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Environmental Protection
Agency

Office of
Emergency and
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September 1989

EPA

Superfund Record of Decision:

Saco Tannery Waste Pits, ME

50272-101

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Saco Tannery Waste Pits, ME
First Remedial Action - Final

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16. Abstract (Limit: 200 words)

The Saco Tannery Pits site is in Saco, Maine, approximately 15 miles southwest of Portland, Maine. The 233-acre site is in a rural area which includes forests and wetlands, and lies within the 100-year floodplain of Stuart Brook. Between 1959 and the early 1980s a leather tannery operator used the site to dispose of process wastes in two 2-acre lagoons and 53 smaller disposal pits. EPA and State investigations in the early 1980s led to a removal response action which included pumping liquids from three waste pits and neutralizing the remaining sludge from the pits. This Record of Decision addresses both source control and ground water remediation and identifies a contingency plan in the event the State legislature fails to enact the necessary institutional controls within two years. The primary contaminants of concern affecting the sediment, sludge, ground water, and surface water are metals including arsenic, chromium, and lead.

The selected remedial action is contingent upon the State enacting legislation within two years designating the site as a permanent conservation area. The remedy includes pumping and offsite treatment and discharge of water from waste pits and lagoons followed by covering and revegetating waste pits, lagoons and associated wet areas; compensation for six acres of lost wetlands; ground water and surface water monitoring (See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision - Saco Tannery Waste Pits, ME
First Remedial Action - Final
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16. Abstract (Continued)

to determine whether contaminants exceed specified action levels which would require further site evaluation; and implementation of institutional controls. If legislation is not passed to restrict future use of the site, a contingency plan will be implemented which includes excavating and solidifying soil and sludge from the waste pits and lagoons with onsite disposal in a RCRA-permitted landfill, and ground water and surface water monitoring. The estimated present worth cost for the selected remedial action ranges from $9,211,600 to $10,551,400, which includes present worth O&M costs ranging from $2,500,000 to $3,800,000.

ROD SUMMARY

SACO TANNERY WASTE PITS SITE

SACO, MAINE

SEPTEMBER 27, 1989

Saco Tannery Waste Pits Site
Record of Decision Summary

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Saco Tannery Waste Pits Site
Saco, Maine

STATEMENT OF PURPOSE

This Decision Document represents the selected remedial action for the Saco Tannery Waste Pits site in Saco, Maine developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Contingency Plan (NCP) 40 C.F.R. Part 300 et seq. (1985). The Regional Administrator for Region I of the United States Environmental Protection Agency has been delegated the authority to approve this Record of Decision.

The remedial action chosen for the Saco Tannery Waste Pits site includes the selected remedy, and an alternate remedy which will be effective in the event that the selected remedy cannot be implemented. The State of Maine has concurred on the selected and alternate remedy and has determined that these remedies are consistent with applicable and relevant and appropriate Maine laws and regulations. The State of Maine also agrees to implement and enforce the institutional controls and land use restriction components of the selected remedy and the alternate remedy.

STATEMENT OF BASIS

This decision is based on the administrative record which was developed in accordance with Section 113(k) of CERCLA. The attached index (Appendix B to the ROD) identifies the items which comprise the administrative record upon which the selection of the remedial action is based.

The Administrative Record is available for public review at the Dyer Library at 371 Main Street in Saco, Maine and the EPA Region I Waste Management Division Records Center at 90 Canal Street in Boston, Massachusetts.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy for the Saco Tannery Waste Pits site is a comprehensive remedy that combines both a source control and groundwater component. The selected remedy includes the following components:

1. The contaminated sludge in the waste pits and lagoons will be contained by installing a cover system that will minimize the threat of direct contact with and ingestion of soils and sludges.

2. To assure that the soil cover is protected from future destruction, and that future development of the Site is prohibited, the Site is to be converted into a permanent state conservation area pursuant to an act of the Maine State legislature. This state statute requirement (i.e., legislatively created institutional controls) is designed to provide a highly effective means to limit the future uses of the Site property.

3. To address the threat of future leaching of chromium from the waste to the groundwater, a groundwater monitoring network will be established to monitor for releases of chromium. In the event chromium is detected in monitoring wells located on site at levels in excess of the MCL for chromium (50 ppb), an evaluation of the need for additional remedial action will be conducted. In the event chromium is detected in monitoring wells at or around the property boundary at levels in excess of ten times the current MCL for chromium, or 500 ppb, a source area treatment alternative will be selected and implemented.

4. To address the groundwater contamination detected at the Site, groundwater monitoring to determine the levels and movement of arsenic and other contaminants will be also be conducted. With respect to arsenic, an Alternate Concentration Limit (ACL) for arsenic will be the relevant and appropriate standard for four on-site monitoring wells. The relevant and appropriate groundwater standards for all other site contaminants will be the Safe Drinking Water Act Maximum Contaminant Levels (MCLs). EPA will evaluate the need for additional remedial action at the Site in the event that groundwater monitoring reveals any of the following conditions: site related groundwater contaminants other than arsenic are detected in on-site monitoring wells at levels greater than their MCLs; site related groundwater contaminants, including arsenic, are detected in monitoring wells located at or around the Site boundary at

levels greater than their MCLs; or arsenic levels in four specific on-site monitoring wells exceed the ACLs established for arsenic at those wells. Further evaluation of the Site will also be conducted if contaminant concentrations above AWQC are detected in on-site identifiable streams because of discharge of site related groundwater contaminants into surface water.

DESCRIPTION OF THE ALTERNATE REMEDY

This Record of Decision includes an alternate plan in the event that the state statute required under the selected remedy is not enacted. This alternate plan will also be implemented in the event that EPA finds that the necessary state statute is inadequate. If an adequate state statute is not enacted and in effect within two years from September 27, 1989, the execution date of this ROD, the alternate cleanup plan for the Site will become effective.

Under the alternate cleanup plan, the soils and sludges from the waste pits and lagoons will be excavated and solidified, and the solidified materials will be placed in a RCRA hazardous waste landfill to be constructed on-site. In addition, groundwater monitoring would be performed as an interim remedy.

DECLARATION CONCERNING THE SELECTED REMEDY

The selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this remedial action, is cost-effective and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The remedy does not utilize treatment and thus does not meet the preference for remedies that employ treatment as a principal element.

Additionally, because the remedy would result in contaminants remaining on-site, EPA will review the Site at least once every five years after the initiation of the remedial action at the Site to ensure that the remedial action continues to be protective of human health and the environment.

DECLARATION CONCERNING THE ALTERNATE REMEDY

The source control component of the alternate remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this remedial action, is cost-effective and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The remedy utilizes treatment and thus meets the preference for remedies that employ treatment as a principal element.

ROD DECISION SUMMARY

I. SITE NAME, LOCATION AND DESCRIPTION

The Saco Tannery Waste Pits site (the STWP site or the Site) is located in the City of Saco, approximately 15 miles southwest of Portland, Maine. The 233-acre site is bordered by the Maine Turnpike to the east, residential property along Hearn Road to the west, the Saco-Scarborough town line to the north, and Flag Pond Road to the south (see Figure 1).

Between 1959 and about the early 1980's, a leather tannery operated the 233-acre STWP site as a disposal area for process wastes. Wastes from the tanning process were reportedly disposed in two lagoons, each roughly two acres in size, and 53 smaller disposal pits (see Figure 2). The total surface area of contamination is approximately 13 acres.

The majority of the Site is forested; unforested land consists of disturbed areas, wetlands, and bedrock outcrops. Both manmade and naturally occurring wetlands are found on site. Manmade wetlands include the two large lagoons and many of the 53 waste pits on site. A 100-year floodplain is located within the property boundaries, but neither the waste pits or lagoons are located within the floodplain.

The Site is located in a rural, residential area. There are approximately 50 single family homes located within a half-mile radius of the Site. Residential development is concentrated along Jenkins and Hearn Roads (see Figure 1). The Maine Turnpike is located on the eastern border of the Site, limiting development in that direction. Residents who live near the Site obtain their water from private drinking wells, and rely on groundwater for their water supply. The groundwater aquifer in the area of the Site is classified under federal standards as IIB, suitable for public water supplies.

The Site includes two surface water drainageways in the western and northern portions of the Site. Both drainageways originate in the swampy region west of Waste Pits 7, 8, and 9 (see Figure 2). One drainage continues south as a swampy stream with poorly defined channels to a culvert under Flag Pond Road. The second drainage flows north and then east, in a well-defined channel, to a confluence with a more northern tributary to form Stuart Brook. Stuart Brook flows southeast through a culvert under the Maine Turnpike.

A more complete description of the Site can be found in Section 2.0 of the Phase II Remedial Investigation Report and also in Section 1.1 of the Feasibility Study. A more complete description of the wetlands and floodplains can be found in the Wetlands and Floodplains Assessment Report.

The groundwater component of the alternate remedy is an interim remedy. Statutory requirements for the groundwater component of the alternate remedy will be met when a final groundwater remedy is selected.

Additionally, because the alternate remedy would result in contaminants remaining on-site, EPA will review the Site at least once every five years after the initiation of the remedial action at the Site to ensure that the remedial action continues to be protective of human health and the environment.

Sept 27, 1984
Date

Paul G Keough
Regional Administrator,
Region I U.S.
Environmental Protection
Agency

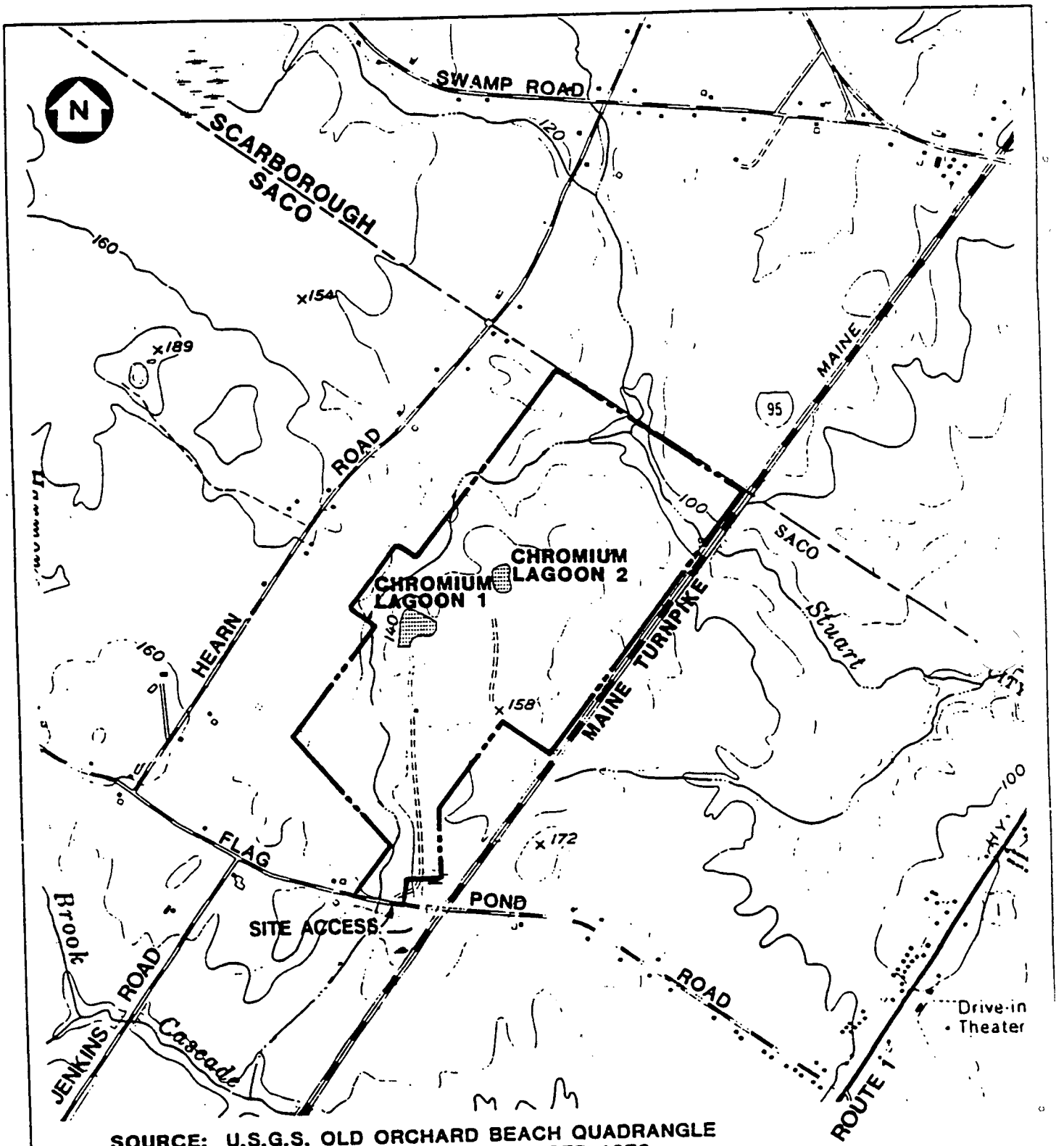
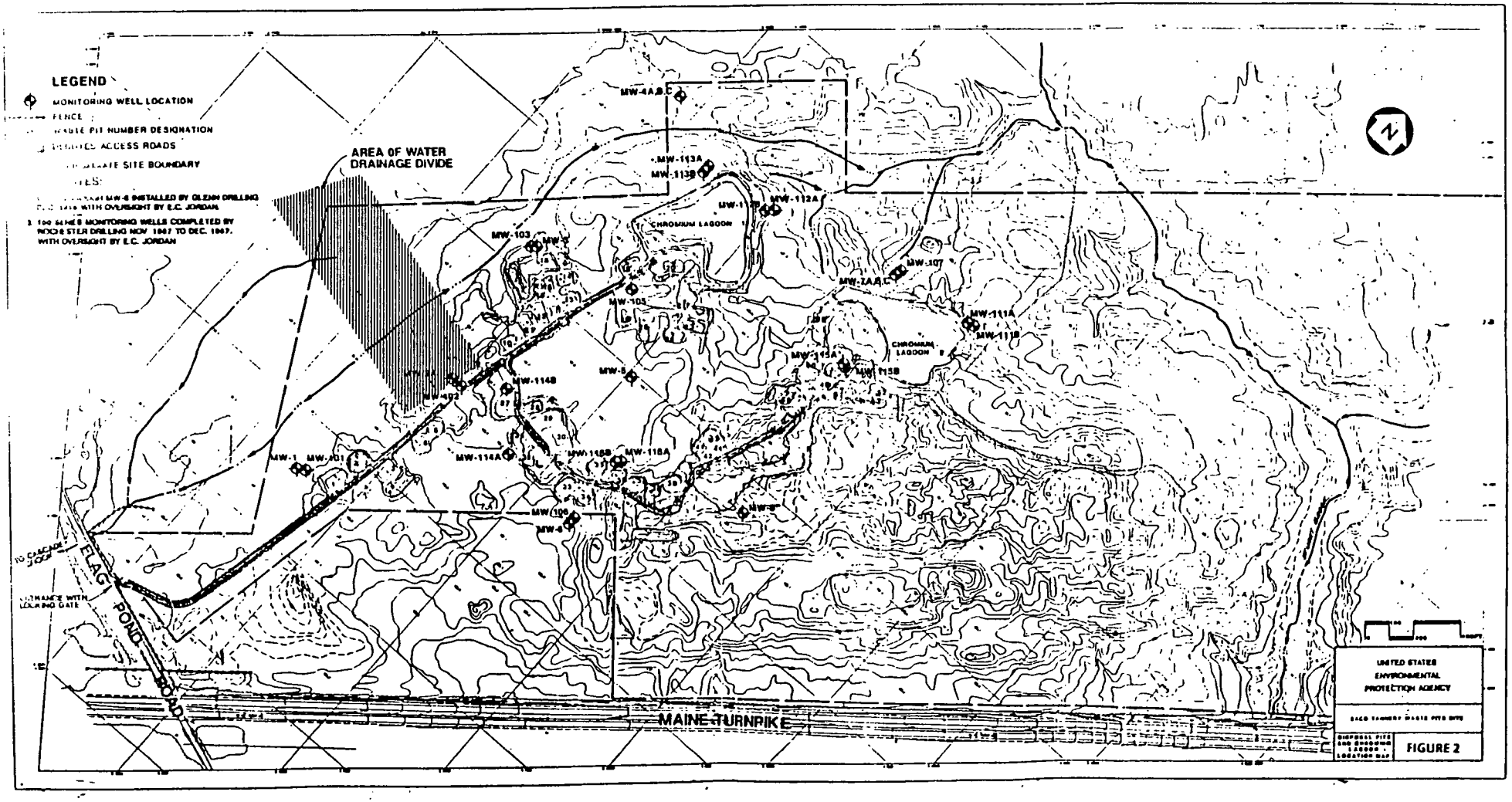


FIGURE 1
SITE LOCATION MAP
SACO TANNERY WASTE PITS SITE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY


LEGEND
MONITORING WELL LOCATION
FENCE
WASTE PIT NUMBER DESIGNATION
ACCESS ROADS
SITE BOUNDARY
NOTES:
1 100 SERIES MONITORING WELLS COMPLETED BY ROCKSTER DRILLING NOV 1987 TO DEC. 1987, WITH OVERSIGHT BY E.C. JORDAN
AREA OF WATER DRAINAGE DIVIDE
MW-4A,B,C
MW-113A
MW-113B
MW-112A
MW-103
MW-2
CHROMIUM LAGOON
MW-107
MW-7A,B,C
MW-105
MW-111A
MW-111B
CHROMIUM LAGOON B
MW-112B
MW-5
MW-114B
MW-3
MW-1
MW-101
MW-114A
MW-116B
MW-116A
MW-106
MW-6
TO CAUCHO JOCK
ENTRANCE WITH LOCKING GATE
FLAG POND ROAD
MAINE TURNPIKE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
FIGURE 2

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Response History Prior to Issuance of the first Proposed Plan

Investigations by the Maine Department of Environmental Protection (DEP or the State) and the United States Environmental Protection Agency (EPA or the Agency) in the early 1980's led to the Site being placed on the National Priorities List in September 1983. From July through October 1983, EPA, in a removal response action at the STWP site, remediated three acid pits which posed an immediate and significant risk to human health. EPA pumped the liquid from the pits, neutralized the remaining sludge with lime, capped the pits, and erected a fence around portions of the site property.

From 1985 to 1987 DEP, under a Cooperative Agreement with EPA, conducted an initial Remedial Investigation (Phase I RI) to determine (1) physical site conditions; (2) contamination resulting from waste disposal at the Site; and (3) health and/or environmental risks associated with the wastes. EPA initiated a Phase II RI and a Feasibility Study in October 1987 to address issues raised during the Phase I RI; to meet the requirements of the Superfund Amendments and Reauthorization Act of 1986 (SARA); and to evaluate potential remedial alternatives for the Site and provide the information necessary to select a remedy.

A more detailed description of the Site history can be found in Section 2.2 of the Phase II Remedial Investigation Report.

B. Issuance of the first Proposed Plan and the revised Proposed Plan

In July 1988, EPA released its first Proposed Plan to address contamination at the STWP Site. Following the issuance of the first Proposed Plan, DEP indicated that it would not concur with EPA's preferred alternative. The DEP refused to concur with EPA's preferred alternative, in part, for reasons of cost-effectiveness. Without DEP's concurrence, and absent DEP's agreement to assist in paying for the costs of the cleanup, the proposed cleanup plan could not be implemented. In view of DEP's comments, EPA reassessed the remedial alternatives considered in the FS and amended one of the source control alternatives considered in the FS. This amended source control alternative was described and evaluated in the FS Addendum, which was released in June 1989. Additionally, in June 1989, EPA released a Wetlands and Floodplains Assessment report to supplement data

contained in the RI and FS.

In June 1989, EPA issued a revised Proposed Plan in which it altered its original recommendations for remedial action at the Site. This Record of Decision adopts as the remediation plan for the Site the preferred alternative recommended in the revised Proposed Plan.

C. Enforcement History

On June 2, 1988, EPA notified three (3) parties who owned or operated the facility, generated wastes that were shipped to the facility, arranged for the disposal of wastes at the facility, or transported wastes to the facility of their potential liability with respect to the Site. Negotiations have not commenced with these potentially responsible parties regarding the settlement of the PRPs' liability at the Site.

One of the PRPs submitted comments on both the first Proposed Plan and the revised Proposed Plan. These comments and EPA's responses are included in the Responsiveness Summary.

III. COMMUNITY RELATIONS

Throughout the Site's history, community concern and involvement has been moderate to high. EPA and DEP have kept the community and other interested parties apprised of the Site activities through informational meetings, fact sheets, press releases and public meetings.

In the winter of 1984-85, DEP released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during remedial activities.

On May 8, 1985, DEP and EPA held an informational meeting at the Dyer Library located on Main Street in Saco to describe the plans for the Remedial Investigation and Feasibility Study.

On May 14, 1986, DEP and EPA held an informational meeting at the Dyer Library to present the findings of the investigations to date.

On December 3, 1987, EPA and DEP held an informational meeting at the Dyer Library to present the findings of the Phase I Remedial Investigation, and to describe the plans for the Phase II Remedial Investigation and Feasibility Study.

EPA published a notice and brief analysis of the first Proposed Plan in the Journal Tribune on July 26, 1988 and made the plan available to the public at the Dyer Library. On August 3, 1988, EPA made the administrative record available for review at EPA's offices in Boston and at the Dyer Library.

On August 2, 1988, EPA held an informational meeting at the Dyer Library to discuss the results of the Remedial Investigations and the cleanup alternatives presented in the Feasibility Study and to present the first Proposed Plan. Also during this meeting, the Agency answered questions from the public. From August 3 to August 24, 1988, the Agency held a three week public comment period to accept public comment on the alternatives presented in the Feasibility Study and the first Proposed Plan and on the other documents which were a part of the administrative record for the Site. On August 16, 1988, the Agency held a public hearing to accept any oral comments. A transcript of this hearing and the comments and the Agency's response to comments are included in the attached responsiveness summary.

EPA published a notice and brief analysis of the revised Proposed Plan in the Journal Tribune on June 26, 1989 and made the plan available to the public at the Dyer Library. On July 11, 1989, EPA made an administrative record addendum available for public review, along with the administrative record, at EPA's offices in Boston and at the Dyer Library. On July 11, 1989, EPA held an informational meeting at the First Parish Congregational Church located on Beach Street in Saco to review the results of the Remedial Investigations and the cleanup alternatives presented in the Feasibility Study and to present the Agency's revised Proposed Plan. Also during this meeting, the Agency answered questions from the public. From July 12 to August 2, 1989, the Agency held a three week public comment period to accept public comment on the alternatives presented in the Feasibility Study and the revised Proposed Plan and on the other documents which were a part of the administrative record and the administrative record addendum for the Site. On July 25, 1988, the Agency held a public hearing to accept any oral comments. A transcript of this hearing and the comments and the Agency's response to comments are included in the attached responsiveness summary.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The selected remedy was developed by combining both a source control and groundwater component to obtain a comprehensive approach for site remediation. In addition, an alternate remedial plan was adopted for this Site in the event that the selected remedy cannot be implemented. In summary, the selected

remedy and the alternate remedy include the following components:

1. The contaminated sludge in the waste pits and lagoons will be contained by installing a cover system that will minimize the threat of direct contact with and ingestion of soils and sludges.

2. To assure that the soil cover is protected from future destruction, and that future development of the Site is prohibited, the Site is to be converted into a permanent state conservation area pursuant to an act of the Maine State legislature. This state statute requirement (i.e., legislatively-created institutional controls) is designed to provide a highly effective means to limit the future uses of the Site property.

3. To address the threat of future leaching of chromium from the waste to the groundwater, a groundwater monitoring network will be established to monitor for releases of chromium. In the event chromium is detected in monitoring wells located on site at levels in excess of the MCL for chromium (50 ppb), an evaluation of the need for additional remedial action will be conducted. In the event chromium is detected in monitoring wells at or around the property boundary at levels in excess of ten times the current MCL for chromium, or 500 ppb, a source area treatment alternative will be selected and implemented.

4. To address the groundwater contamination detected at the Site, groundwater monitoring to determine the levels and movement of arsenic and other contaminants will be also be conducted. With respect to arsenic, an Alternate Concentration Limit (ACL) for arsenic will be the relevant and appropriate standard for four on-site monitoring wells. The relevant and appropriate groundwater standards for all other site contaminants will be the Safe Drinking Water Act Maximum Contaminant Levels (MCLs). EPA will evaluate the need for additional remedial action at the Site in the event that groundwater monitoring reveals any of the following conditions: site related groundwater contaminants other than arsenic are detected in on-site monitoring wells at levels greater than their MCLs; site related groundwater contaminants, including arsenic, are detected in monitoring wells located at or around the Site boundary at levels greater than their MCLs; or arsenic levels in four specific on-site monitoring wells exceed the ACLs established for arsenic at those wells. Further evaluation of the Site will also be conducted if contaminant concentrations above AWQC are detected in on-site identifiable streams because of discharge of site related groundwater contaminants into surface water.

5. Finally, as indicated above, this Record of Decision also includes an alternate plan in the event that the necessary state statute, and regulations or agreements implementing the state statute, are not enacted or adopted. This alternate plan will also be implemented in the event that EPA finds that the necessary state statute, regulations, or agreements are inadequate. If an adequate state statute, and regulations or agreements implementing the state statute, are not passed, adopted, and in effect within two years from September 27, 1989, the execution date of this ROD, the alternate cleanup plan for the Site will become effective. Under the alternate cleanup plan, the soils and sludges from the waste pits and lagoons will be excavated and solidified, and the solidified materials will be placed in a RCRA hazardous waste landfill to be constructed on-site. The alternate remedy is discussed in Section XIII.

V. SITE CHARACTERISTICS

Section 1.0 of the Feasibility Study contains an overview of the Remedial Investigations. The significant findings of the Remedial Investigations are summarized below.

A. Soil

1. Waste Pits

The STWP site includes 53 waste pits ranging in size from approximately 1,395 to 57,940 square feet. In general, waste pit soils are characterized by high concentrations of chromium (on the order of 10,000 ppm) and lead (on the order of 100 to 1,000 ppm), often accompanied by VOC and/or SVOC contamination. VOCs were detected in 19 samples from waste pits, three of these samples contained high VOC concentrations of greater than 100 ppm. SVOCs were detected in 40 samples from waste pits, seven of these samples contained high SVOC concentrations greater than 100 ppm.

Soil contaminant concentrations immediately adjacent to waste pits are two to four orders of magnitude lower than those within the waste pits, which indicates that the highly contaminated soils are generally restricted to the waste pits.

Vertically, soil contaminant concentrations decrease immediately below or underneath the visibly contaminated waste sludge. The most common contaminant detected below the sludge was chromium, which was found in concentrations of 1,950 ppm and 3,660 ppm more than two feet below the sludge in two waste pit borings. Otherwise, chromium concentrations below the visibly contaminated

sludge were generally low, i.e., below 1,000 ppm. In samples collected from below the sludge, VOCs and SVOCs either were not detected, or were detected at very low levels.

The Phase I and Phase II Remedial Investigations support the following characterization of the waste pits:

* The nature of the waste sludge found in the pits does not differ significantly between waste pits, with the exception of the three waste pits that were neutralized and capped during EPA's 1983 removal action.

* High levels of contamination are restricted to the waste pit interiors. Concentrations of site contaminants appear to return to background levels in soils directly outside the waste pits. In two locations on-site, however, contamination is not restricted to the waste pit interiors. The western berm of Waste Pit 9 is incomplete and, as a result, sediments have flowed from the pit and into an adjacent wet swampy area. In addition, there is a seep area outside the northern berm of Chromium Lagoon 2 containing contaminated sediments.

* EP Toxicity analyses of waste samples indicate that chromium has some potential to leach (particularly under acidic conditions) from the waste to groundwater. However, groundwater analyses indicate that chromium is not migrating from the sludge under current conditions, and has not migrated into the groundwater in the many years since disposal began.

2. Chromium Lagoons and Filled Areas

The STWP site includes two large chromium lagoons. Contamination in the lagoons has two general characteristics:

* The contamination found within the lagoons is similar to that observed in the waste pits on-site. The average thickness of sludge found in the lagoons is greater than the average thickness found in the waste pits.

