- a requirement to continue monitoring, evaluation and remediation of the risk posed by potential vapor intrusion, as necessary.

The basis for these decisions is outlined below.

First, EPA and the Maine Department of Environmental Protection (ME DEP) (collectively the Agencies) have determined that the groundwater extraction and treatment system (GWETS) which has been operating at the Site will not be effective in reducing levels of arsenic, the only contaminant in groundwater which remains significantly above cleanup targets known as Alternate Concentration Limits, or ACLs. Because continued operation of the GWETS will not be effective in addressing arsenic, and because all other groundwater contaminants are below or will soon be below cleanup targets, the Agencies are requiring that the GWETS be permanently decommissioned. This is a significant difference from the remedy as described in the 1985 ROD, which rested on the assumption that the GWETS could effectively treat all contaminants, and which therefore envisioned that the GWETS would not be shut down until cleanup

targets had been met for all contaminants, including arsenic. Although the GWETS System will be decommissioned, the Agencies' goal to meet protective levels for arsenic remains the same. However, instead of meeting this cleanup requirement through operation of the GWETS or another treatment technology, this ESD provides that protective levels of arsenic will be achieved over an extended period of time through natural processes.

In addition, because contaminated groundwater will continue to be discharged to points of exposure and Site-related contaminants may accumulate to levels above protective concentration limits, this ESD requires the development and implementation of a plan to monitor and remediate Site-related contaminants at the points of exposure, as necessary, to ensure continued protection of human health and the environment. This will specifically include a plan to address arsenic accumulation in sediment.

Finally, in order to address the potential for vapor intrusion of vinyl chloride or other Site-related contaminants in the future, this ESD will require periodic monitoring and, if appropriate, further evaluation and corrective actions to address unacceptable risks posed by vapor intrusion.

In accordance with CERCLA §117(d), 42 U.S.C. § 9617(d), and the rules at 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2), this ESD and its supporting documents will be made available for public inspection and will be added to the Administrative Record for the Site. The Administrative Record is available for public review at the EPA Region 1 Records Center in Boston, Massachusetts, and the repository located at the Site, at the addresses listed below:

EPA Region 1 Records Center
One Congress Street, Suite 1100
Boston, Massachusetts 02114-2023
By appointment only: 617-918-1440

Public Information Repository
Winthrop Groundwater Extraction & Treatment System building
294 Annabessacook Road
Winthrop, Maine, 04364

The repository is open every Wednesday from 8:00 am to 4:00 pm. If Wednesdays are not convenient, interested parties can call Nathan Hagelin or John Baron at MACTEC, 800-341-0460, to make alternative arrangements.

The ESD is also available at ME DEP's offices in Augusta, Maine.

II. SITE HISTORY, CONTAMINATION, AND THE SELECTED REMEDY

The Winthrop Landfill Superfund Site is located at 294 Annabessacook Road in the Town of Winthrop, Maine. The landfill consists of two contiguous parcels with a total surface area of approximately 20 acres, situated between Annabessacook Road and the western shore of 1,420-acre Annabessacook Lake, a large controlled reservoir which is located in the upper reaches of the Cobbossee Watershed. An 11.5 acre sphagnum bog is located directly to the east of the Site, and a 6 acre cattail marsh and Hoyt Brook are located to the north. Groundwater flow from the Site discharges to Annabessacook Lake to the south, and to Hoyt Brook to the north.

The Site is located approximately two miles away from the center of the Town of Winthrop. There are approximately 21 residential homes in close proximity to the landfill (within 300 to 400 feet). Figures in Attachments B and C show the general location of the Site and a more detailed map of the area. Annabessacook Lake is used for recreational purposes, such as swimming and boating. Hoyt Brook is generally not used for any purposes within the vicinity of the Site, other than limited recreational use by bordering landowners or trespassers. The current land use for the surrounding area is mainly residential, with some areas of limited commercial use (i.e., an auto repair shop).

The Site was initially used in the 1920s as a sand and gravel pit. In the 1930s, parts of the Site operated as the Winthrop Town Dump, accepting mixed municipal, commercial and industrial wastes. The Site received hazardous substances between the early 1950s and mid 1970s. It is estimated that more than 3 million gallons of chemical wastes, mostly complex organic compounds including resins, plasticizers, solvents and other process chemicals were disposed of at the Site. Wastes were openly burned until 1972, and landfilling occurred from 1972 until 1982.

Residences near the Site originally obtained their drinking water from private residential wells. In 1980, volatile organic compounds (VOCs) were detected in a residential well south of the landfill, and subsequent sampling detected Site-related contaminants in groundwater to the northeast, east, and south of the landfill at levels up to 400 parts per million.

The Site was listed on the National Priorities List (NPL) on October 23, 1981, and a Remedial Investigation/Feasibility Study (RI/FS) was conducted from 1981 to 1985. The RI determined that liquid chemical wastes were migrating from the landfill in shallow and deep groundwater in three separate flows. Organic contaminants were detected in groundwater within the bedrock beneath the Site and also in lake sediments south of the landfill.

Under an Administrative Order by Consent (AOC), the Town of Winthrop and Inmont Corporation installed a permanent public water supply to area residents in 1984. On October 9, 1985, the Town of Winthrop enacted an ordinance to prohibit groundwater withdrawal and to prohibit all groundwater use and certain excavation activities within

the Site. This ordinance was revised April 3, 1991 to provide further excavation control in areas potentially impacted by landfill gas migration.

On November 22, 1985, EPA issued an Enforcement Decision Document, (which later came to be called a Record of Decision, or ROD) for the Site. The ROD concluded that potential threats to human health and the environment could primarily occur via ingestion of contaminated groundwater, physical contact with wastes, discharge of contaminants to surface waters, and migration of contaminated groundwater off-site. Ingestion of contaminated groundwater was determined to be the primary threat to human health.

As outlined in the ROD, the selected remedy for the Winthrop Landfill Superfund Site included:

- extension of an alternate water supply to area residents;
- construction of a chain link fence around the landfill and imposition of deed restrictions prohibiting use of the landfill for activities other than the remedial action;
- prohibition of groundwater withdrawal for purposes other than remedial action within the landfill and at certain areas around the landfill;
- prohibition of excavation within the landfill and at certain areas around the landfill, except for residential construction or remedial action;
- quarterly sampling of monitoring points in sensitive areas;
- grading and placement of a Resource Conservation and Recovery Act (RCRA) cap over the entire landfill;
- completion of engineering design work (geologic, hydrogeologic, treatability pilot studies);
- establishment of an Alternate Concentration Limit (ACL) for each contaminant in groundwater; and
- In the event of an ACL exceedance, installation and operation of a groundwater extraction and treatment system (GWETS).

