



Site: Pineville's
Break: 3.4.1
Other: _____

Park West Two
Cliff Mine Road
Pittsburgh, PA 15275
412-786-1080

R-31-1-3-15

September 20, 1983

Project No. 0701.17

Mr. Elliott Thomas
U. S. Environmental Protection Agency
John F. Kennedy Federal Building
Region I Office, Room 2303
Boston, Massachusetts 02203

Subject: Washburn Site RAMP
EPA Work Assignment No. 01-1V34.0

Dear Mr. Thomas:

Enclosed are one (1) unbound copy and six (6) bound copies of the Remedial Action Master Plan (RAMP) for the Washburn Site in Washburn, Maine. The document control numbers for these copies are WA-1-F through WA-7-F. Mr. William M. Kaschak will receive three (3) copies (document control numbers WA-8-F through WA-10-F). At the request of Ms. Susan Santos, also enclosed is her marked-up copy of the Draft RAMP.

As discussed in your telephone discussion of September 15, 1983 with Mr. William D. Wall of our staff, this version of the RAMP constitutes the final submittal required under this work assignment. Accordingly, the project account for the Washburn RAMP will be closed and no further charges accepted.

Very truly yours,

E. Dennis Escher, P. E.
Manager, Remedial Planning

EDE/lmw

Enclosures (7)

cc: Mr. William M. Kaschak

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PINETTES SALVAGE YARD
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412-788-1280

R-31-1-3-15
WA-14-F

REMEDIAL ACTION MASTER PLAN

WASHBURN SITE
WASHBURN, MAINE

EPA WORK ASSIGNMENT
NUMBER 01-1V34.0
CONTRACT NO. 68-01-6699

NUS PROJECT NUMBER 0701.17

SEPTEMBER 1983

SUBMITTED FOR NUS BY:

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EXECUTIVE SUMMARY

This Remedial Action Master Plan (RAMP) for the Washburn Site will act as both a general planning document and a site management tool. It contains information necessary for planning a coherent strategy and for assisting in the selection of an appropriate course of action.

Site Description

The Washburn Site, otherwise known as Pinette's Salvage Yard, is located one mile southwest of Washburn in Aroostook County, Maine. In June of 1979, three PCB filled transformers were removed from the Loring Air Force Base and deposited in a field at the Salvage Yard. During unloading, the transformers ruptured, spilling their contents onto the ground. The resulting spill area measured approximately 40 feet by 40 feet and recently has been capped with an impervious liner to mitigate migration of the hazardous substances and prevent direct contact with the wastes. There is no evidence of other hazardous wastes being disposed of at the site.

On the basis of records kept by the Washburn town manager, Rita Pinette is the present owner of the property upon which the spill is located as she was at the time of the dumping. Her son, Roger Pinette, continues to operate the Salvage Yard.

The site is currently ranked 258th of 418 sites on the National Priorities List issued by the USEPA in December of 1982.

Environmental Concerns

The dumping of PCB contaminated oil at the Washburn Site raises two major environmental concerns:

- Potential contamination of groundwater aquifers and nearby surface waters.

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- Possible migration of wastes to areas where crops are grown or animals grazed.

The potential for direct contact has been alleviated by the placement of a cap over the spill area. The limited sampling and analysis which has been performed indicates that polychlorinated biphenyl (PCB-Arochlor 1260), trichlorobenzene, and dichlorobenzene are present in the soil within the spill area in appreciable quantities. In addition, PCB has been detected in samples taken of soil downgradient of the spill, thus indicating that some horizontal migration of the wastes has occurred. The presence of hazardous substances in these areas is of vital concern since farming and grazing are common activities in this region of Maine. Use of contaminated soil for agricultural purposes can allow hazardous substances to enter the food chain.