* The filled area in the southern portion of Chromium Lagoon 2 contains sludge, similar to that in the waste pits, and solid waste in the form of leather hides and strips not encountered elsewhere on-site.

B. Groundwater

The Phase I and Phase II groundwater investigations support the following characterization of groundwater conditions:

1. **On-site groundwater conditions**

* Arsenic is the single groundwater contaminant present on-site at concentrations greater than its MCL.

* No definable source of arsenic was identified in the wastes or soils on-site. Arsenic is not a characteristic contaminant of tannery wastes, and arsenic concentrations within the pits have not been found to be significantly higher than those found outside the pit areas. One sediment sample taken from the seep area outside Chromium Lagoon 2 contained sufficient arsenic to be initially considered as a potential contaminant source to groundwater; however, no arsenic contamination was detected in groundwater from that area.

* Organic groundwater contaminants were detected on-site at levels significantly below MCLs or health-based groundwater standards. The source of these contaminants appears to be the contaminated sludge present in the waste pits and chromium lagoons.

* Arsenic contamination and low levels of organic contaminants were detected in groundwater monitoring wells located in the overburden and shallow bedrock. Neither arsenic or organic contamination was detected in the three deep bedrock wells on site.

2. **Off-site groundwater conditions**

* Residential wells sampled in the Site vicinity did not reveal any contaminant levels in excess of MCLs.

* Under current conditions, there is no evidence of any hydraulic connection between the residential wells and the STWP site. Based on local and regional topography, the regional groundwater movement in the Hearn Road area is generally moving from the residential wells eastward towards the on-site wetlands and streams. In addition, groundwater movement demonstrated in the on-site monitoring wells indicates upward flow and discharge of groundwater to on-site surface water. The hydrogeologic investigation indicates that the effects of residential well pumping in the site vicinity are

not felt in on-site monitoring wells.

* The hydrogeologic investigation indicates that under existing conditions the arsenic and low levels of organic contaminants detected in groundwater beneath the Site are not expected to be drawn into residential wells in the Site vicinity. However, future development in the Site vicinity, resulting in additional groundwater withdrawal, could affect groundwater conditions and cause contaminant migration off-site.

C. Surface Water and Sediments

Surface water and sediments were sampled in the Phase I and Phase II investigation programs. Contamination was generally limited to the following areas:

* As stated above, in two locations on-site, contamination is not restricted to the waste pit interiors. The western berm of Waste Pit 9 is incomplete, providing a path for contaminated soil to move into a wet swampy area as entrained sediment in overland flow. In addition, there is a seep area outside the northern berm of Chromium Lagoon 2 containing contaminated sediments.

* Sediment in the wet swampy area west of Waste Pit 9 contained high concentrations of chromium and lead. Decreasing concentrations of chromium and lead in sediment samples trace a path of contamination from the back of Waste Pit 9 to a location 1000 feet downstream in the surface water drainage leading to Stuart Brook. Surface water sampling in this drainage found chromium and lead in concentrations exceeding the respective AWQC standards. Chromium levels of 31 and 21 ppb exceed both the acute and chronic standards. Lead concentrations at 5.6 ppb exceed the chronic standard. These elevated concentrations appear to be caused by overland flow over the contaminated wet area behind Waste Pit 9. Further downstream, levels of chromium and lead attenuate to below background or undetectable levels.

* The seep area outside the northern berm of Chromium Lagoon 2 contained the highest concentration of arsenic detected on site. Chromium lagoon samples were not analyzed for arsenic; however, contaminated materials in the lagoons are similar to those in the waste pits,

and waste pit soils analyzed did not contain significant arsenic. Thus, the specific source of arsenic detected in the seep area is unknown.

* Arsenic, at low levels, was detected in off-site stream sediments collected from a location upstream of the pits and lagoons (SED-103). The presence of arsenic at locations upstream of the pits and lagoons indicates that arsenic levels on-site cannot be attributed solely to the Site.

* Standing water in the waste pits and lagoons, as represented by a sample from Waste Pit 33, contained elevated concentrations of chromium, lead, and a limited number of organic compounds.

A complete discussion of site contamination can be found in Section 7.0 of the Phase II Remedial Investigation Report.

D. Wetlands and Floodplains

A Wetlands and Floodplains Assessment Report was prepared to supplement the data contained in the RI and FS. The significant findings are summarized below:

* The STWP Site includes portions of the 100-year floodplain for Stuart Brook (Figure 3). Stuart Brook is located on the north and northeast portions of the Site. The area of the 100-year floodplain is approximately 30 acres. Neither the waste pits, chromium lagoons, the Chromium Lagoon 2 seep area, or the wet area behind Waste Pit 9 are located within the 100-year floodplain. Chromium Lagoons 1 and 2 are approximately 120 feet and 440 feet respectively from the floodplain. The nearest waste pits are numbers 1 and 18 which are approximately 370 feet and 330 feet respectively from the floodplain.

* Approximately 53 acres of the Site are covered by wetlands. These wetlands consist of approximately 47 acres of naturally occurring wetlands and 5.85 acres of manmade wetlands, which were created as a result of human activities. The manmade wetlands include Chromium Lagoons 1 and 2 and a number of the waste pits.

VI. SUMMARY OF SITE RISKS

A Phase I Public Health Baseline Risk Assessment for the STWP

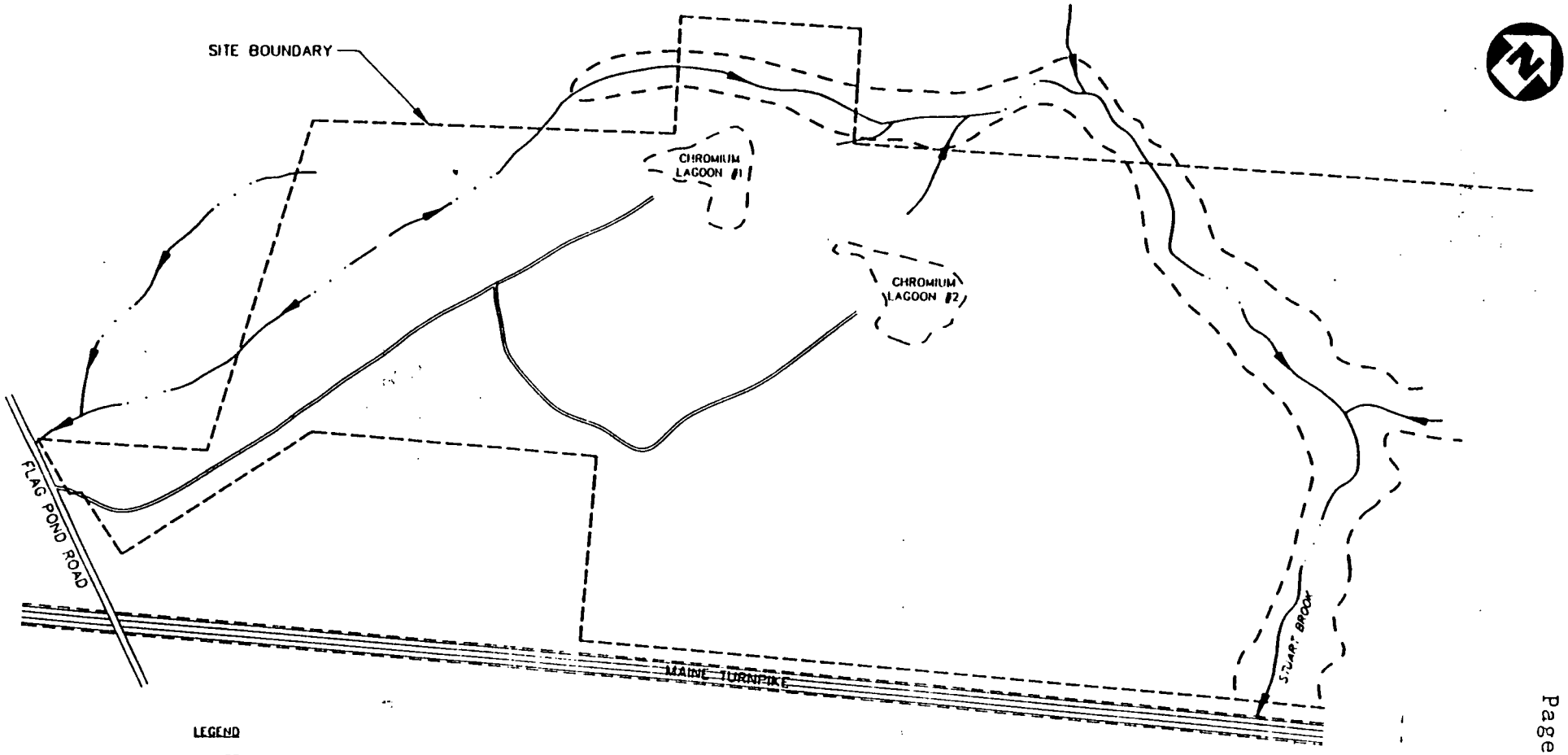


FIGURE 3

FLOODPLAIN MAP

site was performed in conjunction with the Phase I RI Report. The Phase I assessment was conducted to provide a risk characterization of the current baseline conditions. Section 9.1 of the Phase II RI Report summarizes the results of the Phase I Baseline Risk Assessment.

Additionally, a Public Health Supplemental Risk Assessment was conducted to evaluate risk to public health assuming future residential use. This assessment was based on sampling data generated during the Phase II RI. Section 9.0 of the Phase II RI Report provides a detailed discussion of the Supplemental Risk Assessment.

Table 1 summarizes the frequency of detection of all Phase II contaminants at the STWP site by location and chemical group; Table 2 lists the contaminants of concern for the Supplemental Risk Assessment. Table 3 lists the average and maximum concentrations for Phase II contaminants of concern. These contaminants constitute a representative subset of the contaminants identified on-site in both the Phase I and Phase II RIs. Contaminants of concern were selected to represent potential on site hazards based on toxicity, level of contamination, mobility, and persistence in the environment.

Potential human health effects associated with the contaminants of concern in groundwater, soil, surface water, and sediment were estimated quantitatively through the development of several hypothetical exposure scenarios. Incremental lifetime cancer risks and a measure of the potential for noncarcinogenic adverse health effects were estimated for the various exposure scenarios. Exposure scenarios were developed to reflect the potential for exposure to hazardous substances based on the characteristic uses and location of the Site.

Table 4 summarizes the risk characterization for the Phase I Baseline Risk Assessment. Table 5 presents a summary of the Phase II risk characterization for future residential use.

At the STWP site, it is reasonable to assume that the Site will be used for residential purposes in the future, if such use is not precluded by the remedial actions. Saco, like many areas of southern Maine, is experiencing an increase in residential homes and year-round residents. Continued population growth in Saco and southern Maine will increase the pressure for residential development in the vicinity of the Site.

The conclusions from the Phase I and Phase II Public Health Risk Assessments are summarized below. (The carcinogenic risk estimates are reported as either below the target range when risks are less than 10^{-7}; within the target range when risks are

TABLE 1
FREQUENCY OF OCCURRENCE OF DETECTED COMPOUNDS[a]
SACO TANNERY WASTE PITS SITE
SACO, MAINE

	Groundwater	Soil	Sediment		Surface Water	
	Monitoring Well Samples	Soil/Waste	Uncontaminated Areas	Contaminated Areas	Uncontaminated Areas	Contaminated Areas
ORGANICS						
Aluminum	3/32	68/68	6/6	6/6	3/6	0/2
Antimony	1/32	18/68	0/6	1/6	0/6	0/2
Arsenic	11/32	52/68	5/6	1/6	0/6	0/2
Calcium	32/32	58/68	4/6	6/6	6/6	2/2
Cadmium	0/32	27/68	5/6	1/6	0/6	0/2
Chromium	1/33	112/114	6/6	6/6	1/6	2/2
Copper	0/32	55/68	6/6	5/6	6/6	2/2
Iron	25/32	68/68	6/6	6/6	6/6	2/2
Lead	2/32	112/114	6/6	6/6	3/6	1/2
Magnesium	27/32	68/68	4/16	1/6	3/6	1/2
Manganese	29/32	68/68	6/6	6/6	3/6	2/2
Mercury	1/32	18/68	1/6	2/6	0/6	0/2
Nickel	3/32	42/68	4/6	1/6	0/6	0/2
Selenium	0/32	0/68	0/6	2/6	0/6	0/2
Silver	0/32	0/68	0/6	1/6	0/6	0/2
Sodium	31/32	3/68	0/6	1/6	6/6	1/2
Zinc	4/32	68/68	6/6	6/6	6/6	1/2

TABLE 1 (continued)
FREQUENCY OF OCCURRENCE OF DETECTED COMPOUNDS[a]
SACO TANNERY WASTE PITS SITE
SACO, MAINE

	Groundwater	Soil	Sediment		Surface Water	
	Monitoring Well Samples	Soil/Waste	Uncontaminated Areas	Contaminated Areas	Uncontaminated Areas	Contaminated Areas
ORGANICS						
2-Butanone	2/32	8/108	0/6	0/2	0/6	0/2
Toluene	1/32	11/108	0/6	0/2	0/6	0/2
Chlorobenzene	7/32	9/108	0/6	0/2	0/6	1/2
Ethylbenzene	2/32	20/108	0/6	0/2	0/6	0/2
Diethylphthalate	0/32	1/108	0/6	0/2	0/6	0/2
Di-n-butyl phthalate	0/32	1/108	0/6	0/2	0/6	0/2
Di-n-octyl phthalate	1/32	0/108	0/6	0/2	0/6	0/2
1,1,1-Trichloroethane	0/32	1/108	0/6	0/2	0/6	0/2
Bis (2-ethylhexyl) phthalate	5/32	18/108	0/6	0/2	0/6	0/2
Phenol	1/32	6/108	0/6	02	0/6	0/2
2,4,5-Trichlorophenol	0/32	3/108	0/6	0/2	0/6	0/2
2,4,6-Trichlorophenol	0/32	1/108	0/6	0/2	0/6	0/2
2-Methylphenol	2/32	0/108	0/6	0/2	0/6	0/2
4-Methylphenol	1/32	10/108	0/6	0/2	0/6	0/2
1,4-Dichlorobenzene	2/32	5/108	0/6	0/2	0/6	0/2
1,3-Dichlorobenzene	0/32	1/108	0/6	0/2	0/6	0/2
1,2-Dichlorobenzene	5/32	20/108	0/6	0/2	0/6	0/2

TABLE 1 (continued)
FREQUENCY OF OCCURRENCE OF DETECTED COMPOUNDS[a]
SACO TANNERY WASTE PITS SITE
SACO, MAINE

	Groundwater	Soil	Sediment		Surface Water	
	Monitoring Well Samples	Soil/Waste	Uncontaminated Areas	Contaminated Areas	Uncontaminated Areas	Contaminated Areas
ORGANICS						
Naphthalene	1/32	8/108	0/6	0/2	0/6	0/2
1,2,4-Trichlorobenzene	0/32	2/108	0/6	0/2	0/6	0/2
2 Methyl naphthalene	0/32	4/108	0/6	0/2	0/6	0/2
Pentachlorophenol	0/32	4/108	0/6	0/2	0/6	0/2
4-Chloroaniline	0/32	1/108	0/6	0/2	0/6	0/2
2-Hexanone	0/32	2/108	0/6	0/2	0/6	0/2
4-Methyl-2-pentanone	0/32	3/108	0/6	0/2	0/6	0/2
Methylene chloride	0/32	1/108	0/6	0/2	0/6	0/2
Xylenes	0/32	26/108	0/6	0/2	0/6	0/2
PESTICIDES						
PCB-1254	0/32	1/108	0/6	0/2	0/6	0/2
4,4 - DDE	0/32	1/108	0/6	0/2	0/6	0/2
4,4 -DDD	0/32	0/108	0/6	1/2	0/6	0/2

[a] Values do not include duplicates or blanks.

TAB
PHASE II CONATAMINANTS OF CONCERN
SACO TANNERY WASTE PITS SITE
SACO, MAINE

	Groundwater	Soil	Sediment		Surface Water	
	Monitoring Well Samples	Soil/Waste	Uncontaminated Areas	Contaminated Areas	Uncontaminated Areas	Contaminated Areas
INORGANICS						
timony		X		X		
Arsenic	X	X	X	X		
Cadmium		X	X	X		
Chromium		X	X	X	X	X
	X	X	X	X		X
anese	X		X	X	X	X
Mercury		X	X	X		
VOCs						
Chlorobenzene	X	X				X
SVOCs						
Bis (2-ethylhexyl) phthalate	X	X				
Phenol		X				
2,4,6-Trichlorphenol		X				

TABLE 3
AVERAGE AND MAXIMUM CONCENTRATION FOR
PHASE II CONTAMINANTS OF CONCERN
SACO TANNERY WASTE PITS SITE
SACO, MAINE

	Groundwater (ug/l)		Soil/Sludge (ug/g)		Sediment				Surface Water			
					Uncontaminated Areas (ug/g)		Contaminated Areas (ug/g)		Uncontaminted Areas (ug/l)		Contaminated Areas (ug/l)	
	Average	Maximum[a]	Average	Maximum[a]	Average	Maximum[a]	Average	Maximum[a]	Average	Maximum[a]	Average	Maximum[a]
INORGANICS												
Antimony			60	463			222	1050				
Arsenic	16.8	79	8.9	33	12.5	31	224	1210				
Cadmium III (est.)[b]			2.3	12	NE	6.5	11.8	55				
Chromium III (est.)[b]			14500	57025	NE	69	12266	49903				
Chromium VI (est.)[b]			667	2625	NE	3	565	2297	8	21	992	3270
Lead	3.4	25	175	1260	NE	31	204	630			9.3	20
Manganese	2120	8270			NE	1700	NE	4740	555	3260	226	361
Mercury			1.1	13	NE	0.73	NE	5				
VOCs												
Chlorobenzene	15	180	5.8	130							11	20
SVOCs												
Bis (2-ethylhexyl) phthalate	55.6	1500	NE	33								
Phenol			NE	120								
Trichlorphenol			3	13								

[a] Maximum concentration did not contribute to a Realistic Worst-case total carcinogenic risk above 10-7 nor to a Realistic Worst-case total Hazard Index above 1.0
Maximum of any sample including duplicates.

[b] Total chromium, but not chromium VI, was measured in surface water. Since chromium VI, the more toxic form of chromium, is more soluble in water than chromium III, for the

TABLE 4
PHASE I RISK CHARACTERIZATION
CURRENT BASELINE CONDITIONS - TRESPASSER SCENARIO
SACO TANNERY WASTE PITS SITE
SACO, MAINE

EXPOSURE SCENARIO	CARCINOGENIC RISK UPPER-BOUND EXCESS LIFETIME CANCER RISK		CHEMICALS CONTRIBUTING MOST TO RISK	NONCARCINOGENIC RISK HAZARD INDEX		CHEMICALS CONTRIBUTING MOST TO RISK
	MOST PROBABLE CASE	REALISTIC WORST CASE		MOST PROBABLE CASE	REALISTIC WORST CASE	
Groundwater - Ingestion	7.1×10^{-4}	4.4×10^{-3}	Arsenic, (Cadmium)b, bis(2-ethylhexyl) phthalate	1.2	2.2	Lead, Cadmium
Soil - Dermal Absorption and Ingestion	1.3×10^{-6}	2.4×10^{-3}	(Chromium VI)[b]	1.7×10^{-2}	1.3	Lead
Sediments - Dermal Absorption	6.4×10^{-6}	5.6×10^{-6}	Arsenic, (Cadmium)[b]	4.0×10^{-6}	1.0×10^{-2}	--------
Surface Water - Ingestion	-------	--------	---------	9.1×10^{-5}	2.6×10^{-3}	---------
Air - Inhalation during Remediation Activities	5.3×10^{-5}	8.6×10^{-3}	(Chromium VI)[b]	3.6×10^{-1}	$7.7 \times 10^{+1}$	Chromium III, Lead

a Assuming a dust concentration level of 50mg/m3.

b Assuming cadmium and chromium are carcingoenic by ingestion and dermal absorption, an assumption which is not recognized by the EPA CAG

TABLE 5
SUMMARY OF PHASE II RISK CHARACTERIZATION
FUTURE RESIDENTIAL USE
SACO TANNERY WASTE PITS SITE
SACO, MAINE

EXPOSURE SCENARIO	CARCINOGENIC RISK UPPER-BOUND EXCESS LIFETIME CANCER RISK		CHEMICALS CONTRIBUTING MOST TO RISK	NONCARCINOGENIC RISK HAZARD INDEX		CHEMICALS CONTRIBUTING MOST TO RISK.
	MOST PROBABLE CASE	REALISTIC WORST CASE		MOST PROBABLE CASE	REALISTIC WORST CASE	
Groundwater - Ingestion	$7.2E^{-4}$	$3.4E^{-3}$	Arsenic, bis(2-ethylhexyl) phthalate	$5.3E^{-1}$	4.5	BEHP, Lead, Manganese
Soil/Waste - Dermal Absorption and Ingestion	$4.8E^{-7}$	$4.8E^{-5}$	Arsenic	$6.4E^{-1}$	104	Lead, Antimony, Chromium VI (est.)
Sediment (Contaminanted) - Dermal Absorption and Ingestion	$7.7E^{-6}$	$6.9E^{-4}$	Arsenic	$7.5E^{-1}$	37	Lead, Antimony, Chromium VI (est.)
Sediment (Uncontaminanted) - Dermal Absorption and Ingestion	$4.2E^{-7}$	$1.7E^{-5}$	Arsenic	NE	$6.6E^{-1}$	----------
Surface Water (Contaminated) - Dermal Absorption	-------	--------	---------	$5.1E^{-2}$	$4.7E^{-1}$	----------
Surface Water (Uncontaminated) - Dermal Absorption	-------	--------	---------	$6.2E^{-4}$	$9.9E^{-3}$	----------

NE = Not evaluated. Hazard Index for realistic worst-case is less than 1.0; therefore, most-probable case will be even less.

between 10^{-7} and 10^{-4}; or above the target range when the risks are greater than 10^{-4}.)

* An increased carcinogenic risk to public health above the target range was seen for ingestion of groundwater on-site from exposure to arsenic assuming future residential use.

* Assuming future residential use, given a realistic worst case, noncarcinogenic risk from ingestion of manganese, chlorobenzene, lead and bis(2-ethylhexyl)phthalate detected in the groundwater had a Hazard Index of 4.5. This exceeds the target Hazard Index of 1.0. However, adverse systemic effects would not be expected for this exceedance of the Hazard Index because, when considering the effects of these contaminants individually rather than as a group, the individual contaminant levels are believed to lie within the boundary of uncertainty which indicates no noncarcinogenic risks. Under the most probable scenario, the noncarcinogenic risk from ingestion of these groundwater contaminants was less than the Hazard Index of 1.0.

* An increased carcinogenic risk to public health within the target range was seen for dermal contact with and ingestion of the soil/waste from exposure to arsenic under future residential use. An increased noncarcinogenic risk was seen under the realistic worst-case scenario from dermal exposure to and ingestion of lead, antimony, and estimated chromium VI[1].

* An increased carcinogenic risk to public health within

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[1] For the compound chromium (Cr), the risk to public health was evaluated for both Cr III and Cr VI. Cr III (trivalent chromium) has a very low human toxicity, whereas Cr VI (hexavalent chromium) has a much greater toxicity. Soil samples were generally analyzed for total chromium (i.e. Cr III and Cr VI combined), however, a limited number of samples were analyzed for both total chromium and hexavalent chromium. The maximum percentage of Cr VI found to be present in samples which were analyzed for both total Cr and Cr VI was found to be 4.4 percent. For purposes of the risk assessment, this value was then used to compute an estimated concentration of potentially present Cr VI in all soil samples. The estimated Cr VI concentration was then subtracted from the total Cr concentration to obtain an estimated Cr III concentration.

the target range was seen for dermal contact with and ingestion of sediment from contaminated areas from exposure to arsenic under future residential use. An increased noncarcinogenic risk from exposure to lead, cadmium, and estimated chromium VI was seen under the realistic worst-case scenario.

* No increased carcinogenic or noncarcinogenic risk to public health was seen from dermal contact with surface water.

* The Phase II air sampling results for VOCs at the waste pit locations did not differ from the levels at the background location near the Maine Turnpike. Based on the EPA CAG value for benzene, the maximum levels of benzene detected at both the background location and the waste pit locations are at the 10^{-6} carcinogenic risk for lifetime exposure. Although no chromium or SVOCs were detected in the air, an increased health risk was seen for remedial site workers using conservative risk assumptions and estimating air concentrations from soil levels. (Appropriate health and safety measures will be used during remediation.)

Section 10.0 of the Phase II RI Report provides a detailed discussion of the Ecological Risk Assessment performed for the STWP site. The Ecological Risk Assessment identifies and characterizes the environments that may be exposed to contamination originating from the STWP site, and evaluates risks to environments at the Site based on ecotoxicity information.

The conclusions of the Ecological Risk Assessment include the following:

* Communities of aquatic fauna are depressed in the areas of high chromium concentrations found in the waste pits and chromium lagoons.

* Aquatic organisms appear to be at little or no risk from environmental contamination at Stuart Brook.

* Aquatic and terrestrial organisms that use the lagoons and waste pits/wetlands for habitat and food are probably at risk where sediment concentrations exceed 2,000 ppm chromium and surface water concentrations exceed 11 ppb chromium.

Based on the public health and ecological risk assessment, actual or threatened releases of hazardous substances from this Site, if

not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or, the environment.

A summary of the risks posed by the STWP site can be found in Sections 1.3 and 1.4 of the Feasibility Study.

VII. DOCUMENTATION OF SIGNIFICANT CHANGES

The first Proposed Plan for the Saco Tannery Waste Pits site was released for public comment in July 1988. The first Proposed Plan identified Alternative SC-5 (excavation, solidification, and landfilling) and GW-2 (groundwater monitoring) as the preferred alternative. Due to the State's refusal to concur on the proposed remedy, in part for reasons of cost-effectiveness, EPA revised its proposed plan, as explained in Section X.C.1. of this ROD.

The revised Proposed Plan for the STWP site was released for public comment in June 1989. The revised Proposed Plan identified Alternatives SC-3A and GW-2 (soil cover system, legislatively-created institutional controls, and groundwater monitoring) as the preferred alternative. In addition, the revised Proposed Plan included an alternate remedy in the event that the state legislature fails to enact the necessary institutional controls. The alternate remedy in the revised Proposed Plan is Alternative SC-5 and GW-2, the remedial alternative recommended in EPA's first Proposed Plan.

EPA has made three significant changes to the revised Proposed Plan. First, the revised Proposed Plan does not include target cleanup levels for soils and sediments. This ROD includes soil and sediment target cleanup levels for lead, antimony, arsenic, and chromium. The target level for chromium was provided in the Remedial Investigation and was available to the public in the Administrative Record, but the target levels for lead, antimony, and arsenic were finalized during the public comment period and have not been previously available to the public. These target levels, as a whole, will be of practical significance at only two limited areas of the Site. All of the waste pits and lagoons at the Site will be subject to remediation under both the selected remedy and the alternate remedy. However, in two locations of the Site where contaminated sediments will be addressed, the target levels will be used to delineate the extent of the area to be covered with the soil cover system.

Second, the revised Proposed Plan indicates that under Alternative SC-3A, a groundwater monitoring network would be established at the Site, with a contingency for treatment should

wastes begin to migrate from the sludge at significant levels. In this ROD, EPA has specified the details of the groundwater monitoring program and selected contingencies for further actions or evaluations at the Site. In particular, EPA has determined that in the event that chromium is detected at levels in excess of 500 ppm in monitoring wells located at or around the site boundary, a further remedy that involves treatment of the wastes at the Site will be performed. The details concerning the monitoring program and contingencies for future actions were developed during the public comment period. These details do not alter the projected cost of the selected alternative.