On March 23, 1986, a Consent Decree was entered between EPA, ME DEP, Inmont Corporation as a generator, and the Town of Winthrop, Maine, Everett Savage and Glenda Savage as owners and operators of the landfill. Through a succession of purchases, Inmont's obligations are currently being fulfilled by United Technologies Corporation, Inc. (UTC).

A monitoring program for groundwater, surface water and sediment locations was implemented in March, 1986 (see Attachment C for sampling locations), with analysis for 32 landfill constituents and additional constituents as necessary. Cap construction was administratively approved by the Agencies in 1992 and UTC continues to perform post-closure monitoring of the cap.

By a 1993 Decision Document, the Agencies approved an ACL Demonstration Report in which ACLs were set at the point of compliance, the edge of the solid waste disposal

area. The ACLs were set at Maximum Contaminant Levels (MCLs) under the federal Safe Drinking Water Act for most contaminants of concern. If an MCL had not been promulgated, a human health risk-based drinking water guideline was used, such as the State of Maine's Maximum Exposure Guidelines (MEGs). If ACLs set at the MCL were determined to not protect ecological receptors at the points of exposure, an ecologically derived guideline was used instead. (See Attachment D.) An ACL exceedance at the point of compliance would require the installation and operation of a groundwater extraction and treatment system (GWETS).

Protective Concentration Limits (PCLs) were set for the points of exposure, where contaminated groundwater could come into contact with a potential human or ecological receptor in surface water or sediment.

Arsenic was recognized in the 1993 Decision Document as being a ubiquitous, naturally-occurring compound, for which background concentrations often exceed health based guidelines. The ACL for arsenic in groundwater was set at 30 parts per billion (ppb). The PCL for arsenic in sediment was set at 31,000 ppb. The PCL for arsenic in surface water was to be set as a background concentration, not less than 0.77 ppb and not to exceed 30 ppb in surface water or groundwater. In 1995, the Agencies approved a PCL of 5 ppb for arsenic in surface water.

An Explanation of Significant Differences was also signed on October 20, 1993, which documented the inclusion of a vapor extraction system as a component of the GWETS.

After a determination that a GWETS system would be necessary due to ACL exceedances, the Agencies conditionally approved a 100% design report in 1994 and construction began shortly thereafter. Operation of the GWETS began in March 1995, and was required to continue until cleanup standards are achieved in groundwater outside the landfill boundary. The GWETS was designed to hydraulically isolate groundwater underneath the landfill and to remediate groundwater constituents. Groundwater was extracted from the central portion of the landfill and treated to remove VOCs, N,N-dimethylformamide, iron, and arsenic. The treated water was re-injected at the landfill northern and southern boundaries to create artificial groundwater mounds that enhanced the size of the capture zone of the extraction system.

The GWETS system consisted of one extraction well (EW-2) located in the center of the landfill pumping at a maximum of 65 gallons per minute (gpm), one inactive extraction well located near the northern end of the landfill, and five recharge wells, two at the north end of the landfill accepting treatment plant effluent at 30 and 5 gpm respectively, two at the south end accepting 5 gpm total, and one in the southern flowpath accepting 25 gpm.

In December 1995, a recharge trench was installed to supplement the system, and another re-injection well was reconstructed in June 1996. In October 1997, UTC installed two extraction wells at an identified hot spot on the landfill in an attempt to maximize efficiency and expedite shutdown of the GWETS, however, detected concentrations were

much lower than the initial investigations, and UTC determined that operating these wells as permanent extraction wells would not result in significant mass removal of contamination.

Contamination from the Site did accumulate in sufficient quantities in sediments at the Annabessacook Lake seep area to cause an exceedance of PCLs for arsenic in sediment. In October 1996, UTC excavated a large area of exposed contaminated sediment. Geotextile fabric and riprap material were placed over the discharge area to prevent any possible future exposure of residents to sediments at groundwater seeps in the lake. A similar exceedance was present in a smaller affected portion of nearby Hoyt Brook, and UTC remediated this area in December 1997.

Throughout 2001 and 2002, UTC and the Agencies discussed the possibility of a GWETS rebound study (i.e., shutting off the GWETS and monitoring the groundwater for a few years) to observe Site conditions under non-pumping conditions and evaluate how effective the operation of the GWETS had been in addressing the contaminated groundwater plume. In August 2002, the Agencies, in conjunction with UTC and its contractor, MACTEC Engineering and Consulting, Inc. (MACTEC), held a public meeting at the Site at which the public expressed general support for this rebound study, and no other comments were received during the public comment period. Agreement was quickly reached on proposed reactivation criteria within the scope of a conceptual groundwater rebound evaluation plan, and in November 2002, the GWETS was shut down and rebound evaluation monitoring began.

In 2006, the Agencies conducted an evaluation of existing Site data to determine if there was a potential risk to occupants of area buildings from vapor intrusion of vinyl chloride or other VOCs in the southern flowpath.

III. BASIS FOR THIS ESD

A. Arsenic in Groundwater

At the time the ROD was written in 1985, it was assumed that the GWETS, if it were built, would be capable of treating arsenic as well as other contaminants in groundwater. This assumption remains accurate in the sense that it is technically possible for the GWETS to remove arsenic from groundwater that has been extracted from the Site. However, since the time of the ROD, a new understanding of the groundwater chemistry at the Site has developed, supported by the results of the rebound evaluation, which indicates that a large amount of arsenic is continuously being mobilized by Site conditions, at a rate and in locations that would overwhelm any effort to remove it through the GWETS. This new information has led to the need to revisit the original expectation that the GWETS would be capable of achieving cleanup targets for arsenic in the same manner as for other contaminants.

Design and purpose of the GWETS

The purpose of the GWETS, as it was conceived in the ROD and as it was designed and implemented in the early and mid 1990s, was to capture contaminated groundwater beneath the landfill, to remove or treat contaminants, and to reinject treated groundwater back into the aquifer. This approach rested on the twin assumptions that the landfill was the only source of groundwater contamination, and that the supply of contaminants, although significant, was limited. Under this scenario, it was expected that gradual removal or treatment of contaminants in the portion of the aquifer beneath the landfill would eventually lower contaminant concentrations within the plumes downgradient of the landfill, to the point that ACLs were achieved.

Extensive data gathered from before, during and after the period of GWETS operation show that in fact the assumptions underlying the use of the GWETS were accurate with respect to contaminants other than arsenic. Removal/treatment of contamination in the groundwater beneath the landfill has led to significantly reduced concentrations of all contaminants other than arsenic in the northern and southern flowpaths, to the point that ACLs are or will soon be achieved.