Of equal concern is the potential contamination of the groundwater (the level of which lies only 27 inches below the surface of the soil at the spill area) and the Aroostook River which is only 1/4 mile downgradient of the site. The groundwater is a source of drinking water for the town of Washburn as well as for many private homeowners living near the site. In addition, a nearby food processing plant (currently shut down due to the poor economic conditions but is expected to reopen) draws its process water from wells. The Aroostook River serves as an industrial water supply for another food processing plant located downstream of the site. Since this plant is also shut down (due to the poor economic conditions), there is no immediate threat to plant operations.

Less is known about the extent of groundwater and surface water contamination than about the soils. Samples, though, have been taken of several private wells and the town's water supply all of which indicated no contamination.

Remedial Action Planning Activities

The National Contingency Plan (NCP) effectuates the new responsibilities and powers of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The NCP was promulgated pursuant to Section

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105 of CERCLA and provides the guidelines for the design and implementation of remedial actions. Remedial actions are actions that are taken in response to releases of hazardous substances. Two types of remedial actions, initial remedial measures (IRMs), and long-term remedial responses are the corrective actions used at hazardous wastes sites. IRMs are urgent measures implemented to prevent actual or potential exposure to a significant environmental problem. Long-term remedial responses are required, after IRM hazards have been addressed, to systematically provide for a safe and economical site clean-up.

The IRMs identified for the Washburn Site are:

- Installation of a perimeter marker to mitigate against disturbance of or direct contact with the contaminated soil,
- Installation of signs which convey the hazardous nature of substances contained on site, and
- Notification of local officials and residents that the spill area and the area downgradient should not be used for growing crops or grazing livestock.

The IRMs will be implemented independently of the long-term measures.

Long-term remedial measures include source control and offsite control measures. Source control measures contain or detoxify the hazardous substance where they are located or eliminate potential contamination by transporting the hazardous substances to a new location for disposal. Offsite measures minimize and mitigate further offsite migration of hazardous substances and the effects of such migration.

The long-term remedial measures which should be investigated may include but are not limited to:

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- Source Control Measures
 - No action.
 - Excavation and removal of contaminated soil
 - Onsite disposal of the contaminated soil in an imperviously lined pit
 - Groundwater barriers
 - In-situ decontamination: elutriation of soil and treatment of "wash" water
 - In-situ decontamination chemical or biological degradation
- Offsite Control Measures
 - Provisions of alternate water supply (extension of town water supply system)
 - Groundwater treatment.

The remedial planning activities which will investigate, select and implement the long-term remedial measures are listed below in the sequence in which they will occur.

- Remedial Investigation

A remedial investigation is undertaken to gather additional data for the engineering feasibility data. Adequate definition of the hazardous waste problem at the Washburn Site will provide the necessary information to select, evaluate, and design long-term remedial measures.

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The remedial investigation for the Washburn Site is divided into the following three major phases:

- Initial activities,
- Groundwater investigation, and
- Sampling and analysis.

The initial activities phase involves work which necessarily precedes onsite investigative work. Activities include preparation of work, health and safety, quality assurance, and community relations plans as well as procurement of subcontractors and mobilization of field equipment. The groundwater investigation phase is designed to gather site-specific geologic and hydrogeologic data. This goal will be accomplished primarily through an onsite drilling program. Lastly, extensive sampling and laboratory analysis will be performed to define the nature and extent of contamination at the site.

- **Engineering Feasibility Study**

The feasibility study is conducted to identify and evaluate appropriate remedial measures, and to prepare a conceptual design of the selected alternative. The study is based on existing site information and on information obtained during the remedial investigation.

- **Remedial Action Design**

Using the conceptual design developed during the engineering feasibility study, a detailed design is prepared for use during implementation of the remedial measure.

- **Remedial Action Implementation**

At this stage, actual site clean-up is begun through implementation of the selected long-term remedial measure.

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- Maintenance and Monitoring

Maintenance and monitoring activities usually occur after the implementation stage to assess and to insure the effectiveness of the long-term remedial measure.