Finally, EPA has established Alternate Concentrations Limits (ACLs) as the groundwater remediation standard for arsenic under the selected remedy. Although ACLs were not discussed in the revised Proposed Plan, EPA did indicate that groundwater monitoring for arsenic would be performed. Subsequent to the release of the revised Proposed Plan, EPA determined that the standards for ACLs were met with respect to arsenic contamination at the Site. The inclusion of ACLs in this ROD does not alter the scope of the selected remedy, which will require groundwater monitoring for arsenic.[2]

VIII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

Prior to the passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA), actions taken in response to releases of hazardous substances were conducted in accordance with CERCLA as enacted in 1980 and the revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, dated November 20, 1985. Although EPA proposed revisions on December 21, 1988, to the NCP to reflect SARA, until those proposed revisions are finalized, the procedures and standards for responding to releases of hazardous substances, pollutants and contaminants shall be in accordance with Section

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[2] Several minor changes to the Revised Proposed Plan have also been made, generally in response to comments made by the State. These minor changes include: the use of a rock and gravel layer in the soil cover at selected waste pits, rather than at all waste pits; the installation of a fence surrounding the soil cover system construction area, rather than surrounding the entire Site; and the installation of monitoring wells at and around the site property boundary and in the interior of the Site, rather than along a perimeter line enveloping all of the waste pits and lagoons.

121 of CERCLA and to the maximum extent practicable, the current NCP.

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is granted; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a statutory preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous wastes over remedies that do not achieve such results through treatment. Response alternatives were developed to be consistent with these Congressional mandates.

In the risk assessment and environmental assessment, several potential exposure pathways were analyzed for risk and threats to public health and the environment. Guidelines in the Superfund Public Health Evaluation Manual (EPA, 1986) regarding the development of risk analyses for remedial alternatives were used to assist EPA in the development of response actions. As a result of these assessments, the following remedial action objectives were developed to mitigate existing and future threats to public health and the environment:

* Minimize exposure to contaminants or reduce contaminants to levels that are protective of human health and the environment.

* Reduce the threat of future leaching of chromium or reduce the levels of chromium in the sludge that could leach into the groundwater in the future.

* Prevent ingestion of contaminated groundwater.

* Minimize exposure of wildlife to contaminated soil, sediments, and standing water.

B. Technology and Alternative Development and Screening

CERCLA, the NCP, and EPA guidance documents including, "Guidance on Feasibility Studies Under CERCLA" dated June 1985, the "Interim Guidance on Superfund Selection of Remedy" [EPA Office of Solid Waste and Emergency Response (OSWER)], Directive No.

9355.0-19 (December 24, 1986), and the Interim Final "Guidance for Conducting RIs and FSs under CERCLA," OSWER Directive No. 9355.3-01 (October 1988), set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements and guidance documents, a range of treatment alternatives were developed for the Site, a containment option involving little or no treatment, and a no-action alternative.

Section 121(b)(1) of CERCLA presents several factors that at a minimum EPA is required to consider in its assessment of alternatives. In addition to these factors and the other statutory directives of Section 121 of CERCLA, the evaluation and selection process was guided by the EPA document "Additional Interim Guidance for FY '87 Records of Decision" (OSWER Directive 9355.0-21) dated July 24, 1987. This document provides direction on the consideration of SARA cleanup standards and sets forth nine factors that EPA should consider in its evaluation and selection of remedial actions. The nine factors are:

1. Overall Protection of Human Health and the Environment.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).

3. Long-term Effectiveness and Permanence.

4. Reduction of Toxicity, Mobility or Volume.

5. Short-term Effectiveness.

6. Implementability.

7. Community Acceptance.

8. State Acceptance.

9. Cost.

Section 4.0 of the Feasibility Study identified, assessed and screened technologies to determine if the technology is an acceptable engineering practice that could provide an implementable, feasible and practicable remedy. These technologies were combined into source control (SC) and groundwater (GW) alternatives. Section 5.0 in the Feasibility Study presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories required by OSWER Directive No. 9355.0-19. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then

evaluated and screened in Section 6.0 of the Feasibility Study. In summary, of the 13 source control and groundwater remedial alternatives screened in Section 6.0, 12 were retained for detailed analysis. Table 6 identifies the 12 alternatives that were retained through the screening process, as well as those that were eliminated from further consideration. After deciding to reconsider the first Proposed Plan, EPA amended one of the source control alternatives (Alternative SC-3) contained in the FS by including additional safeguards to human health and the environment. This amended source control alternative (Alternative SC-3A) is described in the addendum to the FS.

IX. DESCRIPTION/SUMMARY OF THE DETAILED AND COMPARATIVE ANALYSIS OF ALTERNATIVES

This section presents a narrative summary and brief evaluation of each alternative according to the evaluation criteria described above. Sections 7.0 (source control alternatives) and Section 8.0 (groundwater alternatives) of the Feasibility Study contain the detailed analyses of each remedial alternative that passed the initial screening in Section 6.0. The FS Addendum contains a detailed analysis of Alternative SC-3A. See Table 7 for a detailed tabular assessment of each alternative.

A. Source Control (SC) Alternatives Analyzed

The source control alternatives analyzed for the Site include a minimal no action alternative (SC-1); institutional action (SC-2); cover system (SC-3); cover system with monitoring network and institutional controls (SC-3A); in-situ solidification/ stabilization (SC-4); excavation/solidification/on-site RCRA landfill (SC-5); excavation/solidification/on-site disposal area (SC-6); excavation/on-site RCRA landfill (SC-7); excavation/soil-washing (SC-9); excavation/on-site incineration (SC-10).

SC-1
No Action

This alternative is developed for each Superfund site to assess impacts on public health and the environment if no measures are taken to remediate current site conditions, and to serve as a comparison to other remedial alternatives considered. No technical or institutional methods would be used to reduce potential exposure. The no-action alternative would be selected only if the Site posed little or no risk to public health and the environment. At the Saco Tannery Waste Pits site, the no-action alternative would not provide adequate protection of human health and the environment.

TABLE 6
INITIAL REMEDIAL ALTERNATIVE SCREENING SUMMARY
SACO TANNERY WASTE PITS SITE
SACO, MAINE

ALTERNATIVE	ALTERNATIVES RETAINED FOR DETAILED ANALYSIS	ALTERNATIVES ELIMINATED IN INITIAL SCREENING
SC-1 No Action	SC-1	
SC-2 Institutional Actions	SC-2	
SC-3 Cover System	SC-3	
SC-4 In-situ Solidification	SC-4	
SC-5 Excavation/Solidification/On-site RCRA Landfill	SC-5	
SC-6 Excavation/Solidification/On-site Disposal Area	SC-6	
SC-7 Excavation/On-site RCRA Landfill	SC-7	
SC-8 Excavation/Solidification/Off-site RCRA Landfill		SC-8
SC-9 Excavation/Soil Washing	SC-9	
SC-10 Excavation/Incineration	SC-10	
GW-1 No Action	GW-1	
GW-2 Institutional Actions	GW-2	
GW-3 Pump and Treat by Precipitation/Flocculation/Clarification	GW-3	

TABLE 7
COMPARATIVE SUMMARY OF SOURCE CONTROL REMEDIAL ALTERNATIVES
SACO TANNERY WASTE PITS SITE
SACO, MAINE

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-1: No Action	Fails to reduce potential for direct contact. Site threats to public health and the environment not addressed. Remedial action objectives not achieved.	Magnitude of risk remains unchanged. Potential for contaminant leaching to ground water not addressed.	No reduction in mobility, toxicity, or volume	Five-year review necessary.	Does not comply with RCRA or Maine closure/ post-closure ARAR's	No protection to public health and the environment.
SC-2: Institutional Actions	Reduces direct contact by restricting site access and through institutional controls. Remedial action objectives not achieved.	Potential for contaminant leaching to groundwater not addressed.	No reduction in mobility, toxicity, or volume.	Fences readily constructable. Legal services for institutional controls required.	Does not comply with RCRA or Maine closure/ post-closure ARARs.	Minimal protection to public health and the environment provided by fence and institutional controls.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-3: Cover System	Reduces potential for direct contact. Limited environmental impacts during cover placement. Remedial action objectives achieved in 1.5 years. Objectives to reduce threat or potential for future leaching not achieved.	Potential for contaminant leaching to groundwater not addressed. Monitoring required to assess future groundwater impacts.	No reduction in mobility, toxicity, or volume of sludge. Pumping ponded water reduces volume of contaminated surface water.	Cover system readily constructable. Services and cover materials available. Remedial work approximately 1.5 years.	Complies with ARARs.	Risk from direct contact controlled by cover soils. Potential for future groundwater impacts not addressed. Environmental impacts from ponded water in pits/lagoons reduced. Compensatory wetland area to be constructed.
SC-3A: Cover System	Reduces potential for direct contact and ingestion. Limited environmental impacts during cover placement. Remedial action objectives achieved in 1.7 years. Objectives to reduce potential for future leaching addressed by establishment of monitoring network and contingency for treatment.	Potential for contaminant leaching to ground water remains Monitoring required to assess future leaching. Contingency plan exists to address potential future contaminant migration. Designation of conservation area minimizes potential for disturbance of cover or use of groundwater.	No reduction in mobility toxicity, or volume of sludge. Pumping ponded water reduces volume of contaminated surface water.	Cover system readily constructable. Services and cover materials available. Remedial work approximately 1.7 years.	Complies with ARARs.	Risk from direct contact controlled by cover soils. Potential for future groundwater contamination addressed by contingency plan. Environmental impacts form ponded water in pits/lagoons reduced. Compensatory wetland area to be constructed.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-4: In-situ Solidification/ Stabilization	Reduces potential for direct contact. Addresses potential for future contaminant leaching to groundwater, but solidified wastes remain below water table. Remedial action objectives achieved in 1.5 years. In-situ solidification is not feasible for solid waste contamination.	Potential for contaminant leaching reduced by solidification treatment. Putty-like sludge hinders effective in-situ mixing of sludge and solidification reagents. Monitoring required to assess future groundwater impacts.	Contaminant mobility reduced through solidification Pumping ponded water reduces volume of contaminated surface water.	In-situ solidification services available. Intimate mixing of sludge with reagents unlikely given pasty nature of sludge. Process not compatible with solid waste disposed in fill area. Remedial work approximately 1 to 2 years.	Complies with ARARs.	Risk from direct contact controlled by cover soils over solidified sludge. Risks to workers associated with sludge handling during in-situ treatment addressed through health and safety protection. Potential for future groundwater impacts reduced. Environmental impacts from ponded water in pits/lagoons reduced. Compensatory wetland area to be constructed.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-5: Excavation/ Solidification On-site RCRA landfill	Sludge excavation reduces potential for direct contact and significantly reduces potential for future leaching of contaminants to groundwater. Considerable remedial construction activities may impact environmental habitats. Source control objectives achieved in three to four years.	Remedy reliable since sludge posing risk is removed. Addresses potential for contaminant leaching to groundwater. RCRA landfill is a reliable technology with little potential for failure. Leachate collection systems installed in landfill. Batch solidification more effective than in-situ mixing.	Contaminant mobility reduced through solidification treatment and RCRA landfill. Pumping ponded water reduces volume of contaminated surface water.	Significant sludge excavation and landfill construction necessary. Solidification well demonstrated on sludge. Services and materials available. Solid waste would be placed in landfill. Remedial work approximately 3 to 4 years.	Complies with ARARs.	Risk from direct contact controlled by excavation and landfilling. Risks to workers associated with sludge excavation addressed through health and safety protection. Potential for future groundwater impacts from sludge eliminated. Waste consolidation and treatment achieved. Environmental impacts from ponded water in pits/lagoons reduced. Compensatory wetland area to abe constructed.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-6: Excavation / Solidification/ On-Site Disposal	Sludge excavation reduces potential for direct contact and significantly reduces potential for future leaching of contaminants to groundwater. Considerable remedial construction activities may impact environmental habitats. Source control objectives achieved in 3 to 4 years.	Remedy reliable since sludge posing risk is removed. Addresses potential for contaminant leaching to groundwater. Batch solidification more effective than in-situ mixing. Disposal area does not employ synthetic liners or leachate collection systems. Disposal area not as protective as RCRA landfill over the long term.	Contaminant mobility reduced through treatment. Pumping ponded water reduces volume of contaminated surface water.	Significant sludge excavation and disposal area construction necessary. Solidification well demonstrated on sludge. Services and materials available. Solid waste would be placed in disposal area. Remedial work approximately 3 to 4 years.	Does not comply with RCRA landfill requirements.	Risk from direct contact controlled by excavation and on-site disposal. Risk to workers associated with sludge excavation addressed through health and safety protection. Potential for future groundwater impacts from sludge reduced. Waste consolidation and treatment achieved. Environmental impacts from ponded water in pits/lagoons reduced. Compensatory wetland area to be constructed.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-7: Excavation/On-Site RCRA landfill	Sludge excavation reduces potential for direct contact and significantly reduces potential for future leaching of contaminants to groundwater. Considerable remedial construction activities may impact environmental habitats. Source control objectives achieved in 3 to 4 years.	Remedy reliable since sludge posing risk is removed. Addresses potential for contaminant leaching to groundwater. RCRA landfill is a reliable technology, however without treatment of the wastes, longterm effectiveness remains uncertain. Leachate collection systems installed in landfill. RCRA landfill design must account for longterm settlement of untreated sludge.	Contaminant mobility reduced through RCRA landfill. Pumping ponded water reduces volume of contaminated surface water.	Significant sludge excavation and landfill construction necessary. Services and materials available. Landfill design must account for geotechnical properties of untreated sludge. Solid waste would be placed in landfill. Remedial work approximately 3 to 4 years.	Complies with ARARs.	Risk from direct contact controlled by excavation and landfilling. Risks to workers associated with sludge excavation addressed through health and safety protection. Potential for future groundwater impacts from sludge reduced. Waste consolidation achieved. Environmental impacts from ponded water in pits/lagoons reduced. Compensatory wetland area to be constructed.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-8: Excavation/ Solidification Off-Site RCRA landfill [not considered for detailed analysis in the feasibility study]	--------	---------	--------	-------	--------	------
SC-9: Excavation/ Soil Washing	Sludge excavation reduces potential for direct contact and significantly reduces potential for future leaching of contaminants to groundwater. Considerable remedial construction activities. May impact environmental habitats. Source control objectives achieved in more than 5 years since soil washing technology requires further development.	Addresses potential for contaminant leaching to groundwater. Reliability of soil washing technology uncertain. O&M and process control requirements difficult to define.	Contaminant mobility reduced through excavation. Soil washing process decreases contaminant volume but would generate other contaminated media requiring treatment. Pumping ponded water reduces volume of contaminated surface water.	Significant sludge excavation necessary. Soil washing process not proven for sludge matrix and would require extensive development, pilot-testing, and specialists. Process not compatible with solid waste disposed in fill area. Remedial work greater than 5 years.	Complies with ARARs.	Risk from direct contact controlled by excavation and soil washing treatment. Risks to workers associated with sludge excavation addressed through health and safety protection. Environmental impacts from ponded water in pits/lagoon reduced. Compensatory wetland are to be constructed.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
SC-10 Excavation/On-Site Incineration	Sludge excavation reduces potential for direct contact and significantly reduces potential for future leaching of contaminants to groundwater. Extensive remedial construction activities and trial burn necessary. Emissions modeling necessary. Source control objectives achieved in about 5 years.	Remedy reliable since sludge posing risk is removed. Addresses potential for contaminant leaching to groundwater. Residual materials likely to be hazardous and would require appropriate management. Potential for resource recovery of chromium, but costs exceed value of recovered material. Resource recovery process requires further development.	Incineration reduces volume of sludge and destroys organic constituents. Contaminant mobility and toxicity may be increased and residual material would require secondary waste management. Reduces volume of contaminated surface water.	Significant sludge excavation necessary. Incineration destroys organic constituents but does not treat inorganics. Incineration equipment and services currently available. Chromium recovery process requires further development. Process compatible with solid waste disposed in fill area. Remedial work greater than 5 years.	Complies with ARARs.	Risk from direct contact controlled by excavation. Risks to workers associated with sludge excavation and residual material from incineration process addressed through health and safety protection. Potential for future groundwater impacts from sludge eliminated. Environmental impacts from ponded water in pit/lagoons reduced. Compensatory wetland area to be constructed.

COMPARATIVE SUMMARY OF GROUND WATER REMEDIAL ALTERNATIVES
SACO TANNERY WASTE PITS SITE
SACO, MAINE

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
GW-1: No Action	Remaining risk from arsenic if groundwater is ingested.	Magnitude of residual risk would decrease with time through natural attenuation processes.	No reduction in mobility, toxicity, or volume of waste through pump-and-treat system, but natural attenuation reduces contaminant concentrations with time.	Five-year review necessary. Future groundwater remedial actions possible depending on rate of natural attenuation.	MCL Compliance attained at site boundaries. On-site concentrations of arsenic exceed MCLs in four monitoring well samples.	No protection to public health and the environment. MCL achieved through natural attenuation over more than 20-500 years.
GW-2: Institutional Actions	Reduces risk from ingesting groundwater through institutional controls. No engineering controls to actively remediate aquifer.	Groundwater monitoring would effectively track contaminant migration but not remediate site conditions.	No reduction in mobility, toxicity, or volume of waste through pump-and-treat system, but natural attenuation reduces contaminant concentrations with time.	Groundwater monitoring easy to implement. Long-term monitoring services available. Five-year review necessary. Future groundwater remedial actions possible depending on rate of natural attenuation.	MCL Compliance attained at site boundaries. On-site concentrations or arsenic exceed MCLs in four monitoring well samples. ACL's established under the selected remedy, and attained in four on-site monitoring wells.	Protection to public health and the environment provided depending on the effectiveness of institutional controls and groundwater monitoring. MCL achieved through natural attenuation over more than 20-500 years.

ALTERNATIVE	SHORT TERM EFFECTIVENESS	LONG TERM EFFECTIVENESS AND PERFORMANCE	REDUCTION OF MOBILITY, TOXICITY OR VOLUME	IMPLEMENT-ABILITY	COMPLIANCE WITH ARARS	OVERALL PROTECTION
GW-3: Pump and Treat by Precipitation/ Flocculation/ Clarification	Reduces risk from ingesting groundwater through active aquifer pumping. Pumping time of about 2 years would be required to reach MCL for arsenic under assumed conditions.	MCL for arsenic would be achieved after pumping, if a pump and treat system could be successfully designed. Groundwater monitoring would verify effectiveness of extraction system.	Groundwater remediation by active pump-and-treat system reduces contaminant mobility. Precipitation/ flocculation/ clarification scheme generates sludge requiring appropriate disposal.	Extensive extraction well network required to pump groundwater. Piping system would need to prevent freezing effects. Precipitation/floc culation/ clarification process readily implementable. However, because of the absence of a defined source area, a pump and treat system would be difficult to design and implement. In addition, the presence of other constituents (iron, manganese) significantly impacts chemical doses and treatment costs.	Complies with federal and state ARARs for groundwater protection.	Risk to human health and the environment reduced over a period of 2 to 5 years depending on the success of groundwater extraction and treatment.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 7-3 in the Feasibility Study.

ESTIMATED TOTAL COST (Present Worth): $57,000 (cost for 5 year site reviews)

SC-2
Institutional Action

This alternative would consist of constructing a fence around the Site, posting warning signs, and restricting site access and future site use. This alternative would not provide adequate protection of human health and the environment.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 7-5 in the Feasibility Study.

ESTIMATED TIME FOR CONSTRUCTION: 1 to 3 months
ESTIMATED CAPITAL COST: $252,500
ESTIMATED O & M COST (Present Worth): $303,000
ESTIMATED TOTAL COST (Present Worth): $555,500

SC-3
Cover System

This alternative consists of covering the waste pits and lagoons with soil. This alternative would reduce potential risks to public health and the environment posed by contacting or ingesting sludge. However, in comparison to the selected remedy, it would not provide long-term effectiveness because it does not include strict, permanent controls over future site development in the form of a legislatively-created conservation area. Additionally, this alternative would not directly address the potential for future leaching of contaminants from the sludge into the groundwater as provided in the selected remedy, which requires the establishment of a monitoring network to monitor for releases of chromium and selection of a source area treatment alternative in the event chromium is detected to be leaching at significant levels.

ESTIMATED TIME FOR CONSTRUCTION: 1 to 2 years
ESTIMATED CAPITAL COST: $5,841,000
ESTIMATED O & M COST (Present Worth): $188,500
ESTIMATED TOTAL COST (Present Worth): $6,029,500

SC-3A
Cover System with Monitoring Network and Institutional Controls

This alternative is the selected source control remedy and is discussed in Section X, THE SELECTED REMEDY.

SC-4
In-Situ Solidification/Stabilization

Contaminated sludge in each waste pit and lagoon would be solidified using a backhoe or injection system to add solidifying reagents. Solidified areas would then be covered with soil to protect from freeze-thaw effects, and revegetated. Excavation of sludge would not be required.

Based on field tests, EPA has serious reservations about how effectively and reliably the sludges at the Site could be solidified in place. Given the pasty nature of the sludge, intimate in-situ reagent mixing would be difficult.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 7-14 in the Feasibility Study.

ESTIMATED TIME FOR CONSTRUCTION: 1 to 2 years
ESTIMATED CAPITAL COST: $14,893,000
ESTIMATED O & M COST (Present Worth): $188,500
ESTIMATED TOTAL COST (Present Worth): $15,081,500

SC-5
Excavation/Solidification/On-Site RCRA Landfill

This alternative will be implemented in the event an adequate state statute, converting the Site property into a permanent conservation area, is not enacted within two years from the date the ROD is signed. Refer to Section XIII for a discussion of this alternative.

SC-6
Excavation/Solidification/On-Site Disposal

This alternative is similar to SC-5, in that sludge would be excavated and treated on site by solidification. However, unlike SC-5, this alternative would not involve the construction of a RCRA hazardous waste landfill. Treated material would be consolidated and placed in a 9.5 acre disposal area on site. Fill material would be added to the base of the disposal area to increase the vertical distance between solidified material and the high water table. No leachate collection system would be employed. The disposal

area would be capped with soils to enhance runoff and minimize infiltration, but synthetic liners would not be used.

This alternative would reduce risks to public health and the environment from exposure to site contaminants. However, this alternative would not attain ARARs. The relevant and appropriate RCRA standards for landfills, which require two or more liners and leachate collection systems, would not be met.

In addition, this alternative could present future risks if the solidification process proved to be inadequate over time. There exists little information on the long-term physical durability and chemical stability of solidification/ stabilization. The fate of organic chemicals in the sludge after solidification is uncertain, and without the additional protection against contaminants leaching into the groundwater provided by the construction of the RCRA landfill, contaminants could potentially leach into the groundwater over time. Finally, the cost of this alternative is not substantially less than the cost of Alternative SC-5, which was rejected by the State following the issuance of the first Proposed Plan in part for reasons of cost-effectiveness.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 7-21 in the Feasibility Study.

ESTIMATED TIME FOR CONSTRUCTION: 3 to 4 years
ESTIMATED CAPITAL COST: $26,946,000
ESTIMATED O & M COST (Present Worth): $752,000
ESTIMATED TOTAL COST (Present Worth): $27,698,000

SC-7

Excavation/On-Site RCRA Landfill

This alternative would involve excavating and disposing of sludge in an on-site RCRA hazardous waste landfill. No waste treatment would be performed prior to landfilling. However, the landfill would include synthetic liners and leachate collection systems to minimize potential groundwater contamination. Because of the soft, pasty, low-strength nature of the sludge, special landfilling techniques or bulking agents may be required to provide adequate stability of the landfill. Primary consolidation and the leachate generated from the primary consolidation would impact the construction schedules, construction methods, and the design of the RCRA landfill.

This alternative would reduce risks to public health and the environment but would not provide the additional protection offered by combining landfilling with a treatment technology such as solidification. The primary uncertainty associated with land disposal of the untreated waste material is the long-term structural integrity of the RCRA cap. Finally, the cost of this alternative is not substantially less than the cost of Alternative SC-5, which was rejected by the State following the issuance of the first Proposed Plan in part for reasons of cost-effectiveness.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 7-24 in the Feasibility Study.

ESTIMATED TIME FOR CONSTRUCTION: 3 to 4 years
ESTIMATED CAPITAL COST: $24,146,000
ESTIMATED O & M COST (Present Worth): $4,903,000
ESTIMATED TOTAL COST (Present Worth): $29,049,000

SC-9
Excavation/Soil-Washing

This alternative would involve processing excavated soils through a series of reaction chambers containing chemical solvents to strip contaminants from the sludge. Aqueous treatment systems would be required to treat and recycle the washing fluids and the extracted contaminants. Chromium in the sludge could potentially be concentrated for recovery and recycling. Treated sludge would be backfilled on-site.

Alternative SC-9 provides treatment to extract contaminants and offers potential for resource recovery of chromium. However, the soil washing process is complex and would require substantial waste handling and treatment of aqueous residuals. Under ideal performance conditions, a reduction in the volume of contaminated material would be achieved. The soil-washing process has not been well demonstrated for sludge treatment such as the treatment required at this site. In order to demonstrate the effectiveness of soil-washing, extensive and costly development and testing prior to full-scale implementation would be required.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 7-26 in the Feasibility Study.

ESTIMATED TIME FOR CONSTRUCTION: 6 to 10 years
ESTIMATED CAPITAL COST: $107,452,000

ESTIMATED O & M COST (Present Worth): $96,000
ESTIMATED TOTAL COST (Present Worth): $107,548,000

SC-10
Excavation/On-Site Incineration

Under this alternative, sludges would be excavated from the pits and lagoons and transported to an on-site incinerator for thermal treatment. The extremely high temperature in the incinerator would destroy an estimated 99.99% of the VOCs in the sludge. The exhaust gases from the facility's combustion chambers would be passed through air pollution control devices before being released into the atmosphere. Residual ash material from the incineration operations would require further management. The substantial quantity of chromium in the ash could potentially be extracted using acids in a controlled leaching process; this option offers potential for resource recovery of the chromium. Alternatively, the ash material could be solidified with pozzolanic reagents and placed in an on-site RCRA landfill.

Incineration would be protective of public health and the environment, and would reduce the volume of the waste. However, contaminant mobility and toxicity may be increased by the oxidation of chromium during thermal treatment. On-site incineration services are available, but a chromium recovery process would need to be developed. Attempts to develop a chromium recovery process during the FS were somewhat successful, but further process development would be necessary to implement the technology for this Site.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 7-33 in the Feasibility Study.

ESTIMATED TIME FOR CONSTRUCTION: 5 to 7 years
ESTIMATED CAPITAL COST: $92,822,000
ESTIMATED O & M COST (Present Worth): $83,000
ESTIMATED TOTAL COST (Present Worth): $92,905,000

B. Groundwater (GW) Alternatives Analyzed

Groundwater alternatives address contaminants that have migrated from the original source of contamination. At the STWP site, there has been limited movement of contaminants from the waste material contained in the waste pits and lagoons. Under current conditions, on-site groundwater is not moving off site, but discharging to the stream or wet area on the western portion of the Site. The groundwater alternatives evaluated for the Site include no action (GW-1); institutional action (GW-2); and

extraction and treatment by precipitation/flocculation/clarification (GW-3).

GW-1
No Action

As with the no-action alternative for source control, the no-action groundwater alternative is included to serve as a basis for comparison with the other groundwater treatment alternatives considered. The no-action alternative would be selected only if the Site posed little or no risk to public health and the environment.

The no-action groundwater alternative for the Saco Tannery Waste Pits site would not be protective of public health and the environment because on-site contaminant levels for arsenic exceed health-based levels. Without adequate monitoring and institutional controls, or treatment, the no-action alternative would not reduce the risk posed by ingestion of contaminated groundwater.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 8-11 in the Feasibility Study.

ESTIMATED TOTAL COST (Present Worth): $57,000 (cost for 5 year site reviews)

GW-2
Groundwater Monitoring and Institutional Action

This alternative is the selected groundwater remedy and is discussed in Section X, THE SELECTED REMEDY.

GW-3
Extraction and Treatment by Precipitation/Flocculation/Clarification

This alternative would involve installing extraction wells to pump groundwater from contaminated areas to a precipitation/flocculation/clarification unit. The treatment process would remove arsenic from the water and the treated water would be discharged to the stream on site. Sludge produced from groundwater treatment would be thickened, dewatered, and temporarily stored for off-site disposal.