In stark contrast to the other contaminants, arsenic is currently found in groundwater at most downgradient wells at concentrations comparable to those measured prior to GWETS operation, and at levels significantly above the ACL. While the GWETS removed approximately 60 pounds of arsenic during each year that it was operating, the data show that significant remediation of arsenic concentrations in groundwater under the landfill and in downgradient flow paths did not occur. These results suggest that the assumptions underlying the use of the GWETS were not accurate with respect to arsenic, but they are consistent with what is now understood about the mobilization of naturally occurring arsenic in aquifers which are within the influence of a landfill, as explained below.

Mobilization of naturally occurring arsenic

While arsenic can come from man-made products, it also occurs naturally in rocks and soil, and is found widely in the environment. Naturally occurring arsenic is common in Maine, where there are extensive deposits of arsenopyritic materials. Arsenic can be mobilized from these deposits in dissolved form through natural processes such as weathering or as the result of anthropogenic changes in pH or oxidation-reduction conditions. In particular, if an aquifer becomes anaerobic/reducing, arsenic that was previously held to soil particles and to the bedrock in the aquifer will be released into the surrounding groundwater.

It is now known that the natural microbial activity associated with the degradation of organic waste placed in landfills, such as that contained in the Winthrop landfill, can cause an aquifer to become anaerobic/reducing for a period of decades to centuries. The anaerobic/reducing conditions in the aquifer, in turn, cause the mobilization of arsenic

into groundwater over roughly the same period, giving rise to elevated concentrations of arsenic in the aquifer for an extended period of time.

Inability of the GWETS to address arsenic mobilization

In contrast to the assumptions underlying the design of the GWETS, the ongoing mobilization of arsenic presents a very different scenario. Because natural sources of arsenic are present throughout the aquifer, it is not feasible to lower downgradient concentrations simply through removal of arsenic in upgradient areas; treated groundwater leaving the area beneath the landfill would simply be re-contaminated as it moved through the northern and southern flowpaths. Even more problematic, from the perspective of a removal technology, is that the supply of arsenic is effectively unlimited, so that arsenic which is removed from any point in the aquifer will continually be offset by the addition of newly mobilized arsenic.

These facts, supported by the results of the rebound evaluation, indicate that continued operation of the GWETS will not have any significant effect on arsenic concentrations in the future.

The Agencies have also reviewed whether or not there were other technologies available to address the remaining arsenic in groundwater. As part of this evaluation, EPA required UTC to conduct an Engineering Evaluation/Cost Analysis or EE/CA. This EE/CA evaluated engineering methods to address this problem by accelerating the process of waste degradation, thereby shortening the period over which the aquifer would be anaerobic. However, as explained in the EE/CA, these types of measures were not recommended primarily on the basis that they were prohibitively expensive, of uncertain effectiveness, or both. UTC and its contractor MACTEC conducted investigations, including pilot studies, of technologies to return the aquifer to aerobic conditions to prevent the further mobilization of arsenic, technologies for immobilizing existing dissolved arsenic in groundwater, and technologies for capturing dissolved arsenic in groundwater prior to its discharge in the lake and brook. However, as discussed in the EE/CA, each of these approaches was also considered inadvisable due to technical challenges, cost considerations, and/or the fact that the remedy would not be permanent. The conclusion reached was that there are no currently available technologies which could address mobilization of naturally occurring arsenic in a cost-effective and reliable manner**.**

B. Arsenic and Other Contaminants at Points of Exposure

As previously outlined, reducing conditions are causing mobilization of arsenic, as well as other metals, in flowpaths, most notably the northern and southern flowpaths which lead to Hoyt Brook and Annabessacook Lake respectively. As groundwater containing arsenic discharges into surface water bodies, arsenic comes out of solution and discharges to sediment. Over time, these discharges to sediment gradually accumulate, and in the

past, as previously discussed, arsenic did accumulate to the point that PCLs were exceeded in sediment at Hoyt Brook and Annabessacook Lake.

Arsenic in groundwater will be addressed through natural processes over an extended period of time. Additional measures are required to address ongoing arsenic discharge, as well as discharge of other metals, to surface water and sediment. This ESD requires the development and implementation of a plan to monitor and remediate points of exposure as necessary, including arsenic accumulation in sediment, to ensure continued protection of human health and the environment at potential points of exposure.

C. Vapor Intrusion

During the GWETS rebound evaluation, vinyl chloride was observed at one well in the southern flowpath above the reactivation criteria. In order to allow the rebound evaluation to continue, but still maintain protection of human health and the environment, the Agencies approved a Vinyl Chloride Contingency Plan that outlined definitive response actions to a confirmed exceedance of the reactivation criteria. The Contingency Plan also established action levels for evaluating potential vapor migration into indoor air, and also requires remediation in the southern flowpath if data indicate that vinyl chloride is likely to migrate to Annabessacook Lake. Since implementation of the Contingency Plan in November 2003, remediation has not been required.

In 2006, the Agencies conducted a supplemental evaluation of existing Site data to determine if there was a potential risk to occupants of buildings in the southern flowpath from vapor intrusion of vinyl chloride or other VOCs. The Agencies have determined that conditions currently at the Site do not present an unacceptable risk via the vapor intrusion pathway, but that continued monitoring, evaluation, and remediation if necessary, is required to ensure that changes in conditions do not present an unacceptable risk in the future from vinyl chloride or any other Site-related contaminants.

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES

A. Decommissioning GWETS/Attainment of Arsenic ACL

The remedy as presented in the 1985 ROD included a requirement to construct and operate a groundwater extraction and treatment system, if necessary, to reduce levels of all groundwater contaminants below cleanup targets known as ACLs. The Agencies have concluded that the GWETS, after operation for a period of years, has been successful in treating all groundwater contaminants, with the exception of arsenic, to the point that concentrations are below, or will soon be below, ACLs. As a result, the GWETS will be decommissioned in light of the fact that it is no longer necessary to treat contaminants other than arsenic and the fact that it will not be effective in treating arsenic.

As discussed above, the continuing problem of elevated arsenic concentrations in groundwater is the result of a large-scale and long-term alteration in the chemistry of area

groundwater caused by the natural degradation of material in the landfill. After an evaluation of possible engineering measures to address this problem, the Agencies have concluded there are no currently available technologies which could address mobilization of arsenic and its effects in a cost-effective and reliable manner. As a result, protective levels of arsenic in groundwater will be met through natural processes. It is expected that an extended period of time will be required before protective levels of arsenic in groundwater are reached at the point of compliance (the edge of the waste management unit). However, EPA believes this is reasonable given conditions at the Site and the fact that the community is connected to a public drinking water supply system.