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1.0 INTRODUCTION

This Remedial Action Master Plan (RAMP) is prepared in accordance with the rules of the National Contingency Plan (NCP) (F. R. Vol. 47 No. 137, July 16, 1982) published pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980. Remedial actions are those responses to sites on the National Priority List that require long-term efforts consistent with permanent site remedy to prevent or mitigate the migration or release of hazardous substances. Further information concerning remedial actions is presented in Phase VI, Section 300.68 of the NCP.

The purposes of a RAMP are to collect and compile existing data regarding the subject site, to assess the adequacy of the collected data and to identify the type, scope, sequence and schedule of appropriate remedial actions. This RAMP will be the basis of a scoping decision to be made by the lead agency (USEPA or other agency) for requesting funding for remedial investigations, feasibility studies, and the implementation of onsite or offsite remedial actions. In addition, this RAMP and subsequent revisions will serve as the basis of a workplan for all remedial activities at the site in accordance with USEPA - State agreements or contracts.

RAMPs are prepared exclusively from existing information. This information may include sampling results; maps and topographical information; generator, hauler, and site operator records; and previous regulatory and remedial actions.

This RAMP contains three major sections: (1) compilation of existing data, contained in Sections 2.0 through 6.0; (2) evaluation of data, Sections 7.0 through 9.0; and (3) remedial actions, Sections 10.0 through 12.0. A site chronology, work plan outlines, and other pertinent information are appended.

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2.0 THE SITE

2.1 Statement of the Problem

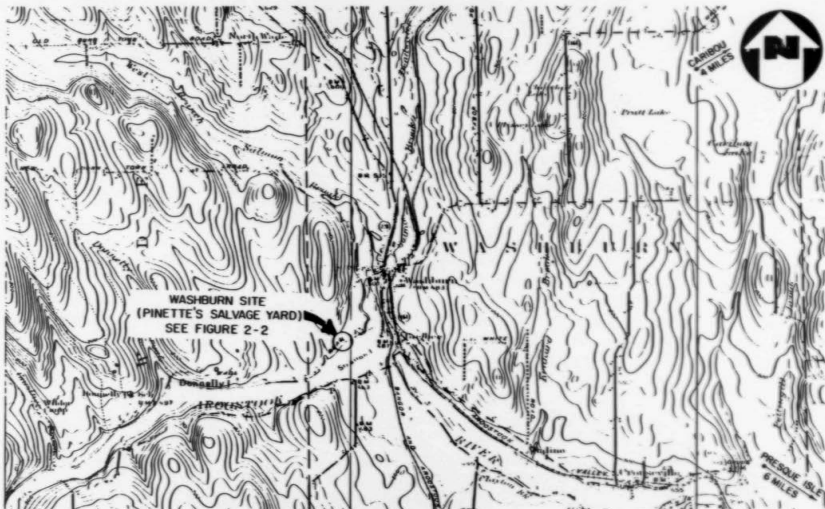
In June of 1979, three PCB-filled transformers were removed from the Loring Air Force Base (north of Caribou, Maine) and deposited in a field at Pinette's Salvage Yard outside the town of Washburn. At the time of dumping, at least two of the transformers ruptured, spilling their contents onto the ground. Since that time, the transformers themselves have been dismantled and sold for scrap, but their liquid contents, estimated at between 500 and 1000 gallons, remain in the soil. Subsequent investigations have revealed that the transformers were filled with Pyranol, a commercial mixture containing PCB (Arochlor 1260), trichlorobenzene and dichlorobenzene. Contamination has spread beyond the initial spill area primarily due to a particularly heavy rainfall in August of 1981, as well as other rainfalls, and secondarily due to the traffic in and around the spill area during salvage of the transformers. Additional details concerning the dumping incident and subsequent actions are presented in the form of a chronology of events in Appendix A.

2.2 Location

The Washburn Site is located in Aroostook County, Maine, one mile southwest of the town of Washburn. The site, as shown in Figure 2-1, is situated within the confines of Pinette's Salvage Yard, at 46°46'40" north latitude and 68°10'05" west longitude. The largest nearby cities are Caribou, Maine, which is 9.5 miles northeast of Washburn, and Presque Isle, Maine located about 11 miles to the southeast.