This alternative would be protective of public health after the contaminated groundwater is removed. However, several potential problems with designing and implementing an effective extraction and treatment system may arise because

of the diffuse nature of the arsenic concentration in the groundwater and the absence of a defined source. Since extraction wells are likely to draw both clean and contaminated groundwater, the influent to the precipitation/flocculation/clarification unit may achieve MCLs without treatment. Additionally, extraction of groundwater may affect the hydrologic function of some of the wetlands by altering groundwater recharge and discharge characteristics. Such an alteration could be harmful to aquatic and terrestrial fauna, destroying important food and habitat resources. The extraction and treatment alternative would reduce contaminant mobility, but generate sludge requiring appropriate disposal.

A detailed tabular assessment of this alternative according to the evaluation criteria can be found on Table 8-19 in the Feasibility Study.

ESTIMATED TIME FOR CONSTRUCTION: 2 to 10 years depending on extraction system employed
ESTIMATED CAPITAL COST: $1,571,000
ESTIMATED O & M COST (Present Worth): $466,000 to $1,756,000
ESTIMATED TOTAL COST (Present Worth): $2 to $3.3 million depending on the extraction system employed

X. THE SELECTED REMEDY

The selected remedy includes both a source control (SC-3A) and a groundwater component (GW-2) to achieve a comprehensive approach for site remediation. Detailed conceptual discussions of the source control and groundwater component can be found in the FS Addendum and Sections 8.3.2 of the Feasibility Study, respectively.

For a discussion of the alternate remedy, see Section XIII. The alternate remedy will be effective if adequate legislation converting the Site property into a permanent conservation area is not enacted within two years of signing of this Record of Decision.

A. Description of the Selected Remedy

1. Source Control

a. Remedial Action Objectives

The source control portion of the remedial action consists of covering all of the waste pits and lagoons, the Chromium Lagoon 2 fill area, and the contaminated sediments with a soil cover, and

enacting legislatively-created institutional controls to restrict future use of the Site. This approach is designed to minimize exposure by human and environmental receptors to site contaminants, which is one of the remedial action objectives selected for the Site. In addition, the implementation of a groundwater monitoring program to monitor releases of chromium from the sludge, along with a contingency for future action, is designed to address the remedial action objective of reducing the threat that chromium will leach from the waste to the groundwater in the future.

b. Target Cleanup Levels

Results from the remedial investigation and risk assessments were used to develop target cleanup levels for contaminated media. Target cleanup levels for chromium were first developed in the remedial investigation. In the attached Technical Memos (see Appendix C), target cleanup levels for chromium were subject to further evaluation and target cleanup levels for lead, antimony, and arsenic were developed. Preliminary target levels were developed for contaminants of concern that showed carcinogenic risk exceeding 10^{-7} or noncarcinogenic risk greater than a total Hazard Index of 1.0. The Technical Memos also discuss the methodology and assumptions used to develop the target levels.

For chromium, target levels were developed both for environmental protection and protection of human health. The health based target levels for chromium of 75,000 ppm (Cr III) and 375 ppm (Cr VI) were developed. Assuming a maximum percentage of 4.4% Cr VI to total Cr (see footnote number one), the corresponding total chromium target level for Cr VI would be 8,523 ppm. The environment based target level for total chromium of 2,000 ppm was established through the Ecological Risk Assessment (Section 10.3 of the Phase II Remedial Investigation Report). The more conservative environment based target level for total Cr (i.e., 2,000 ppm) will be used as the target level to provide protection of both human health and the environment.

For lead, EPA developed a health-based target level of 275 ppm. The DEP (in consultation with the Maine Department of Human Services - DHS), requested a more stringent target level of 125 ppm due to different assessments of lead toxicity. Specifically, in contrast to EPA's assumptions, DHS assumed that the toxic effects of lead do not require exposure for over a year's time period to manifest themselves in some segments of the population. EPA has set the target level for lead at 125 ppm as protective of human health to satisfy the concerns of DEP and in consideration of the relatively small cost increase associated with the more stringent lead cleanup level.

The following are the cleanup target levels for sludge and sediment to be used for the Saco Tannery Waste Pits site:

Lead:	125 ppm
Antimony:	30 ppm
Total Chromium:	2,000 ppm
Arsenic:	60 ppm[3]

These target levels will be used to determine the extent of the soil cover at the two areas of the Site where soil and sludge contamination is not confined to the waste pits and lagoons.

c. Areas requiring remediation

EPA has determined that all of the waste pits and lagoons at the Site require remediation. This determination is based on a review of sampling data, visual observations during field activities, health and environment based target levels, and contaminant transport considerations. In addition, EPA has determined that the soil cover can be installed over each pit and lagoon, generally without further sampling of contaminant locations, because soil and sludge contamination appears confined to the waste pits and lagoons. Further sampling, however, will be necessary prior to installation of the soil cover in the areas of sediment contamination found at the Site near Waste Pit 9 and in the seep area near Chromium Lagoon 2.

Some of the information that EPA considered in deciding to remediate all of the waste pits and lagoons, and to install the soil cover over the waste pits and lagoons generally without further sampling, is provided below:

* The chemical and physical nature of sludge does not differ among waste pits. Therefore, the remedial

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[3] The average concentration of arsenic in soil/waste at the STWP site is 8.9 ppm. The maximum level of arsenic detected in sediment outside of contaminated areas from surface water drainages at the STWP site is 31 ppm. Since the arsenic is not associated with the waste sludges and may be an artifact of former pesticide use at the Site or may be naturally occurring, a concentration of 60 ppm, which falls within the carcinogenic risk range of 10^{-4} to 10^{-5}, will be used as the target level for arsenic in contaminated sediment. In other words, EPA has selected a target level for arsenic which does not pose an unacceptable risk and which is close to background levels for arsenic found at the Site. Using this standard, EPA will not require remediation of background arsenic levels.

action should address contamination in all waste pits or lagoons rather than particular waste pits.

* Dense sludge layers generally ranging from two (2) to six (6) feet exist in waste pits and lagoons. Soil contamination appears restricted to the highly contaminated waste sludge. Significant contamination was not detected below the waste sludge or outside chromium lagoons and waste pits with sand berms.

* Contaminated sludge is likely to be relatively easy to identify because it is generally limited to the confines of waste pits and lagoons, and has not migrated. The dense, black, pasty nature of the sludge clearly distinguishes it from surrounding and underlying native soils. It is anticipated that the interface between contaminated sludge and clean soil is distinct. It should therefore be technically feasible to distinguish between contaminated sludge and clean soil during installation of the cover system.

As stated above, two areas of the Site will undergo further investigation prior to installation of the cover system. Two on-site locations contain elevated levels of contaminated sediment. First, sediments collected from the wet area near Waste Pit 9 contain significant concentrations of chromium and lead. As stated in the Phase II RI report, Waste Pit 9 appears to be the source of chromium and lead in the wet area west and north of the pit. Using analytical data and field observations, this area of contamination appears to be approximately 29,000 square feet. A sampling program will be implemented to further delineate the extent of area to be covered. This area will be covered to meet the target levels established in preceding section.[4]

Second, a sediment sample taken from the seep area adjacent to Chromium Lagoon 2 detected the highest arsenic concentration at the Site. Before arsenic contaminated sediment is covered, the Chromium Lagoon 2 seep area will be sampled to identify the extent of arsenic contamination. This area will then be covered to meet the target levels established in preceding section.

2. Groundwater

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[4] It is anticipated that the elevated concentrations of chromium and lead detected in surface water draining from this area will attenuate once the source area has been covered. If levels continue to exceed AWQC after the cover system has been established, the need for additional remedial measures will be reevaluated.

a. Remedial Action Objectives

The groundwater portion of the remedial action involves restricting the use of groundwater at the Site, and implementing a water quality monitoring program to observe the distribution, migration, and attenuation of contaminant concentrations over time. Under the water quality monitoring program, further evaluation of the Site will be conducted if contaminants exceed specified action levels. The groundwater portion of the remedial action is designed to prevent ingestion of contaminated groundwater. The only contaminant detected in on-site groundwater at levels in excess of its MCL is arsenic.

Currently, on-site groundwater is not used as a drinking water source. In addition, on-site groundwater contamination has not moved to off site residential well locations, and groundwater at the Site is not affecting the quality of surface water as the groundwater discharges to the surface. The institutional controls, monitoring program, and contingency for further evaluation of the Site will assure that the objective of preventing ingestion of contaminated groundwater continues to be maintained.

In addition, on-site groundwater contamination is expected to dissipate as natural attenuation dilutes and disperses the contaminants. However, the natural attenuation process may not result in substantial reduction in contaminants for many years in the future. Through the water quality monitoring program, EPA will observe the distribution, migration, and reduction of contaminant concentrations over time.

b. Action Levels

Action levels have been established for use in the groundwater/surface water monitoring program required by the selected remedy. Exceedances of these action levels will result in further evaluation of the remedial action.

First, Safe Drinking Water Act Maximum Contaminants Levels (MCLs) are relevant and appropriate groundwater standards at the Site. These standards will be used in monitoring the levels of groundwater contaminants for all contaminants, other than arsenic, for which a ACL has been established.

Second, with respect to arsenic, EPA is setting Alternate Concentration Limits (ACLs). The ACLs for arsenic will be set at the currently observed maximum arsenic levels detected in four on-site monitoring wells, as follows: MW 103 (123 ppb), MW 114B (77 ppb), MW 111B (64 ppb), and MW 101 (70 ppb). The levels of

arsenic in these four on-site wells will be monitored to determine whether the ACLs for arsenic continue to be met in the future. Further, the levels of arsenic detected in monitoring wells located at the site boundary will be monitored to assure that arsenic at levels in excess of the MCL for arsenic are not migrating off-site. EPA has set ACLs for arsenic in four monitoring wells at the STWP site in accordance with CERCLA §121 (d)(2)(B)(ii), as discussed in Section X.C.2.c of this ROD.

Third, with respect to surface water monitoring, EPA will monitor on-site streams to determine whether federal Ambient Water Quality Criteria (AWQC) are exceeded.

B. Description of Remedial Components

Site Preparation: Site preparation will include clearing and grubbing to prepare the Site for remedial activities. See Figure 7-1 in the Feasibility Study for a conceptual site layout for remediation. Before remedial construction begins on-site, a fence will be installed around the construction area to deter vandalism and minimize public exposures to construction activities during remedial activities. Warning signs will be posted along the fence and at the entrance gate. The current lock at the entrance gate will be inspected to insure its integrity and will be replaced if it is in deteriorating condition. Roadways will be designed and constructed to minimize environmental impact while providing adequate access for construction equipment.

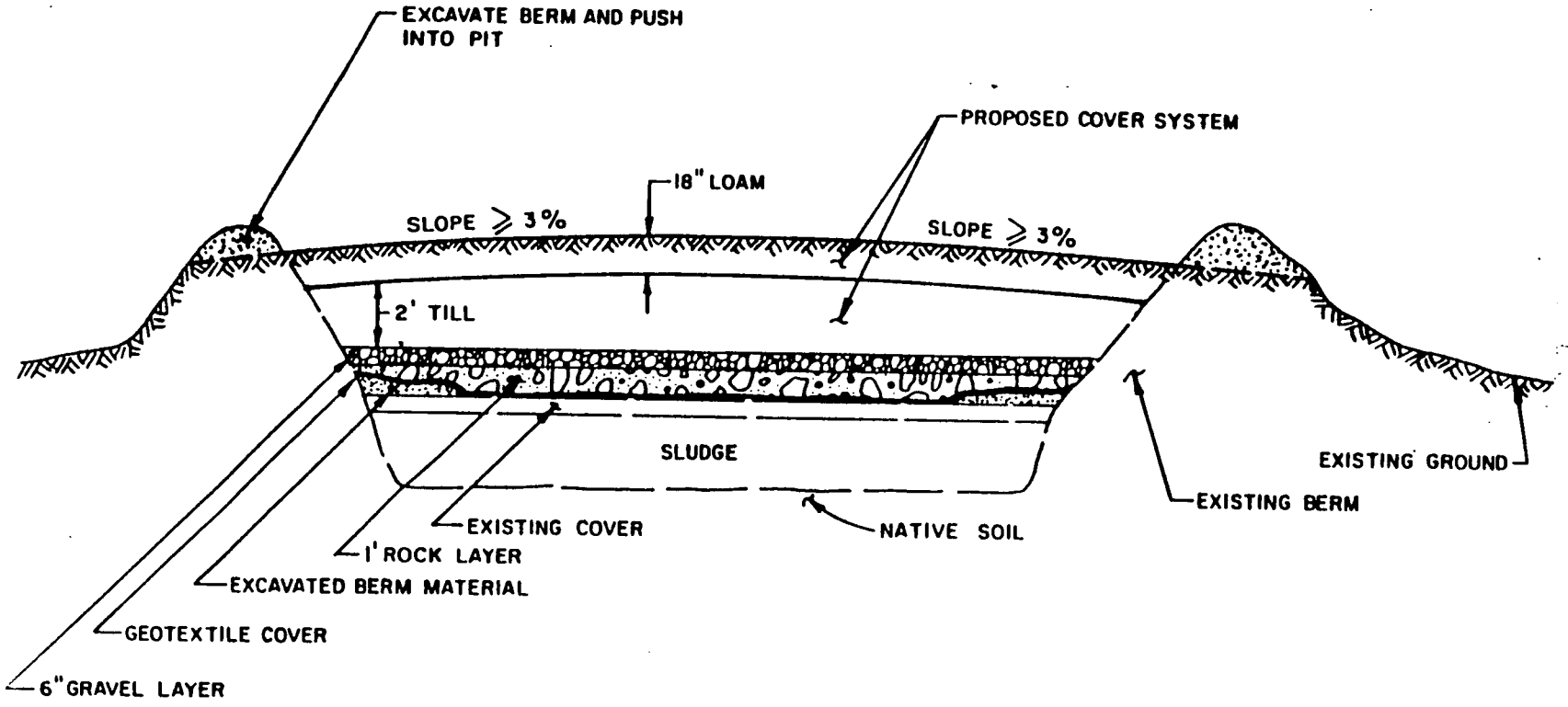
Remove Ponded Water from Pits and Lagoons and Treat at Off-Site Facility: Ponded water will be pumped from each waste pit and lagoon and transported off site for treatment at a commercial water treatment facility, or, alternatively, at a local POTW. This process will occur on a pit by pit basis as the pits are covered.

Install Bio-intrusion Barriers: A geotextile fabric will be installed to cover the waste sludges in the pits and lagoons and provide for a stable surface for the placement of the rock, gravel and soil layers. A one-foot thick rock and a six to eight (6 to 8) inch thick gravel layer may be installed to inhibit the disturbance of the waste sludges by burrowing animals. During remedial design the need for the rock and gravel layers will be evaluated on a pit by pit basis. Burrowing animals will not disturb wastes situated below the water table. Thus, an evaluation of the need for a rock and gravel layer in a particular pit will include consideration of the depth of the water table and whether the installation of a groundwater extraction and treatment system in the future might affect the depth of the water table. In addition, the decision to use a

rock and gravel layer will depend on whether the use of an alkaline rock layer throughout the cover system is determined to be necessary during remedial design. The use of alkaline rocks might affect the pH of groundwater percolating through the wastes and possibly reduce the potential for chromium leaching. In any event, if a rock layer is installed, rock sizes of five (5) inches or greater will be used since the burrowing animals are not likely to move objects greater than themselves.

Cover Waste Pits and Lagoons: The cover system for each pit will consist of a minimum of two (2) feet of till material (three [3] feet of till material if rock and gravel layer is not incorporated) and a minimum of 18 inches of a vegetative loam material. Figure 4 illustrates a cover system cross section of a typical pit. The till layer will likely consist of a variety of silts, sands, and some clays. The amount of fines (ASTM D 422 Specification for sieve analysis) will be approximately 20 to 50 percent. This soil makeup will enable the material to hold some moisture and help enhance growth in the overlying vegetative loam material. The till material will also minimize the potential for erosion. The vegetative loam cover (18 inches) will seek to re-establish typical vegetation found in a wooded environment like the STWP site. Standard unscreened loam will be used for the top layer in the cover system. Both till and loam will be supplied from an off-site source. However, whenever practicable, site remediation activities requiring the excavation of soils will be timed so that recovered on-site till and loam can be used as part of the cover system. To promote runoff at each waste pit location, the cover will be sloped no less than three (3) percent. The thickness of the cover system must be adequate to develop and maintain a higher elevation than the surrounding ground surface, taking into account the expected consolidation of sludges under the cover material. Prior to placement of the cover material, large vegetative growth (e.g., trees) will be removed from inner pit areas. This clearing will occur during site preparation work. In addition, existing berms surrounding the pits will be cut down if their present elevations exceed the anticipated final cover system elevation. During remedial design, the use of one large cover for pit clusters instead of multiple covers will be evaluated where feasible to avoid potential drainage and erosion problems between covers.

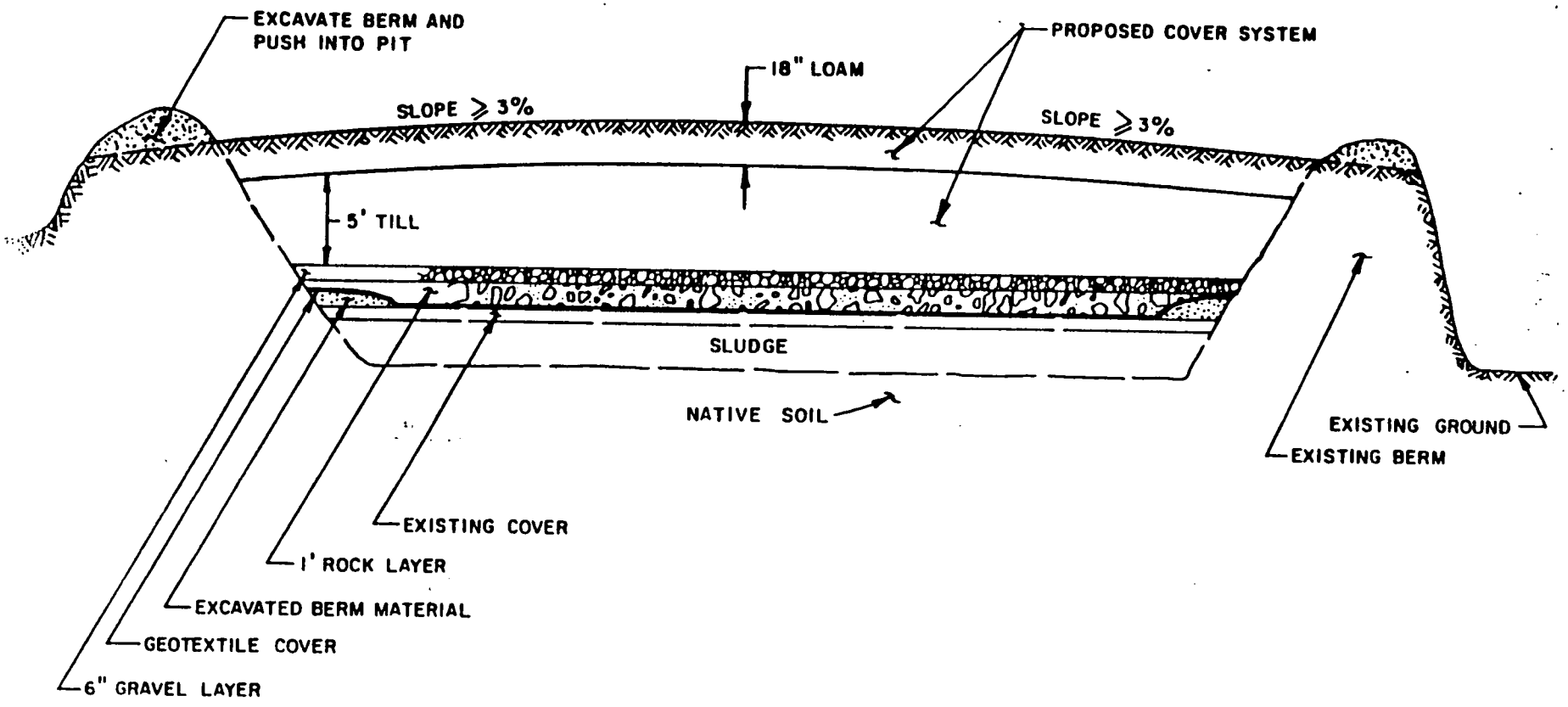
Chromium Lagoons 1 and 2 will be covered using these same procedures. As with the pits, the need for the rock and gravel layer in Chromium Lagoons 1 and 2 and the Chromium Lagoon 2 fill area will be evaluated during design. Because the lagoons are significantly larger and deeper than the pits, more cover material will be necessary to fill and cover these areas. The soil system for both lagoons, as illustrated in Figures 5 and 6, will consist of a minimum of five (5) feet of till (assuming a



WASTE PIT CROSS SECTION
NOT TO SCALE

FIGURE 4

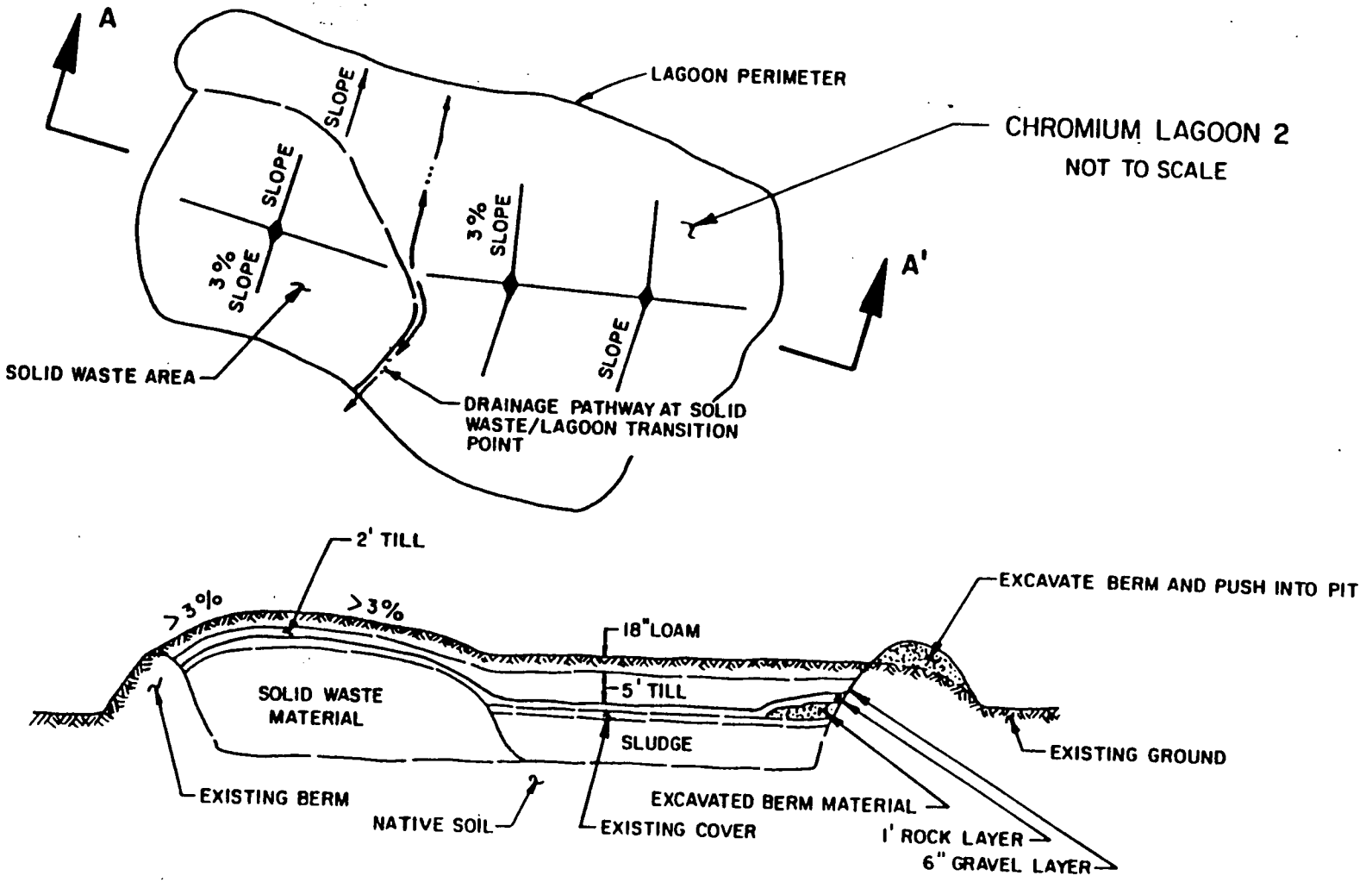
WASTE PIT COVER SYSTEM
SACO TANNERY WASTE PITS SITE SACO, MAINE



LAGOON 1 CROSS SECTION
NOT TO SCALE

FIGURE 5

LAGOON 1 COVER SYSTEM
SACO TANNERY WASTE PITS SITE SACO, MAINE



LAGOON 2 CROSS SECTION A-A'
NOT TO SCALE

FIGURE 6

LAGOON 2 COVER SYSTEM
SACO TANNERY WASTE PITS SITE SACO, MAINE

one and one-half [1.5] foot rock and gravel layer) and a minimum of one and one-half (1.5) feet of vegetative loam. Cover material will be graded and sloped (i.e., greater than or equal to three [3] percent) to promote runoff. Existing berms will be cut if their present elevations exceed the anticipated final cover system elevation.

The solid waste area located in the southwestern corner of Chromium Lagoon 2 will be covered with two (2) feet of till material and 1.5 feet of loam (overlying the rock and gravel if needed, and geotextile). Existing berms around the solid waste area will not be moved or cut. The solid waste area will also be graded and sloped (see Figure 6).

Covering Wet Area and Seep Sediments: An estimated 29,000 square foot (based on analytical data and field observations) wet area near Waste Pit 9 contains contaminated sediments. To protect public health and the environment from potential exposure, this area will be covered with approximately two (2) feet of till and one and one-half (1.5) feet of vegetative loam overlying the geotextile fabric or the rock and gravel layer. Grading and sloping will be similar to the pit covering process.

Finally, the seep area along the outer perimeter of Chromium Lagoon 2 (near the western berm) will be covered. This area consists of surface leachate believed to be seeping from Chromium Lagoon 2. The estimated 7,000 square foot seep area will be covered with a one (1) foot layer of rock and six to eight (6 to 8) inches of gravel (if a rock and gravel layer is determined to be necessary), two (2) feet of till, and one and one-half (1.5) feet of vegetative loam. Following installation of the soil cover, the seep area will be graded and sloped to promote runoff.

The exact extent of the wet area and seep sediments to be covered will be determined during design. A sampling program will be undertaken to further delineate the area of contamination. The area will be covered to meet target levels established in Section X.A.1.b.

Survey Final Cover Contours and Install Permanent Markers: The location of the final cover contours will be surveyed and permanent markers installed for easier location in the future. Additional markers will be located at various locations on-site. These markers will include warning language to provide notice to the public that hazardous substances are buried below the soil cover.

Re-establish Vegetation at Covered and Disturbed Areas: A variety of seeding and planting procedures may be used to re-establish vegetation at covered and disturbed areas after the

cover system is installed. Vegetative loam cover soils would support several types of vegetation. Presently, wetlands and upland areas at the Site provide habitats that can support diverse wildlife populations. Given the size of the Site and its heavily forested nature, it is likely that much of the Site will revegetate itself over a period of several years after remediation. A meadow grass such as crown vetch or reed canary grass will be applied to begin the revegetation process. However, seeds and nuts from present plant species will gradually re-establish natural vegetation in covered areas. In addition to the covered areas, stockpiling areas, equipment storage areas, and vehicle turnaround areas will be revegetated following remediation to prevent further erosion and restore natural habitats.