It should be noted that since the ROD was written and ACLs were developed, EPA has revised the safe drinking water standard for arsenic downward from 50 ppb to 10 ppb. The interim Maine Maximum Exposure Guideline for arsenic in drinking water is also 10 ppb. At this Site, the ACL for arsenic is set at 30 ppb. This calls into question the protectiveness of the ACL selected some time ago. In addition, natural background levels of arsenic in groundwater in the vicinity of the Site have not been determined but may exceed the MCL of 10 ppb and/or the ACL of 30 ppb. Under the Superfund law, EPA cannot cleanup contaminants at a site below natural background concentrations. Given these two outstanding issues, as levels of arsenic approach the ACL of 30 ppb or at such other time as determined by EPA, a study shall be conducted to determine background for arsenic in groundwater for this Site. Based upon the results of that study, the ACL for arsenic maybe revised to the higher of the MCL or background.

Site-wide monitoring of groundwater, surface water, and sediment will continue until such time that the Agencies determine monitoring is no longer necessary for the protection of human health. If elevated levels of Site contaminants are detected during Site-wide monitoring, appropriate measures will be taken to investigate, evaluate, and, as necessary, remediate, these elevated contaminant levels.

B. Arsenic and Other Contaminants at Points of Exposure

To address the ongoing accumulation of arsenic at points of exposure, including sediment, and any future PCL exceedance at points of exposure from Site-related contaminants, a Point of Exposure Monitoring and Remediation Work Plan will be developed and implemented. This plan will require periodic monitoring at points of exposure, including sediments, and will set forth a phased response to the discovery of any exceedance of the PCL for arsenic in sediment (31,000 ppb), including, at a minimum, procedures for confirmation sampling, for delineation of the areal extent of the exceedance, for determining whether remedial actions, including excavation of sediment and off-site disposal, are necessary to protect human health or the environment at the location where the PCL exceedance is discovered, and for implementing any other response actions determined by the Agencies to be necessary.

C. Vapor Intrusion

With respect to vinyl chloride, monitoring of groundwater and soil gas will continue as required by the Vinyl Chloride Contingency Plan. The potential for vapor intrusion from vinyl chloride or any other Site-related contaminants will continue to be evaluated. Based upon an evaluation of monitoring results, additional response actions, as appropriate, may be required under this ESD to ensure that the remedy remains protective. This monitoring will continue until such time as the Agencies determine monitoring is no longer necessary for the protection of human health.

All remaining components of the original remedy remain unchanged.

Change in Expected Outcomes

Due to the inability of the GWETS to reduce elevated arsenic levels, and the inability of other technologies to address the problem, it is likely to take significantly longer to achieve the ACL for arsenic than anticipated at the time of the 1985 ROD. It is important to emphasize that this increase in the time to achieve the ACL is not the result of the decommissioning of the GWETS, but rather the result of inherent limitations to the original remedy which were unforeseen at the time the ROD was being developed. It is also worth noting that operation of the GWETS most likely shortened the overall period of time that ultimately will be required to attain the ACL for arsenic, through the removal of a significant amount of organic contaminants which would otherwise have lengthened the amount of time in which reducing conditions in the aquifer continued to cause mobilization of arsenic.

All other expected outcomes remain unchanged.

V. Support Agency Comments

ME DEP participated with EPA in developing the changes to the selected remedy described herein and concurs with these changes as provided in Attachment A.

VI. Statutory Determinations

EPA believes that the remedy as adjusted herein remains protective of human health and the environment and satisfies the requirements in Section 121 of CERCLA. The changes made in this ESD have not changed the remedial action objectives for the Site. Rather, the modifications to the remedy described herein will allow the remedy to continue to perform in the most cost-effective manner practicable while meeting all of the statutory requirements of CERCLA.

VII. Public Participation Compliance

In accordance with Section 117(d) with CERCLA and Section 300.825(a) of the NCP, this ESD will become part of the Site's Administrative Record which is available for public review at the locations identified in the introduction to this document.

Although a formal comment period is not required when issuing an ESD, EPA, ME DEP and UTC mailed a fact sheet to citizens notifying them of a public meeting on August 28, 2006 to discuss the ESD, and that EPA would collect public comments from August 28, 2006 to September 15, 2006. On September 4, 2006, EPA received a request for a 30 day extension to the public comment period. EPA granted the request, extending the public comment period until October 16, 2006.

EPA received two submittals during the public comment period, one from a consultant on behalf of a local citizens group, and one from an individual. These comments, and EPA's responses, are summarized in Attachment E to this document. In addition, a markup of the ESD was provided by UTC's contractor, MACTEC, and certain of MACTEC's suggested wording changes have been incorporated into this final ESD as appropriate.

As required by NCP section 300.435(c)(2)(i)(B), EPA will publish a notice of availability and a brief description of this ESD in a major local newspaper of general circulation following the signing of this ESD.

REFERENCES

United States Environmental Protection Agency
Superfund Enforcement Decision Document: Winthrop Landfill, ME
November 22, 1985

Consent Decree, Civil Action No. 86-0029-B and 86-0031-B
Winthrop Landfill Superfund Site
March 23, 1986

Final Rebound Evaluation Work Plan
Winthrop Landfill
MACTEC Engineering and Consulting for United Technologies Corp.
February 2003

Contingency Plan, Vinyl Chloride Reactivation Criterion Exceedance
Winthrop Landfill Rebound Evaluation
MACTEC Engineering and Consulting, Inc. for United Technologies Corp.
October 2003

Post-GWETS Engineering Evaluation/Cost Analysis
Winthrop Landfill
MACTEC Engineering and Consulting, Inc. for United Technologies Corp.
August, 2006

Citizen Update Memos:

Memo from MACTEC Engineering and Consulting to
Citizens Adjacent to the Former Winthrop Landfill
Winthrop Landfill Groundwater Extraction and Treatment System
Rebound Evaluation Program Status
February 17, 2003

Memo from MACTEC Engineering and Consulting, Inc. to
Citizens Adjacent to the Former Winthrop Landfill
Winthrop Landfill Groundwater Extraction and Treatment System
Rebound Evaluation Program Status Update, Volume 2, Fall 2003
October 24, 2003

Memo from MACTEC Engineering and Consulting, Inc. to
Citizens Adjacent to the Former Winthrop Landfill
Winthrop Landfill Groundwater Extraction and Treatment System
Rebound Evaluation Program Status Update, Volume 3, Fall 2004
November 19, 2004

Memo from MACTEC Engineering and Consulting, Inc. to
Citizens Adjacent to the Former Winthrop Landfill
INVITATION – Public Meeting and Informational Session for Winthrop Landfill Superfund Site, August 28, 2006, Town Hall, 17 Highland Ave., Winthrop, Maine; Informational Session 3:00 PM to 5:30 PM, Followed by Public Meeting at 6:30 PM. August 8, 2006

EPA Guidance:

U.S. Environmental Protection Agency (USEPA). 1990. *National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan).* Code of Federal Regulations, Title 40, Part 300, Federal Register, Volume 55, Number 46, pp. 8866 et. seq. March 9, 1990.

U.S. Environmental Protection Agency (USEPA). 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Documents.* Office of Solid Waste and Emergency Response, Washington D.C. Directive 9200.1-23.P. July 1999.

U.S. Environmental Protection Agency (USEPA). 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils.* RCRA/2002/033. November 2002.
http://www.epa.gov/correctiveaction/eis/vapor.htm

ATTACHMENT A
ME DEP Concurrence Letter

ATTACHMENT B
Site Map

ATTACHMENT C
Sampling Locations

ATTACHMENT D
EPA and ME DEP Approved Alternate Concentration Limits and Protective Concentration Limits

ATTACHMENT E
Response to Comments Received from the Public.

ATTACHMENT A
ME DEP Concurrence Letter

SDMS DocID 260744

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

RECEIVED
IMMEDIATE OFFICE
2007 FEB -5 P 3:17
OFFICE OF
SITE REMEDIATION
AND RESTORATION

February 1, 2007

Mr. James T. Owens
U.S. EPA, Region 1
1 Congress Street
Suite 1100 (HBT)
Boston, MA 02114-2023

Re: Explanation of Significant Differences, Winthrop Landfill Superfund Site, Winthrop, Maine

Dear Mr. Owens:

The Maine Department of Environmental Protection (MEDEP) has reviewed the January 8, 2007 Explanation of Significant Differences (ESD) for the Winthrop Landfill Superfund Site located in Winthrop, Maine. Additionally, the MEDEP has worked closely with EPA throughout the implementation of the remedy that was set forth in the November 22, 1985, Enforcement Decision Document (presently referred to as the Record of Decision or ROD).

Based on our review of the ESD, the MEDEP concur with the three (3) major components of the ESD which are:

- a decision requiring the decommissioning of the GWETS and attainment of the arsenic Alternative Concentration Limit (ACL) through natural processes;
- a requirement to monitor and evaluate contaminants at points of exposure and, if warranted, remediation of contaminants that pose an unacceptable risk; and
- a requirement to continue monitoring, evaluation and remediation of the risk posed by potential vapor intrusion, as necessary.

The MEDEP looks forward to a continuation of our collaborative working relationship with EPA at this site. If you have any questions please call me at (207) 297-2651.

Sincerely,

Mark Hyland, Director
Bureau of Remediation and Waste Management

pc: Rebecca Hewett, MEDEP
Theodore Wolfe, MEDEP
Hank Aho, MEDEP
Anni Loughlin, EPA
Mary Jane O'Donnell, EPA

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

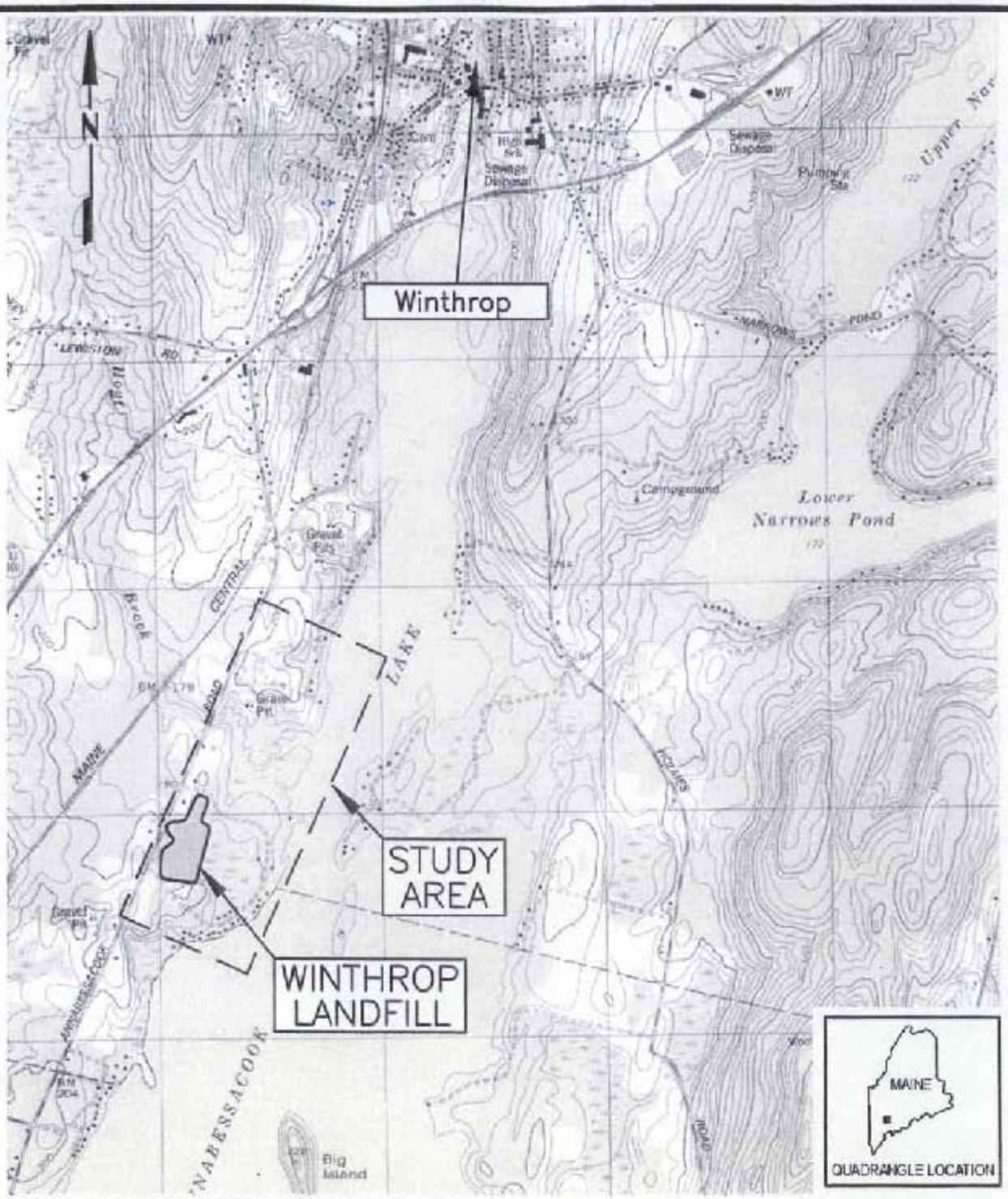
PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

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

printed on recycled paper

ATTACHMENT B
Site Map



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 7.5-MINUTE SERIES, WINTHROP, ME., DATED 1980.