Create Compensatory Wetlands Area On-Site: A minimum of about 5.85 acres of wetlands may be lost as a result of source control remedial activities at the Site. Additional areas may also be lost during site preparation work or during clearing for pit/lagoon access. Given the levels of contaminated wastes disposed of at the Site, there is no practicable alternative to covering the waste pits and lagoons that would have a lesser impact on the wetlands. Unavoidable impacts on the wetland areas would be mitigated to the maximum extent possible using silt curtains, hay bales and check dams. In order to compensate for wetlands lost, wetlands of equal or higher value will be recreated, to the extent required by the federal and state wetlands ARARs. In siting and developing compensatory wetlands, EPA will consider potential effects on groundwater flow or adverse impacts on other aspects of the remedial actions. In order to re-create wetlands of equal or higher value, the functional attributes of the wetlands presently on site will be further evaluated during remedial design. The Baseline Wetlands Assessment and the Ecological Risk Assessment provide some of the necessary information to evaluate the functional attributes of the STWP wetlands. Further evaluation is required concerning the following functional attributes of the wetlands: hydrologic functions, water quality functions, habitat functions, ecosystem functions, and socioeconomic functions. A yearly operation and maintenance program to be developed during remedial design will be required for several years after construction of wetland areas. Additionally, a monitoring program to be developed during remedial design will be required to evaluate the wetland sediment and water quality and the success of the wetland in meeting the hydrological, biological and cultural functions necessary for the STWP site. Section 7.2.3 of the Feasibility Study includes a discussion on establishing compensatory wetlands.

Post-Closure Maintenance: Post-closure maintenance will be necessary to visually inspect remediated areas and, if necessary,

to perform additional work or repairs on covered areas. For at least the first five years following the installation of the cover system, post-closure maintenance inspections will occur twice a year. Maintenance activities may be required if cover soils have been disturbed by burrowing animals or "off-road" vehicles driven over the Site. Repairs may also be necessary to support erosion control or to revegetate base areas. Additional cover soils may be applied and graded during post-closure maintenance.

Land Use Restrictions: The Site property will be designated as a permanent state conservation area pursuant to an act of the Maine state legislature. Under the state law, development of the Site for residential or commercial purposes will be permanently prohibited. Excavations which penetrate the cover system described above will be prohibited. The use of on-site groundwater as drinking water and the installation of drinking water wells on-site will also be prohibited. State law, or state regulations or agreements implementing the state law, will also include provisions for future maintenance of the Site property by state officials, for the enforcement of the law by state officials, and for the maintenance of permanent markers to provide notice to the public of the location of the covered waste pits and lagoons. In addition to a state law restricting the future uses of the Site, deed restrictions will be instituted to provide additional assurance that the future development of the Site will be permanently prohibited.

The State will enact the necessary law, including regulations or agreements implementing the law, within two years of September 27, 1989, which is the execution date of this ROD by the Acting Regional Administrator of U.S. EPA Region I. If the necessary law, and regulations or agreements are not enacted, and in effect, within two years of September 27, 1989, i.e., on September 27, 1991, the alternate remedy described in Section XIII of this ROD will be effective and will be implemented. Similarly, if EPA determines that the necessary state law, regulations, or agreements as enacted and in effect on September 27, 1991 are inadequate, the alternate remedy described in Section XIII of this ROD will be effective and will be implemented.[5]

Performance of the remedial action will begin prior to September 27, 1991 if the necessary state law, regulations, and agreements

[5] Although a state law converting the Site into a conservation area was recently passed, EPA is currently reviewing the adequacy of the law. A copy of the state law is contained in the Administrative Record.

are in effect and deemed adequate prior to that date, and other considerations do not delay performance.

Design and Install Monitoring Network: Monitoring wells will be sited at and around the property boundary (including but not limited to MW 4 A,B) as well as within the interior of the Site.

Perform Monitoring of Groundwater/Surface Water: The groundwater/surface water monitoring program to be implemented at the Site will have five objectives and components.

1. Monitoring will be performed to detect releases of chromium from the wastes to the groundwater. To monitor for releases of chromium, groundwater quality samples will be collected from the property boundary wells, and from selected wells within the property boundary, and analyzed for chromium on a quarterly basis.

2. Monitoring will be performed in four on-site monitoring wells to assure that the ACLs for arsenic continue to be attained in these wells. As stated above, the ACLS for arsenic will be set at the currently observed maximum arsenic levels detected in four on-site monitoring wells as follows, MW 103(123 ppb), MW 114(77 ppb), MW 111B (64 ppb), and MW 101 (70 ppb). These wells will be sampled quarterly to assure that the ACL set in each of these wells continues to be attained. In addition, a monitoring program will be developed and implemented to confirm continuation of conditions supporting an ACL demonstration, in accordance with CERCLA §121(d)(2)(B)(ii). This monitoring program may include an evaluation of the seasonal variability in contaminant concentrations, the geochemical conditions that may affect the mobility of arsenic, and determination of arsenic speciation.

3. Monitoring will be performed in wells sited at and around the property boundary and within the interior of the Site to monitor the levels, distribution, and migration of arsenic, and other selected target compounds. To monitor the levels and movement of these contaminants, selected monitoring wells will be sampled quarterly for selected target compounds[6] (including but not limited to arsenic, lead, manganese, chlorobenzene and bis[2-ethylhexyl]phthalate), and annually for Target Compound List

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[6] The selected target compounds to be monitored in the groundwater will include the contaminants of concern identified for groundwater at the STWP site. Contaminants of concern were selected based on toxicity, level of contamination, mobility, and persistence in the environment. For groundwater these are: arsenic, lead, manganese, chlorobenzene, and bis(2-ethylhexyl) phthalate

metals, VOCs and SVOCs.

4. Surface water monitoring in on-site streams will be performed. Surface water and sediment samples will be collected from selected on-site stream locations twice a year, during low and high flow seasons, and analyzed for selected target compounds (including but not limited to arsenic, chromium, lead, manganese, chlorobenzene and bis[2-ethyl-hexyl]phthalate).

5. Monitoring will also be performed in off-site residential wells. A residential well sampling program will be instituted with the objective of collecting periodic samples for Target Compound List metals, VOCs and SVOCs from existing and new residential wells in use along Hearn and Flag Pond Roads within the area shown on Figure 7. Additionally, if new residential wells are installed along Hearn and Flag Pond Roads, water-level data will be collected to monitor for possible changes in on-site groundwater flow patterns (as it affects contaminant distribution). The water level monitoring program will be accomplished through the periodic use of continuous recorders on selected monitoring wells during seasonal low water periods.

The sampling and monitoring programs presented above will be conducted for at least three years beyond the completion of construction phase of the remedial action. At that time, the frequency and list of analytes monitored in the groundwater and surface water will be evaluated and possibly reduced, in accordance with relevant and appropriate RCRA groundwater monitoring standards. Subsequent to the initial reassessment, the duration and scope of monitoring activities will be reassessed periodically based on sampling results and observed trends. At a minimum these reassessments will occur during each five-year site review described below. If the water level monitoring program is instituted, and residential well use is subsequently reduced below current usage, the water level monitoring program would be reevaluated and possibly discontinued. Similarly, the residential well sampling program will be reevaluated and modified based on reductions of residential well use.

Prior to and during design and implementation of the selected or alternate remedy, groundwater monitoring of selected monitoring wells and residential wells located near the Site will begin to ensure that the current situation remains stable.

Contingencies for Future Actions: An evaluation of the need for an additional remedial action at the Site will be performed in the event that groundwater monitoring reveals any of the

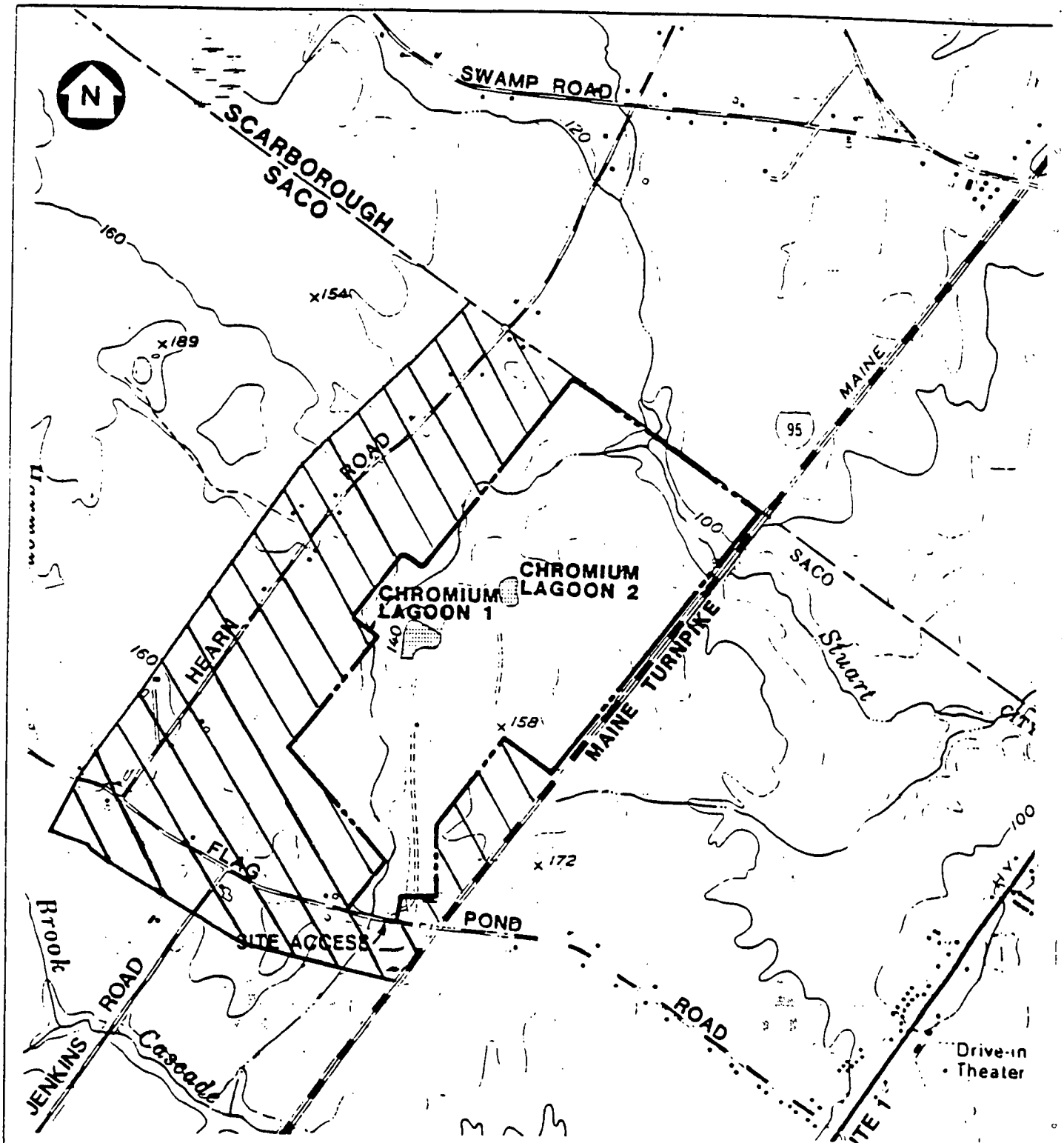

FIGURE 7
ITE LOCATION MAP
WASTE PITS SITE
TECTION AGENCY

UNITED TATES E NMEN

following action level exceedances[7]:

1. Further evaluation of the Site will be conducted if concentrations of chromium and other contaminants, other than arsenic, are detected at levels above MCLs in any of the monitoring wells.

2. Further evaluation of the Site will be conducted if concentrations of arsenic are detected above the established ACLs set for arsenic in MW 103, MW 114B, MW 111B, and MW 101, or if conditions no longer support an ACL demonstration in accordance with CERCLA §121(d)(2)(B)(ii).

3. Further evaluation of the Site will be conducted if concentrations of arsenic are detected above the MCLs for arsenic in any of the wells sited at or around the property boundary.

4. Further evaluation of the Site will be conducted if contaminant concentrations above AWQC are detected in on-site identifiable streams because of discharge of site related groundwater contaminants into surface water.

During any future evaluation of the Site, the need for a groundwater extraction and treatment system, an alternate drinking water supply, or other remedy will be reevaluated. This evaluation will account, to the extent feasible, for natural or seasonal fluctuations in groundwater quality affecting the contaminant concentrations and for increases in contaminant concentrations attributable to the short term impacts of construction activities.

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[7] EPA will determine whether sampling results establish an exceedance of any groundwater/surface water action level in accordance with the applicable or relevant and appropriate standards for the Site. For any contaminant for which no MCL, ACL or AWQC exists, monitoring results shall be compared to health-based levels and interpreted in accordance with the EPA's Supplemental Risk Assessment Guidance for the Superfund Program (June 1989) ("Risk Assessment Guidance"), or any relevant guidances which may become effective in the future. The current EPA Risk Assessment Guidance provides, in relevant part that:

> When the [Hazard Index] exceeds one [1.0] for either a single compound or several compounds exhibiting similar toxic endpoints, then further discussion is needed considering the nature of the relevant toxicity endpoint, the quality of the toxicological database, and the magnitude of the uncertainty factor used in the derivation of the reference dose.

In addition, if, in the future, based on the results of this water quality monitoring, levels of chromium at 500 ppb (i.e., levels ten times in excess of the MCL for chromium of 50 ppb) are detected in any of the wells sited at or around the property boundary, a source control remedial alternative that uses treatment technologies will be performed at the Site.

Conduct Five-Year Site Review: Because this alternative would result in contaminants remaining on-site, EPA will review the Site at least once every five years after the initiation of the remedial action at the Site to assure that the remedial action continues to be protective of human health and the environment. This review will be consistent with the CERCLA standards applicable for five-year site reviews in effect at the time of the review. If justified by the five-year review, remedial actions, such as installation of a groundwater extraction and treatment system, installation of an alternate water supply, or treatment of the sludge may be evaluated, required, recommended and/or implemented. EPA will also evaluate the risks posed by the Site at the completion of the remedial action (i.e., before the Site is proposed for deletion from the NPL).

ESTIMATED TIME FOR CONSTRUCTION: 1 to 2 years
ESTIMATED CAPITAL COST: $6.6 to 6.8 million depending on the number of wells
ESTIMATED O&M COST (Present Worth): $2.5 to 3.8 million depending on the number of wells
ESTIMATED TOTAL COST (As presented in Table 8): $9.2 to 10.6 million

[These costs represent the combined costs of Alternative SC-3A and GW-2.]

C. Rationale for Selection

The rationale for choosing the selected alternative is based on the assessment of each criteria listed in the evaluation of alternatives section of this document. In accordance with Section 121 of CERCLA, to be considered as a candidate for selection in the ROD, the alternative must have been found to be protective of human health and the environment and able to attain ARARs unless a waiver is invoked. In assessing the alternatives that met these statutory requirements, EPA focused on the other evaluation criteria, including, short term effectiveness, long-term effectiveness, implementability, use of treatment to permanently reduce the mobility, toxicity and volume, and cost. EPA also considered nontechnical factors that affect the implementability of a remedy, such as state and community acceptance. Based upon this assessment, taking into account the

TABLE 8
COST ESTIMATE: ALTERNATIVE SC-3A
COVER SYSTEM WITH INSTITUTIONAL CONTROLS
SACO TANNERY WASTE PITS SITE
SACO, MAINE

OPTION 1: EIGHT ADDITIONAL MONITORING WELLS

	ACTIVITY	COST	TOTALS
I.	CAPITAL COSTS		
	A. INITIATE LEGISLATION FOR CONSERVATION AREA DESIGNATION		
	B. SITE PREPARATION (INCLUDING SITE FENCE)	$479,000	
	C. REMOVAL AND OFF-SITE TREATMENT OF PONDED WATER	$363,000	
	D. INSTALLATION OF GEOTEXTILE	$123,700	
	E. INSTALLATION OF ROCK & GRAVEL FOR BIO-BARRIER	$569,300	
	F. COVERING PITS, CHROMIUM LAGOONS 1 AND 2, AND WET AREA NEAR WASTE PIT 9	$1,440,800	
	G. INSTALL MONITORING WELLS	$46,000	
	H. REVEGETATE ALL COVERED AREAS AND ADDITIONAL DISTURBED AREAS	$26,500	
	I. WETLANDS RESTORATION	$1,222,000	
	SUBTOTAL OF ITEMS A - I		**$4,270,300**
	J. HEALTH & SAFETY (@ 10%) LEVEL D PROTECTION	$427,000	
	K. LEGAL, ADMINISTRATION, PERMITTING (@ 5%)	$213,500	
	L. ENGINEERING (@ 10%)	$427,000	

TABLE 8 (Continued)
COST ESTIMATE: ALTERNATIVE SC-3A
COVER SYSTEM WITH INSTITUTIONAL CONTROLS
SACO TANNERY WASTE PITS SITE
SACO, MAINE

OPTION 1 (Continued)

	ACTIVITY	COST	TOTALS
M.	SERVICES DURING CONSTRUCTION (@ 5%)	$213,500	
	SUBTOTAL OF ITEMS J - M		$1,281,000
	SUBTOTAL		$5,551,300
	CONTINGENCY (@ 20 %)		$1,110,300
	TOTAL CAPITAL		**$6,661,600**
II.	ANNUAL OPERATING COST (2-YEAR PERIOD DURING REMEDIAL ACTION)		
	A. SECURITY	$5,100/YR	
	PRESENT WORTH OF ANNUAL OPERATING COSTS		**$9,500**
III.	POST-CLOSURE ANNUAL COSTS		
	A. ANNUAL INSPECTIONS (30 YEARS)	$7,600/YR	
	B. MISCELLANEOUS LAND SURFACE CARE (30 YEARS)	$1,000/YR	
	C. SAMPLING & ANALYSIS (QUARTERLY, YEARS 0-2)	$266,800/YR	
	(SEMI-ANNUALLY, YEARS 2-30)	$133,400/YR	
	PRESENT WORTH OF POST-CLOSURE ANNUAL COST		**$2,483,500**
IV.	FIVE-YEAR REVIEW (FOR 30 YEARS)	$20,400/REVIEW	
	PRESENT WORTH OF FIVE-YEAR REVIEW		**$57,000**
	NET PRESENT WORTH OF ALTERNATIVE (OPTION 1)		**$9,211,600**

TABLE 8 (Continued)
COST ESTIMATE: ALTERNATIVE SC-3A
COVER SYSTEM WITH INSTITUTIONAL CONTROLS
SACO TANNERY WASTE PITS SITE
SACO, MAINE

OPTION 2: SIXTEEN ADDITIONAL MONITORING WELLS
(REFER TO OPTION 1 FOR BREAKDOWN OF ACTIVITIES)

	ACTIVITY	TOTALS
I.	TOTAL CAPITAL COSTS	$6,725,600
II.	ANNUAL OPERATING COSTS (PRESENT WORTH)	$9,500
III.	POST-CLOSURE ANNUAL COSTS (PRESENT WORTH)	$3,154,700
IV.	FIVE-YEAR REVIEW COSTS (PRESENT WORTH)	$57,000
	NET PRESENT WORTH OF ALTERNATIVE (OPTION 2)	**$9,946,800**

OPTION 3: TWENTY-FOUR ADDITIONAL MONITORING WELLS
(REFER TO OPTION 1 FOR BREAKDOWN OF ACTIVITIES)

	ACTIVITY	TOTALS
I.	TOTAL CAPITAL COSTS	$6,792,600
II.	ANNUAL OPERATING COSTS (PRESENT WORTH)	$9,500
III.	POST-CLOSURE ANNUAL COSTS (PRESENT WORTH)	$3,692,300
IV.	FIVE-YEAR REVIEW COSTS (PRESENT WORTH)	$57,000
	NET PRESENT WORTH OF ALTERNATIVE (OPTION 3)	**$10,551,400**

NOTE: DISCOUNT RATE = 5%

statutory preferences of CERCLA, EPA selected the remedial approach for this Site.

1. Source Control

The range of source control alternatives considered for detailed analysis at the STWP site included no action alternatives (SC-1 and SC-2), alternatives that involved covering the soils and sludges (SC-3 and SC-3A), alternatives that involved treatment of the wastes (SC-4, SC-5, SC-6, and SC-7), and alternatives that involved resource recovery (SC-9 and SC-10). Of these alternatives, two (SC-3A and SC-5) best satisfied EPA's remedial selection criteria.

Initially, in the first Proposed Plan issued for the Site, EPA proposed SC-5 as the preferred alternative for the Site. Under Alternative SC-5, described in Section XIII, the soils and sludges from the waste pits and lagoons would be excavated, consolidated, and solidified, and the solidified material would be placed in a RCRA hazardous waste landfill to be constructed on-site. Due to the large volume of wastes disposed of at the Site, the excavation, treatment, and landfilling of the wastes required by Alternative SC-5 would be expensive. Alternative SC-5 has an estimated present worth cost of $33.8 million.

Following the issuance of the first Proposed Plan, DEP refused to concur with the preferred alternative. DEP's stated objections to the preferred alternative included its cost effectiveness in addition to certain technical concerns.[8] Because the STWP site is a fund-lead site, the preferred alternative could not be implemented without DEP's concurrence and its agreement to assist in paying for the costs of the remedial action.

In view of DEP's comments, EPA reassessed the alternatives considered in the Feasibility Study. Specifically, EPA amended the cover alternative (SC-3) so that it included several additional protective measures. The amended cover alternative (SC-3A) involves the covering of soils and sludges with several feet of layered soil and other materials. For additional protection, SC-3A also requires the implementation of a groundwater monitoring system, a contingency for treatment in the event that significant levels of chromium migrate from the waste in the future, and the enactment of a state law which will convert the Site into a state conservation area. Alternative SC-3A was analyzed in detail in an addendum to the Feasibility Study. The present worth cost of SC-3A is approximately $10

[8] For a discussion of DEP's technical concerns, see the Responsiveness Summary to the Record of Decision.

million, substantially less than the cost of Alternative SC-5.

Alternative SC-3A, with its additional safeguards, is protective of human health and the environment. Assuming that chromium will not leach into the groundwater and migrate off-site in the future, EPA concludes that this alternative is as protective of human health and the environment as the originally proposed alternative, SC-5. Large volumes of waste were disposed of at the STWP site in two waste lagoons and 53 disposal pits. Disposal occurred during a period of about twenty years or more. The surface area of the contamination is approximately 13 acres. Significantly, although there was a large volume of wastes disposed of at the Site over a long period of time, contamination originating from the tannery wastes is mainly confined to the waste pits and lagoons. Groundwater analyses indicate that chromium is not migrating from the sludge under current conditions, and has not migrated from the wastes in the many years since disposal began. Other contaminants associated with the sludge have been detected in the groundwater in low levels, which further indicates the limited movement of the waste material found at the Site. Based on the absence of evidence of significant levels of migration of the wastes, the installation of a soil cover system over the pits and lagoons will effectively protect human health and the environment.[9]

In addition, to address concerns that chromium may begin to migrate from the soils and sludges in the future, Alternative SC-3A includes a groundwater monitoring program and a contingency for further evaluation and treatment in the event that significant levels of chromium migrate from the wastes in the future. These measures are designed to detect chromium migration and, if necessary, take corrective action. These measures will provide protection in the event of chromium migration over the long-term and thus assure the long-term effectiveness of the remedy. The rationale for the action levels set for the contingencies for future action are provided in Subsection 2, concerning groundwater, below.

The implementation of the source control alternative also requires the enactment of legislatively-created institutional controls, i.e., the enactment of a state law converting the site property into a state conservation area. The use of legislatively-created institutional controls is central to the protectiveness and effectiveness of the selected remedy. By

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[9] In discussing the contamination detected at the Site which originated from the tannery wastes, EPA notes that the arsenic detected in on-site groundwater is not believed to be associated with tannery wastes.

converting the Site into a conservation area under state law, the selected remedy assures that the soil cover system will not be disturbed or destroyed, and that it will be adequately maintained.

It should be noted that EPA does not ordinarily consider the use of institutional controls to restrict use or access to a site as an adequate substitute for active response measures. Alternative SC-3A, which requires the installation of a soil cover system, does not use institutional controls as a substitute for active response measures. Nevertheless, EPA believes that the significant reliance on institutional controls at this Site is only appropriate because special circumstances are present.

First, EPA has selected an alternative that relies significantly on institutional controls because the State refused to concur on the more costly alternative, SC-5. Without the State's concurrence, and its agreement to assist in paying for the remedial action, Alternative SC-5, which uses treatment technologies, could not be implemented.

Second, by requiring the passage of a state law, in addition to the use of deed restrictions, the institutional controls used at this Site will be the most effective possible. EPA believes that the enactment of a state law to restrict future uses of the Site, and to assure future maintenance of the soil cover, provides greater protection than other institutional controls. A conservation area operated by public officials under state law will provide a rigorously enforced, highly reliable institutional control.

Third, the STWP site is particularly suited for conversion into a conservation area. The entire site consists of 233 acres of land, which is mostly forested. The 233 acres are located adjacent to a rural, residential area which is not densely populated at this time. In addition, the Site contains 53 acres of wetlands, and is therefore suited to land use restrictions which will prohibit the future development of the Site. All of these geographic considerations indicate that legislatively-created institutional controls will be effective in providing future protection to the soil cover system.[10]

Other source control alternatives considered for the STWP site are less acceptable than the selected source control remedy for the following reasons. Alternative SC-1 and SC-2, the no-action

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[10] During the five year reviews of the Site, EPA will evaluate whether the institutional controls enacted at the Site continue to be effective.

alternatives, did not address risks from exposure pathways and are therefore not protective of human health and the environment. Alternative SC-3, the cover system, was not selected because it did not include legislatively-created institutional controls to prohibit future uses of the Site. This alternative also did not include a monitoring system to detect releases of chromium or a contingency for further evaluation and treatment. Alternative SC-4, involving in-situ solidification, was rejected, even though it used treatment technologies, because of implementability problems. Alternative SC-5 is the alternate remedy that will be implemented if an adequate state statute is not enacted within two years from the date that the ROD is signed. Alternatives SC-6 and SC-7, involving excavation and disposal of wastes in an on-site disposal area or landfill, were perceived to be too costly to gain State acceptance and not as effective in the long-term as the selected remedy. Alternatives with a present worth cost in excess of $90 million (Alternatives SC-9 and SC-10) were rejected due to implementability problems.

The State concurs with the selected source control remedy and agrees to assist in paying for the remedial action. The public comments received during the public comment period also indicate that the public generally concurs with or does not oppose the selected source control remedy.

2. **Groundwater**

The components of the source control and groundwater portions of the selected remedy overlap in certain respects. Like the source control alternative, the groundwater monitoring component of the selected remedy is designed to detect increasing contaminant concentrations on-site, contaminant migration off-site, and to build in a contingency for future actions at the Site if necessary.

In particular, the selected groundwater remedy includes a groundwater monitoring program to detect possible future releases of contaminants from the wastes. Further, the selected remedy also includes specific monitoring requirements with respect to chromium, which has the known potential to leach from the wastes, and with respect to arsenic, which is present at the Site at levels in excess of its MCL. Overall, the groundwater portion of the selected remedy represents the best remedial groundwater alternative for the Site, in comparison to the no action groundwater alternative and the pump and treat groundwater alternative under consideration.

a. **Rationale for the creation of a monitoring network to detect contaminant migration from the waste to the groundwater**

The investigations of the STWP site demonstrate that contaminants detected in the soils and sludges have not migrated to the groundwater at the Site. In fact, arsenic is the only groundwater contaminant present at the Site at levels in excess of its MCL, and arsenic is not believed to be associated with the tannery wastes disposed of at the Site.[11] To address concerns that contaminants might begin to migrate from the wastes in the future, a groundwater monitoring program was selected for the Site.

The groundwater monitoring program will provide an early warning of contaminant levels changes at the Site. Groundwater standards for all contaminants except arsenic are currently met at the Site, and the monitoring program will demonstrate whether these standards continue to be met in the future. In the event that contaminants, other than arsenic, are detected in any of the monitoring wells at levels in excess of their MCLs further evaluation of the Site will be performed and the need for an additional groundwater remedy will be assessed.

EPA believes that this monitoring program, with a contingency plan for future evaluation, is protective of human health and the environment. The monitoring program will provide an effective means to detect possible future contaminant migration at the Site. The contingencies for further evaluation based on exceedances of the action levels assure that additional steps will be taken at the Site if necessary in the future. These contingency plans provide sufficient time to perform additional remedial actions at the Site because site contaminants are not expected to migrate through the groundwater at a rapid rate. This portion of the groundwater remedy is not designed to reduce the mobility, toxicity, or volume of contaminants. Instead, the groundwater monitoring network serves to detect any contaminant migration from the wastes to the groundwater, increasing contaminant concentrations on-site, or off-site migration of contamination.

b. Rationale for the requirements under the monitoring program with respect to chromium

With respect to chromium, EPA has determined that chromium has the potential to leach from the waste to the groundwater. Although there is no evidence that chromium has leached from the wastes at the Site, the groundwater monitoring program includes a

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[11] The portion of the groundwater remedy which involves groundwater monitoring for arsenic is discussed in Section X.C.2.c.

commitment to treat soils and sludges located at the Site in the future under certain circumstances.

The MCL level for chromium is 50 ppb. Like the contingency for further actions with respect to other contaminants detected at the Site, if chromium is detected in any of the monitoring wells at levels in excess of 50 ppb (the MCL), further evaluation of the Site will be performed. This groundwater response will aim to assure that exceedances of MCLs for chromium are addressed and that groundwater standards continued to be attained. Based on such further evaluation, it may be possible to remedy chromium exceedances through such measures as a groundwater pump and treat system.

However, if chromium is detected in any monitoring wells situated at and around the site boundary at levels above 500 ppb, wastes at the Site will be treated following evaluation of treatment-based remedial alternatives. EPA considers the 500 ppb action level, ten times the current MCL level for chromium, to be sufficiently significant to trigger implementation of a source control alternative that uses treatment. The type of treatment alternative that would be performed if this contingency developed is not specified at this time because treatment choices should be based on the best available technology the time that wastes at the Site undergo treatment.

EPA believes the monitoring program will provide an effective means to detect chromium migration from the wastes to the groundwater. The contingency for treatment of chromium also provides assurance that, at certain levels, wastes at the Site will undergo treatment. Because chromium migration is not expected to occur at a rapid rate, there would be sufficient time to treat the wastes at the Site if necessary. EPA believes that it will be feasible to excavate wastes at the Site even after installation of the soil cover system for two reasons. First, the wastes at the Site are visibly distinguishable from the clean soils located next to the waste pits and lagoons. Second, the use of a geotextile fabric prior to installation of the soil cover and waste pit and lagoon markers will assist in identifying the buried wastes.

c. Rationale for the selection of groundwater monitoring with respect to arsenic.

The selected groundwater alternative is also designed to address arsenic contamination detected on-site through groundwater monitoring. Given current site conditions, the conversion of the Site into a conservation area with the prohibition of groundwater use, and the establishment of Alternate Concentration Limits at the Site, groundwater monitoring of arsenic levels satisfies

EPA's remedial selection criteria.

In comparing the available groundwater alternatives, EPA considered the following site characteristics.

Arsenic was the only contaminant detected in monitoring well samples at concentrations greater than its MCL. Arsenic was detected in 11 of 32 monitoring wells at concentrations greater than the Contract Required Detection Limit (CRDL) of 10 ppb. Only four shallow monitoring wells in till contained arsenic at concentrations greater than the MCL of 50 ppb. However, other monitoring wells in equally close proximity to the pits or lagoons have not shown arsenic levels exceeding MCLs. None of the 34 residential wells sampled from the surrounding area outside the site boundaries contained arsenic at levels above the CRDL.

Arsenic has been detected in stream sediments (16 ppm at station SED-103) in off-site stream sediments at a location upstream of the pits and lagoons. This indicates there are sources of arsenic in the area other than the waste disposal activities on-site. These sources may include naturally occurring arsenic, or the use of agricultural pesticides containing arsenic. Portions of the Site and abutting areas to the west have been or are currently being farmed. On-site soils considered to be unaffected by the disposal of tanning wastes indicated background concentrations of arsenic at approximately 14 ppm. Arsenic concentrations in the pits and lagoons are quite variable and are not significantly above background, and arsenic is generally not associated with tannery wastes.

Based on these data, EPA believes that arsenic concentrations in groundwater above MCLs are localized in certain portions of the Site and have no definable source area(s). These localized plumes may represent arsenic mobilized by changes in the geochemical environment due to the interaction of tannery waste materials and native groundwater or aquifer materials. Transport distances of arsenic above MCLs are expected to be short with mechanisms of attenuation reducing concentrations below MCLs at or before the plumes reach the on-site streams.

As discussed in Section 5.4.2.3 of the Phase II RI Report, data indicate that site groundwater, including the four monitoring well locations with arsenic MCL exceedances, discharges on-site into three surface water bodies: Stuart Brook, an unnamed tributary to Stuart Brook, and an unnamed tributary to Cascade Brook. No arsenic was detected in surface water samples from these streams. Three stream sediment samples contained arsenic greater than the Site soil background level of 14 ppm in concentrations ranging from 16 to 31 ppm. No chemical specific

ARARs exist for this sediment contamination. These levels are within the carcinogenic risk range of 10^{-4} (290 ppm) and 10^{-5} (29 ppm). These levels are most probably the result of arsenic adsorbed on soil particles migrating with overland flow from the seep area located near the northern berm of Chromium Lagoon 2, rather than from subsurface migration through the groundwater. Further migration from the seep will be prevented by the source control remedy.

The hydrogeologic investigations indicate that the effects of residential well pumping in the Site vicinity are not felt in on-site monitoring wells. Groundwater off-site currently meets all MCLs. Therefore, arsenic concentrations on-site do not impact off-site drinking water receptors.

Site conditions as a whole suggest that active restoration of the groundwater is not practicable, given the absence of a defined source area, the diffuse nature of the contamination, and the localization of the contamination in random areas of the Site. For these reasons, it would be difficult to design a pump and treat system that would effectively treat the arsenic contamination detected at the Site.

In addition to the site characteristics, EPA has considered the unusual nature of the institutional controls at the Site in selecting the groundwater remedy. Under the state law converting the Site into a conservation area, the use of the groundwater at the Site for drinking water purposes will be prohibited. EPA believes that the legislatively-created institutional controls to be used at the Site will be effective in permanently prohibiting future groundwater use and that groundwater monitoring, therefore, will provide a protective groundwater alternative.

Finally, the groundwater remedy will meet ARARs because EPA is invoking the provisions of CERCLA §121(d)(2)(B)(ii), which allow the Agency to supplant MCLs for arsenic with Alternate Concentration Limits (ACLs) because certain statutory criteria are satisfied. CERCLA §121(d)(2)(B)(ii) provides for ACLs in lieu of MCLs where three conditions in the statute are met, as follows:

(1) There are known or projected points of entry of such groundwater into surface water;

(2) On the basis of measurements or projections, there is or will be no statistically significant increase of such constituents from such groundwater into such surface water at the point of entry or at any point where there is reason to believe accumulation of constituents may occur downstream; and

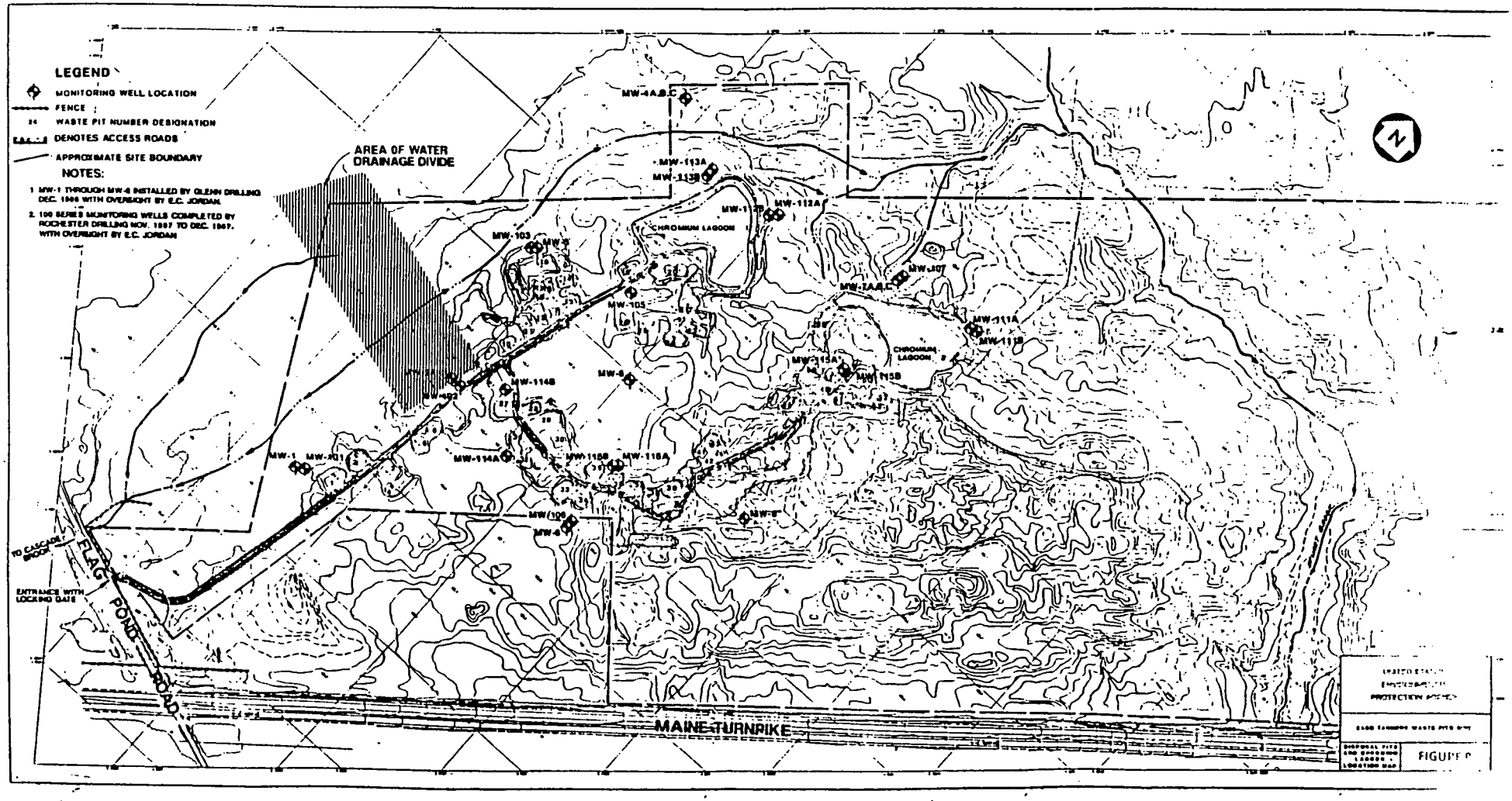
(3) The remedial action includes enforceable measures that will preclude human exposure to the contaminated groundwater at any point between the facility boundary and all known and projected points of entry of such groundwater into surface water then the assumed point of exposure may be at such known and projected points of entry.

EPA believes that the conditions for setting ACLs are met at this Site. First, points of entry of groundwater into surface water are located at discharge zone(s) which contain the on-site streams of Stuart Brook, an unnamed tributary to Stuart Brook, or an unnamed tributary to Cascade Brook. (See Figure 8) Although there has been no known regular human use of these streams, these streams serve as a potential point of exposure for humans or animals to arsenic if transported via groundwater.

The second requirement of CERCLA §121(d)(2)(B)(ii) is satisfied because, to date, no arsenic has been detected in the stream surface water. As stated above, transport distances of arsenic above MCLs are expected to be short with mechanisms of attenuation reducing concentrations below MCLs at or before the plumes reach the on-site streams.

Finally, the remedial action includes enforceable institutional controls that will preclude human exposure to contaminated groundwater. The conversion of the site property into a conservation area under state law, and the use of deed restrictions, will preclude the use of on-site groundwater for drinking water. In addition, at the STWP site, the point of exposure will be set at the on-site streams and along the property boundary for the Site. The point of exposure is a location where environmental or human receptors are expected to be exposed to groundwater or surface water. Exposure to groundwater/surface water at the point of exposure cannot result in an endangerment to human health or the environment. At the STWP site, no arsenic has been detected in surface water from on-site streams. Monitoring of the surface water will be conducted in the future. Further, along the site boundary, arsenic has not been detected in groundwater at levels in excess of the MCL. Groundwater monitoring along the site boundary will be conducted to assure that exceedances of the MCL for arsenic are not detected at the site boundary in the future.

Based on the above findings, EPA is setting as ACLs for arsenic the currently observed maximum arsenic levels detected in four on-site monitoring wells. The point of compliance of ACLs will be the well locations where ACLs will be monitored. Future monitoring will be performed to assure that ACL levels continue to be met in these four wells and to assure that the requirements of CERCLA §121(d)(2)(B)(ii) continue to be met. This monitoring


LEGEND
MONITORING WELL LOCATION
FENCE
WASTE PIT NUMBER DESIGNATION
DENOTES ACCESS ROADS
APPROXIMATE SITE BOUNDARY
NOTES:
1. MW-1 THROUGH MW-6 INSTALLED BY GLENN DRILLING DEC. 1986 WITH OVERSIGHT BY E.C. JORDAN.
2. 100 SERIES MONITORING WELLS COMPLETED BY ROCHESTER DRILLING NOV. 1987 TO DEC. 1987, WITH OVERSIGHT BY E.C. JORDAN
AREA OF WATER DRAINAGE DIVIDE
MW-4A,B,C
MW-113A
MW-113B
MW-112A
CHROMIUM LAGOON
MW-103
MW-3
MW-105
MW-107
MW-1A,B,C
MW-111A
MW-111B
MW-115A
MW-115B
MW-5
MW-114B
MW-102
MW-1
MW-101
MW-114A
MW-116B
MW-116A
MW-109
MW-4
MW-6
TO CASCADE BROOK
ENTRANCE WITH LOCKING GATE
FLAG POND ROAD
MAINE TURNPIKE
N

will serve to trigger evaluations of whether future remedial actions will be necessary. Other triggers for this decision are described in Section X.B, Contingencies for Future Actions, of this ROD.

In sum, groundwater monitoring for arsenic will satisfy the requirements of CERCLA, because it will be protective of human health and the environment, comply with ARARs, and provide an effective means to detect changes in the levels of arsenic contamination on-site. Alternative Concentration Limits (ACLs) have been established at the Site for arsenic, and for no other site contaminants. Although the selected groundwater remedy does not use treatment technologies, EPA has determined the pumping and treating the groundwater would present design and implementation problems.

d. Comparison to other groundwater alternatives.

In comparison to the other groundwater remedies considered for the Site, the selected groundwater monitoring alternative represents the best remedial alternative for groundwater at the Site. The no action alternative (GW-1) is not protective of human health and the environment because it would not reduce the risk posed by ingestion of contaminated on-site groundwater. The pump and treat alternative (GW-3) does not provide a practicable solution because the source of the arsenic contamination is not known and an effective pump and treatment system would be difficult to design.

The State has concurred with this portion of the groundwater portion of the selected remedy. Several members of the public expressed support for the installation of a water line to provide protection from possible future contaminant migration. The provision of a water line is not appropriate, however, because groundwater from the Site is not at this time impacting the water quality of off-site residential wells.

XI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Saco Tannery Waste Pits Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs, and is cost effective. The selected remedy does not, however, satisfy the statutory preference for treatment which reduces the mobility, toxicity, or volume of waste as a principal element. Nevertheless, given the State's refusal to concur on the first Proposed Plan, the selected remedy utilizes permanent solutions

to the maximum extent practicable.

Statutory determinations regarding the alternate remedy are provided in Section XIV.

A. The Selected Remedy is Protective of Human Health and the Environment

From the risk assessment, EPA concluded that if the Site were used for residential purposes, there would be an increased risk to human health posed by contact with and ingestion of contaminated soils and sludges. EPA also concluded that if groundwater were to be used as a source of drinking water, it would pose a threat to human health. Environmental receptors that use the waste pits and lagoons for habitat and food are also at risk due to site contaminants. The selected remedy specifically addresses all of these risks. In addition, the selected remedy addresses the risk that chromium might begin to leach from the wastes to the groundwater at some future time.

Because the soils and sludges at the Site will be covered by several feet of till and loam materials, the remedy will eliminate the risk posed by contact with or ingestion of contaminants found in the waste pits and lagoons. Bio-intrusion barriers, consisting of a layer of rock and gravel, will be used where necessary to prevent burrowing animals from coming into contact with the contaminated soils. By installing the cover system, environmental receptors will be inhibited from using the waste pits and lagoons for habitat and food. The use of a soil cover system, consisting of several feet of different layers of soil and other materials will provide effective, long-term protection to the public and environmental receptors from contact with or ingestion of contaminated soils.

Monitoring of the groundwater for chromium, with a contingency for further evaluation and treatment of the soils if necessary, reduces the threat of harm posed by the possible migration of chromium in the future. By implementing a groundwater monitoring system to detect releases of chromium, any future migration of chromium from the waste into the groundwater should be detected. Moreover, the establishment of a contingency for treatment of the wastes in the event that significant levels of chromium migrate from the waste in the future provides further protection to human health and the environment.

The risk of future exposure to contaminated soils due to destruction of the cover system will be eliminated through the use of legislatively-created institutional controls by which the site property will be converted into a state conservation area. Pursuant to state law and this Record of Decision, the cover

system will also be properly maintained and protected.

With respect to the groundwater located at the Site, under the state law converting the site property into a conservation area, the future use of on-site groundwater for drinking water purposes will be prohibited. Risks from ingestion of on-site groundwater will be reduced or eliminated through the use of the legislatively-created institutional controls, the groundwater monitoring program, and the contingency for further evaluation of the Site in the event that current levels of on-site arsenic and other contaminants increase in the future, or begin to move off-site.

In sum, EPA finds that the selected remedy will be fully protective of human health and the environment because it effectively addresses all of the risks posed by the Site.

B. The Selected Remedy Attains ARARs

This remedy will attain all applicable or relevant and appropriate federal and state requirements that apply to the Site. Federal environmental laws that are applicable or relevant and appropriate to the selected remedial action at the Saco Tannery Waste Pits site include the:

Resource Conservation and Recovery Act (RCRA)
Clean Water Act (CWA)
Clean Air Act (CAA)
Occupational Safety and Health Administration (OSHA)
U.S. Fish and Wildlife Coordination Act

State environmental laws that are applicable or relevant and appropriate to the selected remedial action at the Site include:

Maine Hazardous Waste Management Rules
Maine Solid Waste Management Rule: Landfill Disposal Facilities
Maine Ambient Air Quality Standards
Maine Freshwater Wetlands Act
Maine Standards for Classification of Minor Drainages
Maine Standards for Classification of Groundwater

Table 9 and Table 10 list the chemical specific and location specific ARARs, respectively, and discuss how they were considered in the development and evaluation of remedial alternatives. Table 11 lists the action specific ARARs, presents a brief synopsis of the requirements, and outlines the action which will be taken to attain the ARARs.

A brief narrative summary of the ARARs follows.

TABLE 9 -- CHEMICAL-SPECIFIC ARARS

REQUIREMENT	REQUIREMENT SYNOPSIS/CONSIDERATION
Safe Drinking Water Act Regulations establishing Maximum Contaminant Levels (MCLs), 40 C.F.R. Part 141, Subpart B	These regulations establish contaminant concentration levels in public drinking water. With respect to the selected remedy, these regulations will be relevant and appropriate for all contaminants, with the exception of arsenic for which ACLs have been established. The MCL for arsenic will, however, be relevant and appropriate at the point of exposure in on-site streams and in monitoring wells at and around the site boundary. With respect to the alternative remedy, the groundwater remedy is an interim remedy only, and these regulations will be relevant and appropriate for all contaminants.
Maine Drinking Water Rules, C.M.R. 10-144A, Chapter 231, Section 7	These regulations establish contaminant concentration levels in public drinking water. With respect to the selected remedy, these regulations will not be remedy, these regulations will not be ARARs on-site because a state statute will prohibit the use of groundwater at the Site for drinking water purposes. With respect to the alternate remedy, the groundwater remedy is an interim remedy only, and these regulations will be relevant and appropriate.
Maine Rules Relating to Testing of Private Water Systems for Potentially Hazardous Contaminants, C.M.R. 10-144A, Chapter 233	These regulations establish maximum exposure guidelines for numerous inorganic and organic compounds in water. With respect to the selected remedy, these regulations will not be ARARs on-site because a state statute will prohibit the use of groundwater at the Site for drinking water purposes. With respect to the alternate remedy, the groundwater remedy is an interim remedy only, and these regulations will be relevant and appropriate.
Maine Standards for Classification of Fresh Surface Waters, 38 M.R.S.A.	Stuart Brook is a Class B water, as Class B is defined under this applicable law.

§ 465

Maine Standards for Classification of Groundwater, 38 M.R.S.A. §§ 465c & 470	The groundwater at the Site is classified as GW-A, as GW-A is defined under this applicable law.

To Be Considered

Federal Ambient Water Quality Criteria (AWQC)	AWQC are health and environment based criteria developed for carcinogens and non-carcinogens. AWQC will be considered in monitoring on-site streams.

TABLE 10 - LOCATION SPECIFIC ARARS

REQUIREMENT	REQUIREMENT SYNOPSIS/CONSIDERATION
Discharge of Dredged and Fill Materials Regulations, 40 C.F.R. § 230, promulgated under Section 404 of the Clean Water Act	Under this applicable requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative with lesser effects is available. At the Saco Tannery Waste Pits site, there is no practicable alternative having lesser effects other that filling or excavating the waste pits and lagoons.
U.S. Fish and Wildlife Coordination Act, 16 U.S.C. § 661	EPA had complied with this applicable law by consulting with the U.S. Fish and Wildlife Service concerning the effect of the remedial action on the wetland area.
Wetlands Executive Order, (E.O. 11990), and EPA regulation 40 C.F.R. Part 6	The Wetlands Executive Order and this EPA regulation are applicable and were weighed in the evaluation of remedial alternatives. During the remedial action, steps will be taken to minimize the adverse affects upon the wetlands and destroyed wetlands will be re-created.
Executive Order 11988 and EPA regulation 40 C.F.R. Part 6	The floodplains Management Executive Order and this EPA regulation are applicable and were weighed in the evaluation of remedial alternatives. During the performance of the selected or alternate remedy, steps will be taken to minimize any adverse impacts on the floodplains. The impact on the floodplain is expected to be minimal because the waste pits and lagoons do not lie within the floodplain.
Maine Freshwater Wetlands Act, 38 M.R.S.A., Chapter 3, §§ 405-410	These relevant and appropriate standards regulating activities in the vicinity of a wetland will be met.
Maine Hazardous Waste Management Rules, 38 M.R.S.A. § 1[illegible] et seq., [illegible]ers 800-802,	These relevant and appropriate regulations outline general requirements for the construction of hazardous waste facilities in Maine, including requirements concerning the location of

850, 851, 853-857	a hazardous waste facility in a wetland or near a floodplain. The remedial action will comply with appropriate portions of these regulations.
Maine Standards for Classification of Minor Drainages, 38 M.R.S.A., Chapter 3, § 468	These applicable regulations which prohibit the degradation of a Class B water will be met with respect to Stuart Brook.
Maine Alteration of Rivers, Streams, and Brooks, 38 M.R.S.A. § 425 et seq.	EPA will comply with these applicable regulations which prohibit interference with the flow or quality of Stuart Brook.
Maine Water Pollution Control Law: Solid Waste Disposal Area; Location, 38 M.R.S.A., Chapter 3, Article 2, § 421	These regulations state that no boundary of a solid waste disposal area shall lie closer than 300 feet to any classified body of surface water. The alternate remedy will comply with these applicable regulations. Because the selected remedy does not involve the construction of a solid waste disposal area, these regulations are not applicable or relevant and appropriate to the selected remedy.
Maine Standards for Classification of Groundwater, 38 M.R.S.A., Chapter 3, § 470	These applicable regulations which prohibit the degradation of onsite groundwater will be met.
Maine Site Location Act, 38 M.R.S.A. Chapter 3, §§ 481-490	These applicable regulations which prohibit adverse impacts on certain natural resources will be met.
Maine Solid Waste Management Rules: Landfill Disposal Facilities, 38 M.R.S.A., § 1301 et seq., Chapters 400-406	These relevant and appropriate regulations concerning the placements of wastes will be met.

TABLE 11 -- ACTION-SPECIFIC ARARS FOR SELECTED REMEDY

REQUIREMENT	REQUIREMENT SYNOPSIS/CONSIDERATION
RCRA General Facility Standards, 40 C.F.R. §§ 264.10-264.18	These relevant and appropriate regulations concern general waste analysis, site security, and training. Substantive portions of these regulations will be met.
RCRA Preparedness and Prevention, 40 C.F.R. §§ 264.30-264.37	These relevant and appropriate regulations outline the requirements for safety equipment and spill control. Substantive portions of these regulations will be met.
RCRA Contingency Plan and Emergency Procedures, 40 C.F.R. §§ 264.50-254.56	These relevant and appropriate regulations require the development and implementation of a contingency plan in the event of fire, explosion, or release of hazardous waste constituents. Substantive portions of these regulations will be met.
RCRA Closure Regulations, Landfills, 40 C.F.R. § 264.310	The cover system will be designed and constructed to meet these relevant and appropriate regulations. Requirements related to permeability and minimization of migration are relevant but not appropriate at this Site because all of the waste pits and lagoons are located in a high water table area, which would limit the effectiveness of an impermeable cover.
RCRA Groundwater Protection Standards, 40 C.F.R. Part 264, Subpart F	The groundwater monitoring program will comply with these relevant and appropriate regulations.
RCRA Closure and Post-Closure, 40 C.F.R. §§ 264.110-264.120, and 264.310 and Part 264, Subpart F	These regulations are relevant and appropriate after installation of the soil cover. These regulations include provisions for development of a post-closure plan, maintenance, and groundwater monitoring.

National Ambient Air Quality Standards (NAAQS) for PM10, 40 C.F.R. § 50.6-50.7, promulgated pursuant to the Clean Air Act	These regulations outline the maximum primary and secondary 24-hour concentrations for particulate matter. This regulation is applicable during construction of the remedial action.
National Ambient Air Quality Standards (NAAQS) for lead, 40 C.F.R. § 50.12, promulgated pursuant to the Clean Air Act	This regulation establishes ambient air quality standards for lead. This regulation is applicable during construction of the remedial action.
Executive Order 11988 and EPA regulation 40 C.F.R. Part 6	The Floodplains Management Executive Order and this EPA regulation are applicable and were weighed in the evaluation of remedial alternatives. During the installation of the soil cover system steps will be taken to minimize any adverse impacts on the floodplains. The impact on the floodplain is expected to be minimal.
Executive Order 11990 and EPA Regulation 40 C.F.R. Part 6	The Wetlands Executive Order and this EPA regulation are applicable and were weighed in the evaluation of remedial alternatives. During the remedial action, steps will be taken to minimize the adverse affects upon the wetlands and destroyed wetlands will be re-created.
OSHA General Industry Standards, 29 C.F.R. Part 1910	These applicable regulations contain safety and health standards that will be met during all remedial activities.
OSHA Safety and Health Standards for Federal Service Contracts, 29 C.F.R. Part 1926	These applicable regulations contain safety standards that will be met during all remedial activities.
OSHA Recordkeeping, Reporting, and Related Regulations, 29 C.F.R. Part 1904	Substantive portions of these applicable regulations, concerning employer recordkeeping and reporting regulations, will be met during all remedial activities.