0 1000 2000
Scale in feet

Prepared/Date: JJW 02/21/06
Checked/Date: NWH 02/21/06

United Technologies Corporation
Winthrop Landfill

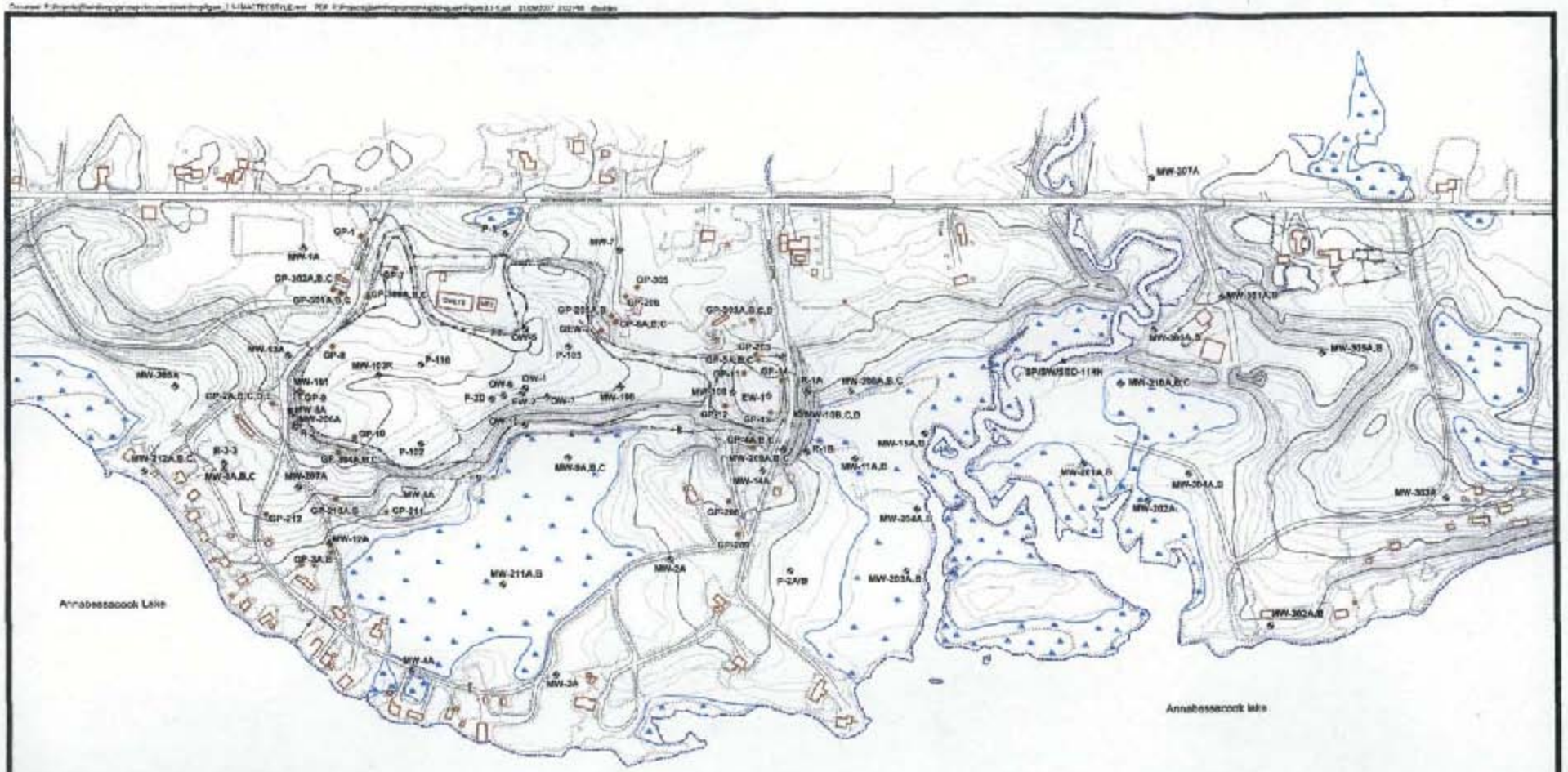
MACTEC

Site Location
Post-Closure Monitoring Report
Winthrop Landfill

Project No. 3617057085 FIGURE 1.0-1

M:\Projects\5135\051351123e.dwg Tue, 21 Feb 2006 - 4:29pm dellawrence

ATTACHMENT C
Sampling Locations



Notes:
1. (SW) Surface Water/Sediment Location, (SB) Sphagnum Bog Surface Water Measurement, (SM) Seep/Marsh Surface Water Measurement, (BR) Nort Brook Surface Water Measurement (MW) Groundwater Monitoring Well, (P) Piezometer, (EW) Extraction Well, (R) Reinjection Well

Legend

- Groundwater Measurement Location
- Surface Water Measurement Location
- Monitoring Well, Extraction Well, or Piezometer Location
- Landfill Gasprobe Monitoring Location
- Surface Water/Seep/Sediment Sampling Location
- Tree Line
- Roads/Driveways
- Index Contours (10 ft)
- Intermediate Contours (2 ft)
- Water Boundary
- Bog/Marsh
- Landfill Limit Boundary
- Building Outlines
- Fence
- Gate

N

0 175 350 Feet

Prepared/Date: DBW 01/09/07
Checked/Date: NWH 01/10/07

United Technologies Corporation
Winthrop Landfill
Winthrop, Maine

MACTEC

Groundwater and Surface Water/Sediment and Gas Probe Monitoring Locations

Project 3617057085 Figure 2.1-1

ATTACHMENT D
EPA and ME DEP Approved Alternate Concentration Limits and Protective Concentration Limits

TABLE 6

EPA AND DEP APPROVED ALTERNATE CONCENTRATION LIMITS AND PROTECTIVE CONENTRATION LIMITS FOR THE WINTHROP LANDFILL SUPERFUND SITE

(The numbers in this Table are in parts per billion (ppb))