Pretreatment Regulations for Indirect Discharges to POTWs, 40 C.F.R. Part 403	These regulations control the discharge of pollutants into POTWs. If standing water from the waste pits is discharged to a POTW, these regulations will be applicable and the remedy will comply through pretreatment.
Discharge of Dredged and Fill Materials Regulations, 40 C.F.R. § 230, promulgated under Section 404 of the Clean Water Act	This regulation applies to the use of fill material in wetlands. The selected remedy will comply with this regulation because there is no practicable alternative to filling the waste pits and lagoons, because steps will be taken to minimize adverse impacts during remediation, and because new wetlands will be recreated onsite.
U.S. Fish and Wildlife Coordination Act, 16 U.S.C. § 661	EPA has complied with this applicable law by consulting with the U.S. Fish and Wildlife Service concerning the effect of the remedial action on the wetland area.
Maine Hazardous Waste Management Rules, 38 M.R.S.A. § 1301 et seq., Chapters 800-802, 850, 851 & 853-857	These relevant and appropriate regulations outline general requirements for the construction of hazardous waste facilities in Maine. The soil cover system will be installed in compliance with appropriate portions of these regulations.
Maine Solid Waste Management Rules: Landfill Disposal Facilities, 38 M.R.S.A. § 1301 et seq., Chapter 401	The soil cover system will be comply with these relevant and appropriate standards for landfill disposal facilities.
Maine Ambient Air Quality Standards, 38 M.R.S.A., § 584, Chapter 110	The applicable ambient air quality standards will not be exceeded during the performance of the on-site construction work.
Maine Freshwater Wetlands Act, 38 M.R.S.A., Chapter 3, §§ 405-410	These relevant and appropriate standards regulating activities in the vicinity of a wetland will be met.

Maine Standards for Classification of Minor Drainages, 38 M.R.S.A., Chapter 3, § 468	These applicable regulations which prohibit the degradation of a Class B water will be met with respect to Stuart Brook.
Maine Standards for Classification of Groundwater, 38 M.R.S.A., Chapter 3, §§ 465-C and 470	These applicable regulations which will prohibit the degradation of on-site groundwater will be met.
Maine Alteration of Rivers, Streams, and Brooks, 38 M.R.S.A., Chapter 3, § 425 et seq.	These applicable regulations which will prohibit interference with the flow or quality of Stuart Brook will be met.

1. Action-specific ARARs

The source control portion of the selected remedy will involve covering the waste pits and lagoons with a soil cover system, prohibiting the future development of the Site under state law, and monitoring the groundwater to detect releases of chromium from the contaminated soils and sludges. The groundwater portion of the remedy will involve restricting the future use of on-site groundwater for drinking water purposes and monitoring the levels of groundwater contamination found on the Site.

a. Federal

The Resource Conservation and Recovery Act (RCRA) governs the transportation, storage, treatment and disposal of hazardous wastes. In general, RCRA will not be an applicable requirement at the Saco Tannery Waste Pits site, but will be relevant and appropriate.

Under 40 C.F.R. § 261.4 (b)(6), wastes that fail the EP Toxicity test due to the presence of chromium, or because they are listed due to the presence of chromium, and which are not hazardous for any other reason (i.e., they do not fail the EP characteristic for any constituent but chromium, do not fail for any other characteristic, or are not listed for any other reason), are not considered hazardous wastes under RCRA, provided that:

(A) The chromium in the waste is exclusively (or nearly exclusively) trivalent chromium; and

(B) The waste is generated from an industrial process which uses trivalent chromium exclusively (or nearly exclusively) and the process does not generate hexavalent chromium; and

(C) The waste is typically and frequently managed in non-oxidizing environments.

EPA has determined that the provisions of 40 C.F.R. § 261.4 (b)(6) (known as the tannery waste exclusion) are satisfied and that no listed or characteristic wastes are found at the Site.[12] For this reason, RCRA will not be applicable. Specific provisions of RCRA will be relevant and appropriate because they address and provide technical guidance for the same kinds of

[12] EP Toxicity tests were performed during the investigation of the Site on arsenic, barium, chromium, lead, mercury, and selenium found at the Site. Chromium was the only one of these contaminants found at the Site that failed the EP Toxicity test.

actions as those that will be taken at the STWP site.

EPA will comply with the substantive provisions of RCRA regulations governing: Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities, General Facility Standards (40 C.F.R. §§ 264.10-264.18); Preparedness and Prevention (40 C.F.R. §§ 264.30-264.37; Contingency Plan and Emergency Procedures (40 C.F.R. §§ 264.50-264.56); Releases From Solid Waste Management Units (groundwater protection) (40 C.F.R. §§ 264.90-264.101); and Closure and Post-Closure - Landfills (40 C.F.R §§ 264.110-264.120 & 264.310, and Part 264, Subpart F).

In accordance with RCRA closure regulations, the selected remedy will meet the requirements that the final cover (1) functions with minimum maintenance; (2) promotes drainage and minimizes erosion or abrasion of the final cover; and (3) accommodates settling and subsistence so that the integrity of the cover is maintained. Requirements related to the long-term minimization of migration of liquids and permeability will not be appropriate because waste materials within the disposal pits and lagoons lie below the high water table and impermeable covers therefore will not provide a successful means of preventing liquids from percolating through the wastes.

The Hazardous and Solid Waste Amendments to RCRA (HSWA) land disposal restrictions (LDR) are not applicable or relevant and appropriate to the selected remedy because the selected remedy does not involve placement of the wastes.

With respect to standing water to be pumped from the waste pits and that may be directed to a POTW, EPA will comply with applicable regulations under the Clean Water Act concerning Pretreatment Standards for POTW Discharge (40 C.F.R. Part 403).

Regulations under the Occupational Safety and Health Act (OSHA) apply to the performance of the remedial action as it involves workers at the Site. EPA will comply with OSHA regulations including the General Industry Standards (29 C.F.R. Part 1910); Safety and Health Standards (29 C.F.R. Part 1926); and the substantive provisions of the Record Keeping, Reporting and Related Regulations (29 C.F.R. Part 1904).

During the performance of the remedy, EPA will also comply with the Clean Air Act and the National Ambient Air Quality Standards (NAAQS) for PM_{10} (40 C.F.R. §§ 50.6-50.7) and lead (40 C.F.R. § 50.12). Fugitive dust emissions caused by site activities will not exceed these ambient air quality standards.

A discussion of the ARARs concerning wetlands and floodplains is

provided in the subsection 3 below, concerning location specific ARARs.

b. State

The selected remedy will also attain action-specific Maine ARARs, including the Maine Hazardous Waste Management Rules (38 M.R.S.A. § 1301 et seq., Chapters 800-802, 850, 851, & 853-857) (only appropriate portions of these regulations will be met); Maine Solid Waste Management Rules: Landfill Disposal Facilities (38 M.R.S.A. § 1301 et seq., Chapter 401); Maine Ambient Air Quality Standards (38 M.R.S.A. § 584, Chapter 110); Maine Freshwater Wetlands Act (38 M.R.S.A. Chapter 3, §§ 405-410); Maine Standards for Classification of Minor Drainages (38 M.R.S.A. Chapter 3, § 468); and Maine Standards for Classification of Groundwater (38 M.R.S.A. Chapter 3, § 465-C and 470).

2. Chemical-Specific ARARs

In determining which contaminants at the Site required remediation, EPA considered both Federal ARARs and potential State ARARs.

ARARs for groundwater contaminants at the STWP site, with the exception of arsenic, are the Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act (40 C.F.R. § 141.11-141.16). Maximum Contaminant Levels are applicable only at the tap and not to an aquifer directly. Because, however, the groundwater at the STWP site is classified as Class IIB under the EPA groundwater protection strategy and must be considered a possible source of drinking water, the Federal MCLs are relevant and appropriate in setting cleanup levels. As indicated earlier, Alternative Concentrations Levels (ACLs) have also been established for arsenic in four on-site monitoring wells, in accordance with CERCLA §121(d)(2)(B)(ii). The selected groundwater remedy will meet the standards set by MCLs and, with respect to arsenic, ACLs.

Although the State of Maine's MCLs (10-144A C.M.R. Chapter 231) and Maximum Exposure Guidelines (MEGs) (10-144A C.M.R. Chapter 233) are potential ARARs for the groundwater, the State of Maine has determined that these standards are not applicable or relevant and appropriate to the performance of the selected alternative. Maine classifies all groundwater in the state as a minimum Class GW-A, suitable for drinking water. However, at the STWP site, state law will prohibit the use of on-site groundwater for drinking water purposes. For this reason, the State of Maine has determined that State MCLs and MEGs are not appropriate remediation standards.

Federal Ambient Water Quality Criteria (AWQC) are health and environmental based criteria developed for carcinogens and non-carcinogens. AWQC will be considered in monitoring on-site streams.

3. Location-Specific ARARS

During the remedial action, EPA will install a soil cover system over the waste pits and lagoons. The two waste lagoons and a number of the waste pits have formed manmade wetlands. Because there is no practicable alternative, these manmade wetlands will be destroyed during remediation. The remedial action will comply with section 404 of the Clean Water Act and with standards set by Maine requirements, including Maine Freshwater Wetlands Act (38 M.R.S.A. chapter 3, section 405-410) and the Maine Hazardous Waste Management Rules (38 M.R.S..A. § 1301 et seq., Chapters 800-802, 850, 851, 853-857), governing actions that take place in a wetland. The remedial action will also comply with the Wetlands Executive Order (E.O. 11990) and the Fish and Wildlife Coordination Act (16 U.S.C. § 661). Following installation of the soil cover system, EPA will create compensatory wetlands to the extent required by federal and state wetlands ARARs to reestablish wetlands that will be lost during remediation.

The remedial action will also comply with the Floodplain Management Executive Order (E.O. 11988) and EPA regulation 40 C.F.R. Part 6, which implements the Executive Order. Although approximately 30 acres of the Site lie within a 100-year floodplain, none of the waste pits, lagoons, and contaminated sediment areas lie within the floodplain. Thus, the soil cover system will not be installed within the floodplain. Nevertheless, during the performance of the remedial action, steps will be taken to minimize any adverse impacts on the floodplains.

The remedial action will also comply with Maine Standards for Classification of Minor Drainages (38 M.R.S.A. Chapter 3, § 468) and Maine Alteration of Rivers, Streams, and Brooks (38 M.R.S.A. Chapter 3, § 425 et seq.), which will prohibit the degradation of Stuart Brook, and Maine Standards for Classification of Groundwater (38 M.R.S.A. Chapter 3, § 470), which will prohibit the degradation of on-site groundwater. Finally, the remedial action will comply with the Maine Site Location Law (38 M.R.S.A. Chapter 3, Section 481-490), which prohibits adverse impacts on certain natural resources.

C. The Selected Remedial Action is Cost Effective

Of those remedial alternatives that are protective and attain ARARs, EPA's selected remedy is cost-effective.

The estimated total present worth cost of the source control and groundwater components of the selected remedy is $10 million. The estimated capital costs are $6.6 to $6.8 million, depending on the number of wells used, and the estimated cost of operations and maintenance is $2.5 to $3.8 million, depending on the number of wells used.

In comparison to the other alternatives considered for the Site, the cost of the selected remedy is less than the cost of the treatment-based alternatives considered and less than the cost of those remedies that involved resource recovery. Leaving aside SC-5, the alternate remedy, the treatment-based alternatives, SC-4, SC-6, and SC-7, have a range of estimated present worth costs between $15 million and $29 million. Each of these alternatives was rejected in part due to technical, implementation, or long-term effectiveness considerations. Alternatives SC-9 and SC-10, which involve resource recovery, have estimated present worth costs of $107 million and $93 million respectively. These costly alternatives also used uncertain technologies and required a considerable amount of further testing prior to implementation.

In comparison to the alternate remedy, which includes Alternative SC-5 and Alternative GW-2, the selected remedy is substantially less expensive. The estimated present worth cost of Alternative SC-5 is $33.8 million and the estimated present worth cost of Alternative GW-2 is $321,000. In spite of the differences in cost between the selected remedy and the alternate remedy, they each provide a similar degree of protection to human health and the environment assuming that contaminants do not migrate from the wastes in the future.

Finally, the groundwater monitoring program to be implemented under the selected remedy will be less costly than the pump and treat groundwater alternative (GW-3). In addition, EPA has determined that the pump and treat alternative presents several potential design and implementation problems.

Table 12 provides a summary of present worth costs for the source control and groundwater alternatives respectively.

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

Given the State's refusal to concur with the first Proposed Plan, the selected remedy utilizes permanent solutions to the maximum extent possible.

As indicated earlier, DEP refused to concur with the remedy that

TABLE 12
REMEDIAL ALTERNATIVES COST COMPARISON
SACO TANNERY WASTE PITS SITE
SACO, MAINE

REMEDIAL ALTERNATIVE	CAPITAL COSTS ($)	ANNUAL OPERATING COSTS (PRESENT WORTH $)	POST-CLOSURE ANNUAL COST (PRESENT WORTH $)	FIVE-YEAR REVIEW COSTS (PRESENT WORTH $)	TOTAL COST (PRESENT WORTH $)
S-1: No action	0	0	0	57,000	57,000
S-2: Institutional Action	252,500	246,000	0	57,000	555,500
S-3: Cover System	5,841,000	9,500	122,000	57,000	6,029,500
S-3A: Cover System with Institutional Controls	6,661,600	9,500	2,488,500 - 3,692,300	57,000	9,211,600 - 10,551,400
S-4: In-Situ Solidification	14,893,000	9,500	122,000	57,000	15,081,500
S-5: Excavation Solidification, On-Site RCRA Landfill	32,892,000	426,000	407,000	57,000	33,782,000
S-6: Excavation, Solidification, On- Site Disposal Area	26,946,000	146,000	549,000	57,000	27,698,000
S-7: Excavation, On-Site RCRA Landfill	24,146,000	4,434,000	412,000	57,000	29,049,000
S-9: Soil Washing	107,452,000	39,000	0	57,000	107,548,000
S-10: Excavation, On-Site Incineration	92,822,000	26,000	0	57,000	92,905,000
GW-1: No Action	0	0	0	57,000	57,000
GW-2: Institutional Action	38,200	GW-2A/Site-Wide Monitoring: 1,345,000 GW-2B/Chemical Specific Monitoring: 226,000	0	57,000	GW-2A: 1,440,200 GW-2B: 321,200
GW-3: Pump and Treat by Precipitation, Flocculation, Clarification	1,571,000	2 Years Pumping: 409,000 5 Years Pumping: 952,000 10 Years Pumping: 1,699,000	0	57,000	2 Years Pumping: 2,037,000 5 Years Pumping: 2,580,000 10 Years Pumping: 3,327,000

EPA proposed in the first Proposed Plan, SC-5. Alternative SC-5 involves the excavation, solidification, and disposal of solidified wastes in an on-site RCRA landfill. Alternative SC-5 thus provides for a permanent disposition of the wastes at the Site without site-wide land use restrictions or an extensive groundwater monitoring network. Without DEP's concurrence, and its agreement to assist in paying for the costs of the cleanup, Alternative SC-5 could not be implemented. EPA therefore reconsidered and revised its preferred alternative and issued a revised Proposed Plan. Because alternative SC-5 could not be implemented without DEP's concurrence, EPA believes that the selected remedy utilizes, to the maximum extent possible, a permanent solution.

EPA's selected remedy does not utilize an alternative treatment technology.

E. The Selected Remedy Does not Satisfy the Preference for Treatment as a Principal Element

The selected remedy does not include treatment and thus does not satisfy the preference for treatment. Treatment-based alternatives were rejected because of DEP's refusal to concur with the proposed alternative SC-5, because other treatment based alternatives were perceived to be too costly to gain state acceptance, or because components of certain treatment-based alternatives were technically impractical. The rejection of these treatment-based alternatives is discussed in Section X.C.1.

XII. STATE ROLE

The Maine Department of Environmental Protection has reviewed the various alternatives and has indicated its support for the selected remedy and for the alternate remedy (Alternative SC-5). The State has also reviewed the Phase II Remedial Investigation, Risk Assessment, Feasibility Study, FS Addendum, and Wetlands and Floodplains Assessment Report to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental laws and regulations. On the basis of these analyses, the State of Maine concurs with the selected remedy and the alternate remedy for the Saco Tannery Waste Pits Site, and agrees to implement and enforce the institutional controls and land use restrictions components of the selected remedy and the alternate remedy. The State of Maine also certifies that the selected remedy and the alternate remedy for the Saco Tannery Waste Pits Site comply with all applicable or relevant and appropriate State environmental laws and regulations. A copy of the declaration of concurrence is attached as Appendix D.

* * *

XIII. THE ALTERNATE REMEDY

As indicated earlier, this Record of Decision includes an alternate remedy. This alternate remedy will become effective in the event that the State does not enact an adequate state law converting the Site into a state conservation area, or adequate regulations or agreements implementing the state law, within two years from the date on which this ROD is signed on September 27, 1989. If an adequate law, and adequate regulations or agreements, are not enacted, and in effect, within two years of September 27, 1989, i.e., on September 27, 1991, the alternate remedy will be effective and will be implemented.

This alternate remedy includes both a source control (SC-5) and a groundwater component (GW-2). A detailed conceptual discussion of the source control and groundwater component can be found in Sections 7.2.5 and 8.3.2 respectively of the Feasibility Study.

A. Description of the Alternate Remedy

1. Remedial Action Objectives

The remedial action objectives for the alternate remedy are identical to the remedial action objectives for the selected remedy. For a discussion these remedial action objectives, see Section X.A.

2. Target Cleanup Levels, Areas Requiring Remediation, and Action Levels

The target cleanup levels, and areas requiring remediation, for sludge and sediment for the alternate remedy are identical to the target cleanup levels, and areas requiring remediation, for sludge and sediment for the selected remedy. The alternate remedy would involve excavating all waste pits and lagoons to the interface between the visibly contaminated sludge layer and the clean soil. Further sampling, prior to excavation of the wastes, would only be required in the wet area near Waste Pit 9 and the seep area adjacent to Chromium Lagoon 2, in order to determine the area of wastes requiring remediation.

Action levels for groundwater remediation have not been established because the groundwater monitoring provided under the alternate remedy is intended to be an interim remedy only. Further action will be taken with respect to groundwater remediation in the form of a permanent groundwater remedy to be

selected and performed at a future time.

B. Description of Remedial Components

Site Preparation: Site preparation will include clearing and grubbing to prepare the Site for remedial activities. See Figure 7-8 in the Feasibility Study for a conceptual site layout for remediation. Before remedial construction begins on-site, a fence will be installed around the construction area to deter vandalism and minimize public exposures to construction activities during remedial activities. Warning signs will be posted along the fence and at the entrance gate. The current lock at the entrance gate will be inspected to insure its integrity and will be replaced if it is in deteriorating condition. Roadways will be designed and constructed to minimize environmental impact while providing adequate access for construction equipment.

Remove Ponded Water from Pits and Lagoons and Treat at Off-Site Facility: Ponded water will be pumped from each waste pit and lagoon and transported off site for treatment at a commercial water treatment facility, or, alternatively, at a local POTW. This process will occur on a pit by pit basis as the pits are excavated.

Excavate Contaminated Material: Contaminated material from designated areas (pits, lagoons, solid waste area, wet area, and Chromium Lagoon 2 seep area) will be excavated and transported to treatment units with equipment such as backhoes, bulldozers, front-end loaders, and dump-trucks. To minimize odor problems, excavated materials will not be stockpiled at the Site and will undergo treatment immediately following excavation. Solid waste and sludge disposed in the Chromium Lagoon 2 fill area will be separated by a screening mechanism. After separation, sludge and soils will be treated and solid waste material will be shredded and disposed of in the on-site landfill.

Solidify Contaminated Material: As the contaminated material is excavated, it will be mechanically mixed with solidification/ stabilization reagents in a plant mixing unit. Processing equipment will be either a mobile processing plant or a semi-stationary plant. Based on the results of the solidification/ stabilization treatability studies conducted at the STWP site, preliminary mix proportions of about 30-percent fly ash, 10-percent high calcium quick lime are recommended. The exact proportions and recommended sequence of field mixing procedures will be established by means of an extensive sludge sampling and laboratory/field testing program during remedial design. Test protocol during site remediation may include regular analysis of fly ash for inorganic constituents. Additional strength

development and leachate tests will also be conducted on the 25-percent cement kiln dust mix to determine whether this mix should be further considered for use in final remediation of the Site. The goal is to use a mixture that meets compressive strength requirements while minimizing the possibility of contaminant migration. The TCLP test and various strength tests are likely candidates as performance specifications. Treatability test information is summarized in Section 7.2.4.1 of the Feasibility Study.

Place Solidified Material in an On-Site RCRA Landfill: Solidified material and shredded solid waste will be placed in a landfill constructed on site. A conceptual discussion of the landfill design, construction, and operations is contained on pages 7-86 through 7-100 of the Feasibility Study. Detailed design criteria for the landfill will be developed during remedial design to allow for the use of the most current materials and procedures appropriate for the specific conditions at the Site. The proposed conceptual landfill design, as presented in the FS, will comply with RCRA Landfill Requirements (40 C.F.R. Part 264, Subpart N) for hazardous waste landfills and will include a gravity fed leachate collection system.

Backfill and Re-Establish Vegetation in Pits, Chromium Lagoon 2 and Wet Area: Existing pits and Chromium Lagoon 2 may be restored as wetlands. Alternatively, empty pits and lagoons will be filled with common-borrow soil material. Soil material would be filled to a level that would promote runoff. The wet area behind Waste Pit 9 would be filled to existing grade. The backfilling task would occur after waste has been excavated from each specific area; backfilling and revegetating would be performed while landfill and treatment operations are taking place.

Create Compensatory Wetlands Area On-Site: Following the landfilling of the solidified wastes, wetlands of equal or higher value will be recreated to the extent required by federal and state wetlands ARARs. Given the levels of contaminated wastes disposed of at the Site, there is no practicable alternative to excavating the waste pits and lagoons that would have a lesser impact on the wetlands. Restoration of wetlands in the area of the existing pits and lagoons may be a more favorable approach than creating a new area for wetland restoration. In siting and developing compensatory wetlands, EPA will consider potential effects on groundwater flow or adverse impacts on other aspects of the remedial actions. In order to re-create wetlands of equal or higher value, the functional attributes of the wetlands presently on site will be further evaluated during remedial design. The Baseline Wetlands Assessment and the Ecological Risk Assessment provide some of the necessary information to evaluate

the functional attributes of the STWP wetlands. Further evaluation is required concerning the following functional attributes of the wetlands: hydrologic functions, water quality functions, habitat functions, ecosystem functions, and socioeconomic functions. A yearly operation and maintenance program to be developed during remedial design will be required for several years after construction of wetland areas. Additionally, a monitoring program to be developed during remedial design will be required to evaluate the wetland sediment and water quality and the success of the wetland in meeting the hydrological, biological, and cultural functions necessary for the STWP site. Section 7.2.3 of the Feasibility Study includes a discussion on establishing compensatory wetlands.

Post-Closure Monitoring and Maintenance of Landfill: Post-closure monitoring and maintenance will be conducted in accordance with RCRA post-closure regulations (40 C.F.R. Part 264, Subpart G). The facility will be operated in accordance with substantive portion of the RCRA General Facility Standards (40 C.F.R. Part 264, Subpart B). Post-closure activities will include: leachate collection, maintenance of the landfill cap, and overall inspections.

A monitoring program will be developed to evaluate the effectiveness of the landfill. The groundwater monitoring system will be developed and maintained to comply with the requirements of 40 C.F.R. Part 264, Subpart F.

Land Use and Groundwater Use Restrictions: Institutional controls such as deed restrictions and/or local ordinances will be implemented or enacted to restrict activities which may destroy the protectiveness of the cap and to prohibit the use of on-site groundwater as drinking water.

The duration and scope of institutional controls prohibiting the use of on-site groundwater as drinking water will be reassessed periodically based on sampling results and observed trends. At a minimum this reassessment will occur during each five-year site review described below.

Interim Groundwater Remedy - Perform Environmental Monitoring on Groundwater/Surface Water: A water quality monitoring program will be implemented to track contaminant distribution, migration and attenuation over time.

To monitor the levels and movement of arsenic and other selected target compounds, monitoring wells will be sampled quarterly for selected target compounds (including but not limited to arsenic, lead, manganese, chlorobenzene and bis[2-ethyl-hexyl]phthalate). Surface water and sediment samples will be collected from

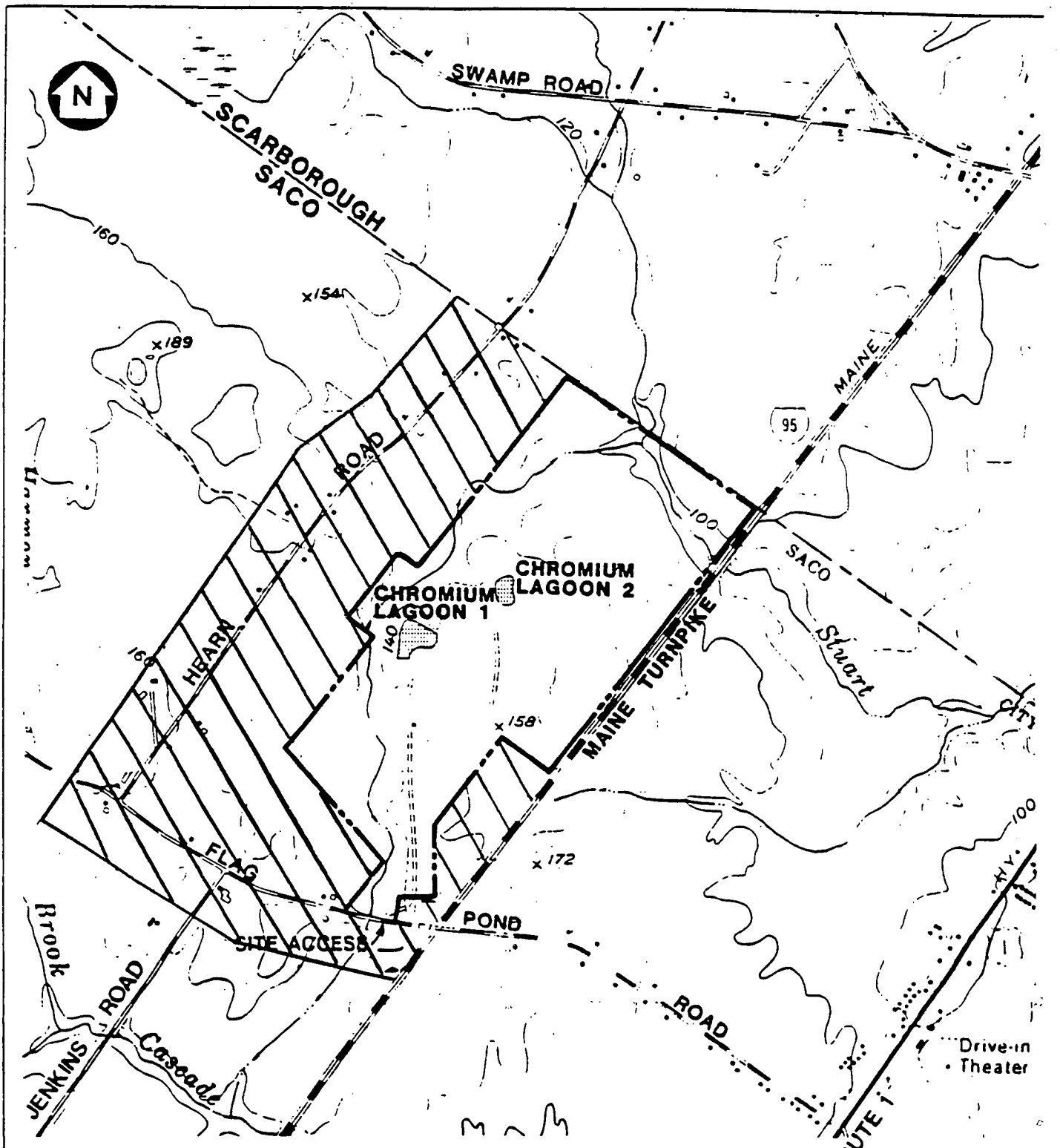


FIGURE 9
SITE LOCATION MAP
SACO TANNERY WASTE PITS SITE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

selected locations in on-site streams twice a year, during low and high flow seasons, and analyzed for selected target compounds (including but not limited to arsenic, chromium, lead, manganese, chlorobenzene and bis[2-ethyl-hexyl]phthalate).

A residential well sampling program will be instituted with the objective of collecting periodic samples for selected target compounds from existing and new residential wells in use along Hearn and Flag Pond Roads within the area shown on Figure 9.