COMPOUND	A	B	C	D	E
	SEDIMENT PCLs	SURFACE WATER PCL		ACLs	
		Number	Basis	Number	Basis
BENZENE	3,100	5		5	(MCL)
TOLUENE	5,800	650	(MEDEP F&S)	1,000	(MCL)
STYRENE	18,500	27	(MEDEP DW)	100	(MCL)
ETHYLBENZENE	5,500	320	(MEDEP F&S)	440	(ECO)
XYLENES	9,500	590		590	(ECO)
METHYLENE CHLORIDE	3,900	5		5	(MCL)
TRICHLOROFLUROMETHANE	7,500	2,300		2,300	(MEG)
CHLOROETHANE	1,800	1,300#		1,300	(ECO)
1,1-DICHLOROETHANE	3,800	5		5	(MEG)
1,2-DICLOROETHANE	5,700	0.73	(EPA F&S)	5	(MCL)
1,1,1-TRICHLOROETHANE	11,800	200		200	(MCL)
1,2-DICHLOROPROPANE	7,500	5		5	(MCL)
VINYL CHLORIDE	1,300	0.32	(EPA F&S)	2	(MCL)
1,1-DICHLOROETHYLENE	1,800	0.34	(EPA F&S)	7	(MCL)
1,2-DICHLOROETHYLENE	460	70		70	(MCL)
TRICHLOROETHYLENE	7,200	5		5	(MCL)
TETRACHLOROETHYLENE	3,000	1.9	(EPA F&S)	5	(MCL)
ACETONE	4,100	390		390	(ME DW)
2-BUTANONE (MEK)	2,600	170		170	(MEG)
2-HEXANONE (MBK)	920	1,400		1,400	(ME DW)
4-METHYL-2-PENTANONE (MIBK)	30,300	190		190	(ME DW)
PHENOL	600	160		160	(ECO)
2,4-DINITROPHENOL	18	31		31	(MEG)
TETRAHYDROFURAN	8,000	3,300		3,300	(ME DW)
DIMETHYLFORMAMIDE	1,200	390		390	(EPA & ME DW)
2-METHOXYETHANOL	810	46		46	(ME DW)
DIETHYLPHALATE	8,300	1,700	(MEDEP F&S)	2,900	(ECO)
DI-2-ETHYLHEXYL ADIPATE	2,100,000	2	(EPA F&S)	40	(ECO)
NICKEL	50,000	88		88	(ECO)
ZINC	270,000	59		59	(ECO)
ARSENIC	31,000	0.77-30	(BACKGROUND)	30	+

\# : Chloroethane shall be 3,500 at the Seeps and Marshes based on eco.

\+ : Formerly a Maine Maximum Exposure Guideline.

ATTACHMENT E
Response to Comments Received from the Public

ATTACHMENT E

RESPONSE TO COMMENTS RECEIVED FROM THE PUBLIC ON THE DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCES WINTHROP LANDFILL SUPERFUND SITE WINTHROP, MAINE February 2007

PREFACE

In August, 2006, the United States Environmental Protection Agency (EPA) issued a draft Explanation of Significant Differences (ESD) for the Winthrop Landfill Superfund Site in Winthrop, Maine. The draft ESD addressed differences between the remedial action being undertaken at the Site and the remedy that was set forth in the Record of Decision (ROD) for the Site on November 22, 1985.

Although a formal comment period is not required in connection with an ESD, EPA and the Maine Department of Environmental Protection (ME DEP) invited citizens to a public meeting on August 28, 2006 to discuss the ESD, and announced that EPA would collect public comments from August 28, 2006 to September 15, 2006. On September 4, 2006, EPA received a request for a 30 day extension to the public comment period. EPA granted the request, extending the public comment period until October 16, 2006.

During the comment period, comments were submitted by an individual and by a consultant on behalf of a local citizens' group. A summary of each comment and the Agencies' response to the comment is provided below. EPA also received a markup of the ESD from United Technologies Corporation (UTC). All comments are paraphrased below. To the extent that the Agencies agree with UTC's suggested changes to the ESD, those changes are summarized below and are reflected in the final ESD.

RESPONSE TO COMMENTS

Comment 1: Assuming that the landfill was responsible for above natural production of arsenic, were adequate numbers of extraction wells located as part of the Groundwater Extraction and Treatment System (GWETS) to cover the total landfill (dump) area?

Response 1: The Agencies believe that an adequate number of extraction wells were installed as part of the GWETS to cover the area within the landfill boundary. This is reflected by the fact that, when the GWETS was running, groundwater traveled inward from the fence line surrounding the landfill toward the extraction wells. However, it is important to note that the current arsenic problem, although caused by the landfill, is occurring largely in groundwater outside the landfill boundary, which is beyond the influence of the GWETS as it is currently configured.

The Agencies do not believe that the GWETS could successfully be modified to reach the groundwater outside of the landfill boundary, primarily because this would require a much larger treatment system, with an estimated capacity of several hundred gallons per minute. It is unlikely that such a system could be implemented effectively. The existing GWETS operated at a capacity of 65 gallons per minute throughout most of its operational life, and even at this low flow rate, legal and technical limitations were encountered relating to the disposal of clean treatment plant effluent. The only legally approved alternative for disposal of clean water was discharge to groundwater (injection of water back into the ground, or "recharge"). Several recharge wells were installed, and supplemented with additional wells and recharge trenches. Despite significant efforts and expense to keep these recharge systems operating at capacity, the systems frequently clogged due to physical and chemical limitations in the aquifer. The Agencies believe that these legal and technical limitations on the amount of effluent which can be disposed effectively prevent the expansion of the GWETS to a size necessary to address groundwater beyond the landfill boundary.

Comment 2: Could chemicals stored in barrels made of plastic instead of steel have been disposed in the landfill, and if so, might those plastic barrels degrade more slowly?

Response 2: It is possible that plastic barrels containing chemicals were disposed in the landfill, although such barrels were not specifically noted in the documented history of the Site. Plastic barrels would not have been detected using conventional magnetometry that was used to locate metal drums. However, even if an intact, full, and sealed plastic barrel were present in the landfill and ruptured in the future, it is likely that continued monitoring would detect such an event, and that any necessary response would be on a much more localized scale. The Agencies believe it is very unlikely that any such scenario would ever warrant a response akin to restarting the GWETS system. Further, while the Agencies would seek to address any such scenario within the landfill boundary if possible, groundwater travel times from the landfill to the seep areas range from five to 15 years, providing an adequate amount of time to address any such scenario before the contaminants would reach a point of exposure.

Comment 3: One commenter agreed that the probability of soil vapor migration of vinyl chloride into area homes in the southern flowpath is low due to the relatively low concentrations of vinyl chloride in groundwater, its limited lateral extent, the presence of a relatively impermeable layer between groundwater and the nearest residence, and no detections of vinyl chloride in GP-2 gas probes located over shallow groundwater between the landfill and the nearest residence. The commenter notes that findings on soil vapor in the southern flowpath are limited to a single cluster of gas probe measurements (at location GP-2), and recommends installation and sampling of additional gas probe clusters perpendicular to groundwater flow (east and west of GP-2).

Response 3: The GP-2 cluster currently includes four vertically-separated screen zones above the water table, adjacent to the area of the flowpath with the highest detected vinyl chloride concentrations and the only area where vinyl chloride has been detected at the

water table. Given that groundwater downgradient of this area has not contained landfill constituents at the water table, and in light of the relatively low levels of vinyl chloride and other volatile organic compounds observed in groundwater in the southern flowpath, it appears that the likelihood is low for volatile landfill constituents to partition into soil vapor. The Vinyl Chloride Contingency Plan currently includes a provision for taking action to prevent vapor migration if vinyl chloride exceeds a conservative criterion (2 parts per billion) at downgradient wells MW-8-B or MW-8C, which are located upgradient of homes along the Annabessacook Lake shore; to date there has been no exceedance of this criterion. If conditions change in the southern flowpath, the Agencies will consider installation and sampling of additional gas probe clusters as necessary.

Comment 4: A commenter notes that landfill gas measurements for methane and other parameters be continuously tested, and subsurface methane testing continue at/beyond the landfill perimeter so long as the landfill is generating significant quantities of methane.

Response 4: Landfill gas measurements are taken on a quarterly basis from 29 locations located both on and off the landfill for methane, oxygen and carbon dioxide as part of the Site's routine monitoring program. The measurements continue to ensure that landfill gas containing greater than 5 percent methane does not migrate past the Landfill property line. Additionally, a Town of Winthrop Groundwater and Air Protection Ordinance controls development on lots near the landfill that may potentially be affected by migration of landfill gases.

Comment 5: A commenter suggested that additional information regarding the source of arsenic (landfill vs. groundwater background) and geochemical parameters such as pH, oxygen content, alkalinity and redox potential was needed to determine the effectiveness of various remedial approaches. The commenter also requested a presentation of evidence that rules out the landfill as a source of arsenic.

Response 5: Definitive studies of the source of arsenic and alternative remediation technologies for arsenic, including pilot studies at Winthrop Landfill, have been conducted by UTC, its consultants, and research scientists from the University of Connecticut, Columbia University, and Barnard College. Among other findings, a study published in 2003 concluded that the dissolved arsenic in groundwater flowing away from the Site does not appear to originate within the landfill. The results of many of these studies are referenced in the recent Engineering Evaluation/Cost Estimate (EE/CA) for this Site. Based on the findings of these studies, the Agencies believe that a virtually limitless source of naturally-occurring arsenic exists in the soil and rock around the landfill and that the landfill leachate will continue to mobilize this arsenic for the foreseeable future. As explained in the ESD and documented in the EE/CA, the Agencies have also determined that no currently available technology exists which could address the problem of arsenic mobilization in a reliable and cost-effective manner.

Comment 6: A commenter requested that EPA facilitate involvement by the Winthrop Landfill Citizens Action Group (WLCAG) in the continuing investigation and remedial

selection efforts pertaining to arsenic in sediment. The commenter states this should include a provision for funding expertise for WLCAG via continuation of the Technical Assistance Grant (TAG) process.

Response 6: The Agencies agree that local citizens should be involved in ongoing discussion regarding issues relating to contamination at points of exposure, including arsenic in sediment. The Agencies plan to facilitate a meeting with the WLCAG group within the next several months. While the WLCAG previously received funding via EPA's TAG program, this grant has expired, and the group would have to reapply to receive such funding, if available.

Comment 7: A commenter stated that all parties should expand their efforts to identify additional candidates for remedial technologies that may be effective in addressing the arsenic problem.

Response 7: The Agencies and UTC believe that that there are no currently available technologies which could address mobilization of naturally occurring arsenic in a cost-effective and reliable manner that would prevent discharge of arsenic to points of exposure. All parties will, however, remain open to advancements in remediation technologies in the future and evaluate such developments as appropriate. The Agencies will work with all parties to develop and implement a plan to monitor and remediate points of exposure as necessary, including arsenic accumulation in sediment, to ensure continued protection of human health and the environment at potential points of exposure.

Comment 8: Regarding plans to decommission the GWETS, one commenter questions if the GWETS has an effect on arsenic levels at the Annabessacook Lake and Hoyt Brook seep areas. Based on Figure 2.4-3 in the Post-Closure Monitoring Report dated August 2006, the commenter observes that arsenic levels appeared to drop to near PCLs during GWETS operation and rise following shutdown of the GWETS, suggesting a correlation between operation of the GWETS and arsenic levels in sediment in the Lake. A similar trend appears to occur in sediment at Hoyt Brook.

Response 8: The Agencies believe that the drop of arsenic levels in sediment at both areas is the result of the excavation and removal of sediment in these areas, rather than operation of the GWETS. As noted in the draft ESD, UTC excavated a large area of exposed contaminated sediment in Annabessacook Lake in October 1996. A similar excavation of sediment in Hoyt Brook occurred in December 1997. Arsenic concentrations in sediment at the respective seep areas have increased since the sediment excavations were conducted, as a result of arsenic precipitating out of solution from groundwater discharging to these areas. This process was not significantly altered by GWETS operation, and trend plots of groundwater indicate no change after the GWETS was shut down for the rebound evaluation. Further, groundwater travel time from the landfill to the seep areas ranges from five to 15 years. Since the GWETS was shut down

in November 2002, groundwater leaving the landfill since that time has not yet reached the seep areas.

Comment 9: One commenter urges caution with regard to removal of the GWETS, stating there may be no compelling reason why the inactive system can't be maintained in a state of readiness (with continued monitoring) until the remedial selection process for arsenic is completed.

Response 9: The Agencies believe it is very unlikely that any future scenario would ever warrant a response akin to restarting the GWETS system. Even in the unlikely event that ex-situ treatment of groundwater is required, the systems and processes inside the GWETS building would not be appropriate. The majority of the systems, including metals precipitation, were designed to assist in the removal of VOCs, the bulk of which have now been addressed. The Agencies believe that any residual contamination, if it were to occur, would be more appropriately addressed through a response specifically tailored to the nature and location of the contamination.

Significant human and infrastructure resources, including the cost of inspection and maintenance of equipment and the cost of heating the building, are currently being expended to maintain the GWETS in a state of readiness. Given that the GWETS will not be a useful resource in any future remediation at the Site, it does not make sense to continue this significant expenditure of resources.

Comment 10: One commenter suggested that it is conceivable that the GWETS could be adapted to alter the flow of groundwater in a manner that alleviates the current arsenic problem.

Response 10: The Agencies do not believe that the GWETS could be adapted to alter the flow of groundwater in a manner that will address the ongoing discharge of arsenic to the points of exposure, primarily because the extraction system was not originally designed to reach beyond the landfill boundary to capture plumes migrating to the south and north of the landfill as previously described.

Changes made to ESD in response to UTC suggestions:

- Clarification in the Declaration and in the ESD Introduction that additional measures shall address arsenic or any other Site-related contaminants to any point of exposure, including, but not limited to, sediment.
- Clarification in the ESD Introduction that monitoring and evaluation of potential vapor intrusion will occur for any Site-related contaminant as necessary, including, but not limited to, vinyl chloride.
- Clarification in the Declaration that other metals, in addition to arsenic, accumulated in area sediments, and that excavation of sediment at two points of exposure have occurred once, not periodically.

- Language added in the Declaration to indicate that the combination of the landfill cap and the GWETS has reduced concentrations of most groundwater contaminants, and to clarify that continued GWETS operation would not expedite attainment of Alternate Concentration Limits (ACLs).
- In the ESD Site History, deleted reference to the southern flowpath as the "primary" flowpath.
- Correction of minor typographical errors and references to UTC's contractors.