Additionally, if new residential wells are installed along Hearn and Flag Pond Roads, water-level data will be collected to monitor for possible changes in on-site groundwater flow patterns (as it affects contaminant distribution). The water level monitoring program will be accomplished through the periodic use of continuous recorders on selected monitoring wells during seasonal low water periods.

The sampling and monitoring programs presented above will be conducted for at least three years beyond the completion of construction phase of the remedial action. At that time, the frequency and list of analytes monitored in the groundwater and surface water will be reassessed. If the water level monitoring program is instituted, and residential well use is subsequently reduced below current usage, the water level monitoring program would be reevaluated and possibly discontinued. Similarly, the residential well sampling program will be reevaluated and modified based on reductions of residential well use.

Conduct Five-Year Site Review: Because this alternative would result in contaminants remaining on-site, EPA will review the Site at least once every five years after the initiation of the remedial action at the Site to assure that the remedial action continues to be protective of human health and the environment. This review will be consistent with the CERCLA standards applicable for five-year site reviews in effect at the time of the review. If justified by the five-year review, remedial actions, such as installation of a groundwater extraction and treatment system or installation of an alternate water supply may be evaluated, required, recommended and/or implemented. EPA will also evaluate the risks posed by the Site at the completion of the remedial action (i.e., before the Site is proposed for deletion from the NPL).

ESTIMATED TIME FOR CONSTRUCTION: 3 to 4 years
ESTIMATED CAPITAL COST: SC-5 - $32,892,000, GW-2 - $38,200
ESTIMATED O & M COST (Present Worth): SC-5 - $890,000
GW-2 - $283,000
ESTIMATED TOTAL COST (Present Worth): SC-5 - $33,782,000
GW-2 - $321,200

Table 7-18 and Table 8-13 in the FS provide cost breakdowns for SC-5 and GW-2 respectively.

C. Rationale for Selection of an Alternate Remedy

The rationale for choosing the alternate remedy is based on the assessment of each criteria listed in the evaluation of alternatives section of this document, and also described in Section X.C, concerning the selected remedy. Based on an assessment of the evaluation criteria, and the statutory preferences of CERCLA, EPA selected an alternate remedy for the Site in addition to the selected remedy.

The alternate remedy involves excavating and solidifying the sludge from the waste pits and lagoons, consolidating and disposing of the solidified material in a RCRA hazardous waste landfill to be constructed on site, and monitoring the groundwater at the Site. Except for minor changes in its description, this alternative is identical to the preferred alternative that was recommended for the Site by EPA in the first Proposed Plan, issued in July 1988. After the State refused to concur with this remedial alternative, EPA adopted the selected remedy for the remediation of the Site.

Under the selected remedy, the State of Maine is required to enact a state law permanently converting the site property into a state conservation area, and to adopt regulations or enter into agreements with EPA implementing the state law. If an adequate state law, and adequate regulations or agreements, are not enacted or adopted, and in effect, within two years from the date that the ROD is signed, the alternate remedy will become effective. Thus, if the selected remedy cannot be implemented, the alternate remedy will become effective.

The alternate remedy is protective of human health and the environment, will attain federal and state applicable or relevant and appropriate public health and environmental requirements, and uses treatment technologies and permanent solutions to the maximum extent practicable.

Through the use of excavation, solidification, and placement in a RCRA landfill, the source control component of the alternate remedy will permanently and significantly reduce the mobility of hazardous contaminants at the Site. EPA believes that excavation of the wastes at the Site can be performed safely and effectively. There is little potential for discharge of contaminants from the wastes to the groundwater during excavation, and during performance of the alternate remedy in general. With respect to solidification, this treatment process

has been used at Superfund sites and other hazardous waste sites across the country with sludges similar to those found at the STWP site. Treatability studies performed on sludge from the Site during the FS demonstrate that solidification is a feasible alternative and that it can successfully reduce the potential of chromium to leach from the wastes. Additional protection is provided by this alternative due to the placement of solidified wastes in a RCRA landfill. The use of a RCRA landfill will minimize freeze-thaw and precipitation effects, as well as collect leachate. The combination of excavation, solidification and landfilling provided under this remedy will provide effective, technically feasible, long-term protection to human health and the environment.

Finally, with respect to groundwater, the groundwater component of the alternate remedy will be an interim remedy only, and groundwater conditions will be re-evaluated during the first five year review of the Site.[13]

Although the State initially rejected this remedy when it was presented in the first Proposed Plan for the Site, the State has concurred with the use of this remedy as an alternate to the selected remedy. No public comments were received during the second public comment period concerning the alternate remedy.

XIV. STATUTORY DETERMINATIONS FOR ALTERNATE REMEDY

A. The Alternate Remedy is Protective of Human Health and the Environment

The site risks, as described earlier, include: an increased risk to human health posed by contact with and ingestion of contaminated soils and sludges, an increased risk to human health posed by ingestion of on-site drinking water, an increased risk to environmental receptors posed by exposure to site contaminants, and a risk to human health and the environment posed by the potential for chromium to leach from the waste to the groundwater at some future time. The alternate remedy addresses all of these risks.

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[13] Because the land use restrictions prohibiting use of the groundwater at the Site for drinking water under the alternate remedy do not depend on the passage of a state statute, and are not as effective as the land use restrictions provided under the selected remedy, EPA will perform an interim remedy for groundwater at this time and re-evaluate the groundwater portion of the alternate remedy in the future.

Under the alternate remedy, the soils and sludges will be excavated, solidified, and contained in a RCRA landfill to be constructed on-site. By this action, the contaminants contained in the two waste lagoons and 53 disposal pits will be consolidated in one area of the Site and contained within a secure landfill. Thus, the alternate remedy will effectively eliminate the risk posed by contact with or ingestion of contaminants found in the waste pits and lagoons.

The consolidation, treatment, and containment of the wastes in an on-site landfill will also significantly reduce the threat of harm posed by the possible migration of contaminants from the wastes in the future. The use of treatment technologies to solidify the waste will reduce the threat that hazardous substances will be able to migrate from the solidified waste. Even in the event that contaminants should begin to migrate from the solidified waste, the use of a double liner barrier in the RCRA landfill will prevent the release of contaminants from the landfill itself.

Groundwater monitoring will effectively monitor changes in groundwater conditions. In addition, the use of institutional controls at the Site will prohibit the use of on-site groundwater for drinking water purposes. Given that groundwater contamination is limited on-site, and that the future use of the on-site groundwater will be prohibited, the alternate remedy will provide adequate protection to human health and the environment. As an interim remedy, the groundwater component of the alternate remedy will be reassessed during the first five-year review of the Site.

Finally, with respect to the performance of the alternate remedy, it should be noted that continuous ambient air monitoring will be conducted near waste pits and site boundaries during remediation to evaluate the effect of the remedial action on air quality in the vicinity of the Site and the residential area near the Site. In addition, workers on site will use the necessary health and safety protection for dermal contact and inhalation.

B. The Alternate Remedy Attains ARARs

This remedy will attain all applicable or relevant and appropriate federal requirements that apply to the Site. Federal environmental laws from that are applicable or relevant and appropriate to the alternative remedial action at the Saco Tannery Waste Pits site include the:

Resource Conservation and Recovery Act (RCRA)
Clean Water Act (CWA)
Clean Air Act (CAA)

Occupational Safety and Health Administration (OSHA) --
U.S. Fish and Wildlife Coordination Act

State environmental laws that are applicable or relevant and appropriate to the alternative remedial action at the Site include:

Maine Hazardous Waste Management Rules
Maine Solid Waste Management Rule: Landfill Disposal Facilities
Maine Ambient Air Quality Standards
Maine Freshwater Wetlands Act
Maine Standards for Classification of Minor Drainages
Maine Standards for Classification of Groundwater
Maine Hexavalent Chromium Particulate Emissions Standard

Table 13 and Table 14 list the chemical specific and location specific ARARs, respectively, and discuss how they were considered in the development and evaluation of remedial alternatives. Table 15 lists the action specific ARARs, presents a brief synopsis of the requirements, and outline the action which will be taken to attain the ARARs.

A brief narrative summary of the ARARs for the alternate remedy follows.

1. Action-specific ARARs

The source control portion of the alternate remedy will involve excavating the wastes from all of the waste pits and lagoons, solidifying these wastes, and placing the solidified material in a RCRA landfill which will be constructed on-site. The groundwater portion of the alternate remedy will involve prohibiting the future use of on-site groundwater for drinking and monitoring the levels of arsenic and other contaminants found in on-site groundwater. The institutional controls used to restrict the future use of on-site groundwater will consist of deed restrictions and/or local ordinances.

a. Federal

The Resource Conservation and Recovery Act (RCRA) governs the transportation, storage, treatment and disposal of hazardous wastes. In general, RCRA will not be an applicable requirement at the Saco Tannery Waste Pits site, but will be relevant and appropriate.

Under 40 C.F.R. § 261.4 (b)(6), wastes that fail the EP Toxicity test due to the presence of chromium, or because they are listed due to the presence of chromium, and which are not hazardous for any other reason (i.e., they do not fail the EP characteristic

TABLE 13 -- CHEMICAL-SPECIFIC ARARS

REQUIREMENT	REQUIREMENT SYNOPSIS/CONSIDERATION
Safe Drinking Water Act Regulations establishing Maximum Contaminant Levels (MCLs), 40 C.F.R. Part 141, Subpart B	These regulations establish contaminant concentration levels in public drinking water. With respect to the selected remedy, these regulations will be relevant and appropriate for all contaminants, with the exception of arsenic for which ACLs have been established. The MCL for arsenic will, however, be relevant and appropriate at the point of exposure in on-site streams and in monitoring wells at and around the site boundary. With respect to the alternative remedy, the groundwater remedy is an interim remedy only, and these regulations will be relevant and appropriate for all contaminants.
Maine Drinking Water Rules, C.M.R. 10-144A, Chapter 231, Section 7	These regulations establish contaminant concentration levels in public drinking water. With respect to the selected remedy, these regulations will not be remedy, these regulations will not be ARARs on-site because a state statute will prohibit the use of groundwater at the Site for drinking water purposes. With respect to the alternate remedy, the groundwater remedy is an interim remedy only, and these regulations will be relevant and appropriate.
Maine Rules Relating to Testing of Private Water Systems for Potentially Hazardous Contaminants, C.M.R. 10-144A, Chapter 233	These regulations establish maximum exposure guidelines for numerous inorganic and organic compounds in water. WIth respect to the selected remedy, these regulations will not be ARARs on-site because a state statute will prohibit the use of groundwater at the Site for drinking water purposes. With respect to the alternate remedy, the groundwater remedy is an interim remedy only, and these regulations will be relevant and appropriate.
Maine Standards for Classification of Fresh Surface Waters, 38 M.R.S.A.	Stuart Brook is a Class B water, as Class B is defined under this applicable law.

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Maine Standards for Classification of Groundwater, 38 M.R.S.A. §§ 465c & 470	The groundwater at the Site is classified as GW-A, as GW-A is defined under this applicable law.

To Be Considered

Federal Ambient Water Quality Criteria (AWQC)	AWQC are health and environment based criteria developed for carcinogens and non-carcinogens. AWQC will be considered in monitoring on-site streams.

TABLE 14 - LOCATION SPECIFIC ARARS

REQUIREMENT	REQUIREMENT SYNOPSIS/CONSIDERATION
Discharge of Dredged and Fill Materials Regulations, 40 C.F.R. § 230, promulgated under Section 404 of the Clean Water Act	Under this applicable requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative with lesser effects is available. At the Saco Tannery Waste Pits site, there is no practicable alternative having lesser effects other that filling or excavating the waste pits and lagoons.
U.S. Fish and Wildlife Coordination Act, 16 U.S.C. § 661	EPA had complied with this applicable law by consulting with the U.S. Fish and Wildlife Service concerning the effect of the remedial action on the wetland area.
Wetlands Executive Order, (E.O. 11990), and EPA regulation 40 C.F.R. Part 6	The Wetlands Executive Order and this EPA regulation are applicable and were weighed in the evaluation of remedial alternatives. During the remedial action, steps will be taken to minimize the adverse affects upon the wetlands and destroyed wetlands will be re-created.
Executive Order 11988 and EPA regulation 40 C.F.R. Part 6	The floodplains Management Executive Order and this EPA regulation are applicable and were weighed in the evaluation of remedial alternatives. During the performance of the selected or alternate remedy, steps will be taken to minimize any adverse impacts on the floodplains. The impact on the floodplain is expected to be minimal because the waste pits and lagoons do not lie within the floodplain.
Maine Freshwater Wetlands Act, 38 M.R.S.A., Chapter 3, §§ 405-410	These relevant and appropriate standards regulating activities in the vicinity of a wetland will be met.
Maine Hazardous Waste Management Rules, 38 M.R.S.A. § 1301 et seq., Chapters 800-802,	These relevant and appropriate regulations outline general requirements for the construction of hazardous waste facilities in Maine, including requirements governing the location of

850, 851, 853-857	a hazardous waste facility in a wetland or near a floodplain. The remedial action will comply with appropriate portions of these regulations.
Maine Standards for Classification of Minor Drainages, 38 M.R.S.A., Chapter 3, § 468	These applicable regulations which prohibit the degradation of a Class B water will be met with respect to Stuart Brook.
Maine Alteration of Rivers, Streams, and Brooks, 38 M.R.S.A. § 425 et seq.	EPA will comply with these applicable regulations which prohibit interference with the flow or quality of Stuart Brook.
Maine Water Pollution Control Law: Solid Waste Disposal Area; Location, 38 M.R.S.A., Chapter 3, Article 2, § 421	These regulations state that no boundary of a solid waste disposal area shall lie closer than 300 feet to any classified body of surface water. The alternate remedy will comply with these applicable regulations. Because the selected remedy does not involve the construction of a solid waste disposal area, these regulations are not applicable or relevant and appropriate to the selected remedy.
Maine Standards for Classification of Groundwater, 38 M.R.S.A., Chapter 3, § 470	These applicable regulations which prohibit the degradation of onsite groundwater will be met.
Maine Site Location Act, 38 M.R.S.A. Chapter 3, §§ 481-490	These applicable regulations which prohibit adverse impacts on certain natural resources will be met.
Maine Solid Waste Management Rules: Landfill Disposal Facilities, 38 M.R.S.A., § 1301 et seq., Chapters 400-406	These relevant and appropriate regulations concerning the placements of wastes will be met.

TABLE 15 -- ACTION-SPECIFIC ARARS FOR ALTERNATE REMEDY

REQUIREMENT	REQUIREMENT SYNOPSIS/CONSIDERATION
RCRA General Facility Standards, 40 C.F.R. §§ 264.10-264.18	These relevant and appropriate regulations concern general waste analysis, site security, and training. Substantive portions of these regulations will be met.
RCRA Preparedness and Prevention, 40 C.F.R. §§ 264.30-264.37	These relevant and appropriate regulations outline the requirements for safety equipment and spill control. Substantive portions of these regulations will be met.
RCRA Contingency Plan and Emergency Procedures, 40 C.F.R. §§ 264.50-254.56	These relevant and appropriate regulations require the development and implementation of a contingency plan in the event of fire, explosion, or release of hazardous waste constituents. Substantive portions of these regulations will be met.
RCRA Groundwater Protection Standards, 40 C.F.R. Part 264, Subpart F	The groundwater monitoring program will comply with these relevant and appropriate regulations.
RCRA Closure and Post-Closure - Landfills, 40 C.F.R. Part 264, Subparts F, G, & N	These regulations are relevant and appropriate to the construction and maintenance of the RCRA landfill. These regulations include provisions for development of a post-closure plan, maintenance, and groundwater monitoring.
National Ambient Air Quality Standards (NAAQS) for PM10, 40 C.F.R. § 50.6-50.7, promulgated pursuant to the Clean Air Act	These regulations outline the maximum primary and secondary 24-hour concentrations for particulate matter. This regulation is applicable during construction of the remedial action.
National Ambient Air Quality Standards (NAAQS) for lead, 40 C.F.R. § 50.12, promulgated pursuant to the Clean Air Act	This regulation establishes ambient air quality standards for lead. This regulation is applicable during construction of the remedial action.
Executive Order 11990 and EPA	The Wetlands Executive Order and this EPA regulation are applicable and were

regulation 40 C.F.R. Part 6	weighed in the evaluation of remedial alternatives. During the remedial action, steps will be taken to minimize the adverse affects upon the wetlands and destroyed wetlands will be re-created.
Executive Order 11988 and EPA regulation 40 C.F.R. Part 6	The Floodplains Management Executive Order and this EPA regulation are applicable. During the performance of the remedial action, steps will be taken to minimize any adverse impacts on the floodplains. The impact on the floodplain is expected to be minimal because the waste pits and lagoons are not located in the floodplain.
OSHA General Industry Standards, 29 C.F.R. Part 1910	These applicable regulations contain safety and health standards that will be met during all remedial activities.
OSHA Safety and Health Standards for Federal Service Contracts, 29 C.F.R. Part 1926	These applicable regulations contain safety standards that will be met during all remedial activities.
OSHA Recordkeeping, Reporting, and Related Regulations, 29 C.F.R. Part 1904	Substantive portions of these applicable regulations, concerning employer recordkeeping and reporting regulations, will be met during all remedial activities.
Pretreatment Regulations for Indirect Discharges to POTWs, 40 C.F.R. Part 403	These regulations control the discharge of pollutants into POTWs. If standing water from the waste pits is discharged to a POTW, these regulations will be applicable and the remedy will comply through pretreatment.
Discharge of Dredged and Fill Materials Regulations, 40 C.F.R. § 230, promulgated under Section 404 of the Clean Water Act	This regulation applies to the use of fill material in wetlands. The selected remedy will comply with this regulation because there is no practicable alternative to filling the waste pits and lagoons, because steps will be taken to minimize adverse impacts during remediation, and because new wetlands will be recreated onsite.
U.S. Fish and Wildlife Coordination Act, 16 U.S.C. § 661	EPA has complied with this applicable law by consulting with the U.S. Fish and Wildlife Service concerning the effect of the remedial action on the wet[illegible]d

	area.
Maine Hazardous Waste Management Rules, 38 M.R.S.A. § 1301 et seq., Chapters 800-802, 850, 851 & 853-857	These relevant and appropriate regulations outline general requirements for the construction of hazardous waste facilities in Maine. The performance of the alternate remedy will comply with appropriate portions of these regulations.
Maine Solid Waste Management Rules: Landfill Disposal Facilities, 38 M.R.S.A. § 1301 et seq., Chapter 401	The alternate remedy will comply with these relevant and appropriate standards for landfill disposal facilities.
Maine Ambient Air Quality Standards, 38 M.R.S.A., § 584, Chapter 110	The applicable ambient air quality standards will not be exceeded during the performance of the on-site construction work.
Maine Freshwater Wetlands Act, 38 M.R.S.A., Chapter 3, § § 405-410	These relevant and appropriate standards regulating activities in the vicinity of a wetland will be met.
Maine Standards for Classification of Minor Drainages, 38 M.R.S.A., Chapter 3, § 468	These applicable regulations which prohibit the degradation of a Class B water will be met with respect to Stuart Brook.
Maine Standards for Classification of Groundwater, 38 M.R.S.A., Chapter 3, § 465-C and 470	These applicable regulations which will prohibit the degradation of on-site groundwater will be met.
Maine Hexavalent Chromium Particulate Emissions Standards, 38 M.R.S.A. §§ 585, 585-A, Chapter 135	During the remedial action, chromium emissions will not exceed the levels established in these relevant and appropriate regulations.

for any constituent but chromium, do not fail for any other characteristic, or are not listed for any other reason), are not considered hazardous wastes under RCRA, provided that:

(A) The chromium in the waste is exclusively (or nearly exclusively) trivalent chromium; and

(B) The waste is generated from an industrial process which uses trivalent chromium exclusively (or nearly exclusively) and the process does not generate hexavalent chromium; and

(C) The waste is typically and frequently managed in non-oxidizing environments.

EPA has determined that the provisions of 40 C.F.R. § 261.4 (b)(6) (known as the tannery waste exclusion) are satisfied and that no listed or characteristic wastes are found at the Site.[14] For this reason, RCRA will not be applicable. Specific provisions of RCRA will be relevant and appropriate because they address and provide technical guidance for the same kinds of actions as those that will be taken at the STWP site.

EPA will comply with the substantive provisions of RCRA regulations governing: Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities, General Facility Standards (40 C.F.R. §§ 264.10-264.18); Preparedness and Prevention (40 C.F.R. §§ 264.30-264.37; Contingency Plan and Emergency Procedures (40 C.F.R. §§ 264.50-264.56); Releases From Solid Waste Management Units (groundwater protection) (40 C.F.R. §§ 264.90-264.101); and Closure and Post-Closure - Landfills (40 C.F.R Subparts F, G and N).

By contrast, EPA has determined the LDR regulations will not be relevant and appropriate because the justification for exempting tannery wastes from the definition of hazardous wastes under RCRA also justifies a determination that the LDR regulations are not relevant and appropriate at the STWP site. See 45 Federal Register 72035 - 72039 (October, 1980) (indicating that the trivalent chromium found in tannery wastes is less mobile and less toxic than hexavalent chromium).

With respect to standing water from that will be pumped from the waste pits and that may be directed to a POTW, EPA will comply with applicable regulated under the Clean Water Act concerning

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[14] EP Toxicity tests were performed during the investigation of the Site on arsenic, barium, chromium, lead, mercury, and selenium found at the Site. Chromium was the only one of these contaminants found at the Site that failed the EP Toxicity test.

Pretreatment Standards for POTW Discharge (40 C.F.R. Part 403).

Regulations under the Occupational Safety and Health Act (OSHA) apply to the performance of the remedial action as it involves workers at the Site. EPA will comply with OSHA regulations including the General Industry Standards (29 C.F.R. Part 1910); Safety and Health Standards (29 C.F.R. Part 1926); and the substantive provisions of the Record Keeping, Reporting and Related Regulations (29 C.F.R. Part 1904).

During the performance of the remedy, EPA will also comply with the Clean Air Act and the National Ambient Air Quality Standards (NAAQS) for PM_{10} (40 C.F.R. §§ 50.6-50.7) and lead (40 C.F.R. § 50.12). Fugitive dust emissions cause by site activities will not exceed ambient air quality standards.

A discussion of the ARARs concerning wetlands and floodplains is provided in subsection 3, below, concerning location specific ARARs.

b. State

The selected remedy will also attain action-specific Maine ARARs, including the Maine Hazardous Waste Management Rules (38 M.R.S.A. § 1301 et seq., Chapters 800-802, 850, 851, & 853-857) (only appropriate portions of these regulations will be met); Maine Solid Waste Management Rules: Landfill Disposal Facilities (38 M.R.S.A. § 1301 et seq., Chapter 401); Maine Ambient Air Quality Standards (38 M.R.S.A. § 584, Chapter 110); Maine Freshwater Wetlands Act (38 M.R.S.A. Chapter 3, § 404-410); Maine Standards for Classification of Minor Drainages (38 M.R.S.A. Chapter 3, § 468); Maine Standards for Classification of Groundwater (38 M.R.S.A. Chapter 3, § 470); and Maine Hexavalent Chromium Particulate Emissions Standard (38 M.R.S.A. § 585, 585-A, Chapter 135).

2. Chemical-Specific ARARs

In determine which contaminants at the Site required remediation, EPA considered both Federal and State ARARs.

ARARs for the groundwater contaminants at the STWP site include the Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act (40 C.F.R. § 141.11-141.16) and the State of Maine's MCLs (10-144A C.M.R. Chapter 231) and Maximum Exposure Guidelines (MEGs) (10-144A C.M.R. Chapter 233). Both the MCLs and MEGs are legally applicable only at the tap and not to an aquifer directly. Because, however, the groundwater aquifer at the STWP site is classified as Class IIB under the EPA groundwater protection strategy and GW-A under state standards.

it must be considered a possible source of drinking water. For this reason, MCLs and MEGs are relevant and appropriate in setting cleanup levels.

Because the groundwater remedy selected at the Site is an interim remedy, rather than a final remedy, it is not necessary to attain groundwater ARARs at this time. At the time that the final groundwater remedy is performed, EPA will determine whether the MCLs and MEGs continue to be ARARs at the Site, whether ACLs should be set, or whether a waiver of groundwater ARARs should be granted.

Federal Ambient Water Quality Criteria (AWQC) are health and environmental based criteria developed for carcinogens and non-carcinogens. AWQC will be considered in monitoring on-site streams.

3. **Location-Specific ARAR**

Under the alternate remedy, all of the waste pits and lagoons will be excavated. The two waste lagoons and many of the waste pits lie within manmade wetland areas. These manmade wetlands will be destroyed during the performance of this remedy. The remedial action will comply with section 404 of the Clean Water Act and with standards set by Maine requirements, including Maine Freshwater Wetlands Act (38 M.R.S.A. Chapter 3, section 405-410) and the Maine Hazardous Waste Management Rules (38 M.R.S.A. § 1301 et seq., Chapters 800-802, 850, 851, 853-857), which govern actions that take place in a wetland. The remedial action will also comply with the Wetlands Executive Order (E.O. 11990) and the Fish and Wildlife Coordination Act (16 U.S.C. § 661). Following landfilling of the solidified wastes, EPA will create compensatory wetlands to the extent required by federal and state wetlands ARARs to reestablish wetlands that will be lost during remediation.

The remedial action will also comply with the Maine Water Pollution Control Law: Solid Waste Disposal Areas; Location (38 M.R.S.A., Chapter 3, article 2, section 421). Under these applicable regulations no boundary of a solid waste disposal area shall lie closer than 300 feet to any classified body of surface water. The design and construction of the landfill will be performed in compliance with these regulations.

The remedial action will also comply with the Floodplain Management Executive Order (E.O. 11988) and EPA regulation 40 C.F.R. Part 6, which implements the Executive Order. Although approximately 30 acres of the Site lie within a 100-year floodplain, none of the waste pits, lagoons, and contaminated sediment areas lie within the floodplain. In addition, the RCRA

landfill to be constructed on-site will not be located within a floodplain. Nevertheless, during construction activities, steps will be taken to minimize any adverse impacts on the floodplains.

The remedial action will also comply with Maine Standards for Classification of Minor Drainages (38 M.R.S.A. Chapter 3, § 468) and Maine Alteration of Rivers, Streams, and Brooks (38 M.R.S.A. Chapter 3, § 425 et seq.), which will prohibit the degradation of Stuart Brook, and Maine Standards for Classification of Groundwater (38 M.R.S.A. Chapter 3, § 470), which will prohibit the degradation of on-site groundwater. Finally, the remedial action will comply with the Maine Site Location Law (38 M.R.S.A. Chapter 3, Section 481-490), which prohibits adverse impacts on certain natural resources.

C. The Alternate Remedial Action is Cost Effective

The alternate remedial action is cost effective. Although the cost of the alternate remedy is substantially more than the cost of the selected remedy, the alternate remedy will only become effective in the event that the selected remedy cannot be implemented, i.e., in the event that the State does not enact an adequate state law converting the site property into a conservation area within two years from the date that this ROD is signed. In comparison to the cost of the other alternatives considered at the Site, and discussed in Section XI.C., Alternative SC-5 is more expensive than the cover alternative (SC-3) and the other treatment and/or consolidation alternatives (SC-4, SC-6, and SC-7). Nevertheless, SC-5 is also more protective or technically feasible than any of these other remedial alternatives. Finally, Alternative SC-5 is substantially less expensive than the resource recovery alternatives (SC-9 and SC-10) considered for the Site.

D. The Alternate Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

The alternate remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The alternate remedy will permanently address contamination contained in the waste pits and lagoons. Excavated wastes will be solidified and disposed of in a RCRA landfill to be constructed on-site. The combination of excavation, treatment, and landfilling in a RCRA landfill will provide a high degree of permanence and protection against the threat of possible future contaminant migration. In addition, the alternate remedy uses a solidification process, which is an alternative treatment technology.

E. The Alternate Remedy Satisfies the Preference for Treatment as a Principal Element

The alternate remedy includes treatment and thus satisfies the preference for treatment. Under the alternate remedy, excavated wastes will be solidified, or treated, prior to disposal in an on-site RCRA landfill. Treatment is a principal element of the remediation.