2.3 Site Layout

The site consists of a spill area (contaminated soil) of approximately 40 ft by 40 ft located in the midst of a one to two acre junkyard. The immediate spill area is an open field which slopes gently to the south to a drainage ditch running parallel to Gardner Creek Road. Beyond the road, the slope increases noticeably leading to a



BASE MAP IS A PORTION OF THE U.S.G.S. CARIBOU, MAINE QUADRANGLE (15' SERIES, 1953)

FIGURE 2-1

LOCATION OF WASHBURN SITE (PINETTE'S SALVAGE YARD)

SCALE: 1"=1 MILE



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field along the Aroostook River. Within close proximity of the affected area are a pond and two drinking water wells. There are other drinking water wells in the vicinity of the site, too. In addition, at least one groundwater seep or spring has been observed on the slope south of Gardiner Creek Road. A detailed sketch of the site showing the relative locations of landmarks is presented in Figure 2-2.

2.4 Ownership History

Ms. Rita Pinette was the owner of the Washburn Site (Pinette's Salvage Yard) prior to the PCB dumping incident in June of 1979 and continues now as the owner. Rita Pinette's ownership, however, has not been confirmed by reference to the deed. Instead, this determination was made on the basis of records kept by the Township Manager, Sheldon Richardson. Her son, Roger Pinette is the operator of the salvage yard.

2.5 Site Use History

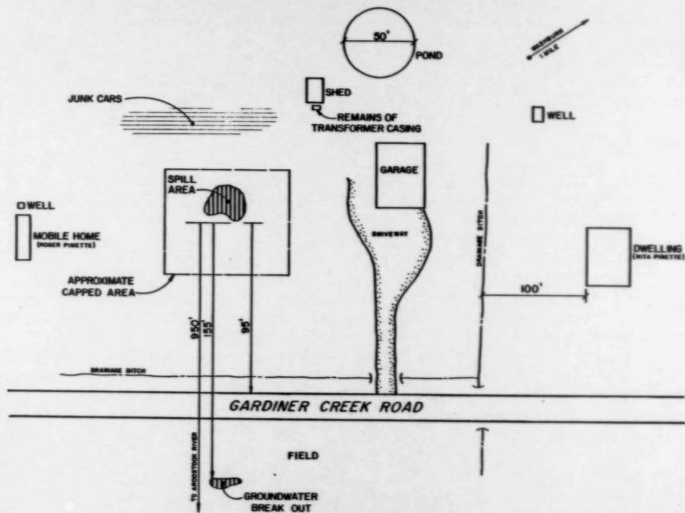
The Washburn Site, also known as Pinette's Salvage Yard, has been operated as a junkyard at least since June of 1979, the time of the PCB spill. Sometime prior to 1979, the site had been worked as a gravel pit. It was also used at one time for grazing. Currently, the site is still used as a junk yard.

2.6 Permit and Regulatory Action History

Since the Washburn Site is not and never has been operated as a hazardous waste disposal or storage facility, no permit has ever been sought or issued.

Investigations concerning the PCB spill have been conducted by Maine's Department of Environmental Protection, the Attorney General's Office for the State of Maine and the Region I Office of the U.S. Environmental Protection Agency.

The site was brought to the attention of the USEPA, Region I by the Maine Department of Environmental Protection for investigation. The site scored 33.97



WASHBURN SITE SKETCH
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FIGURE 2-2



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on the Hazard Ranking System and is currently listed at 334 on the National Priorities List of 406 sites, released in August 1983.

2.7 Remedial Actions to Date

Environmental sampling was conducted during site inspections by the Maine Department of Environmental Protection (MEDEP) on April 16, 1980 and July 29, 1981. In addition, the Region I Office of the U.S. Environmental Protection Agency collected samples on May 13, 1982 and November 10, 1982. These sampling investigations were undertaken to determine the nature and extent of contamination particularly in regards to nearby drinking water supplies. Results for the samples analyzed are tabulated and discussed in Section 6.0.

A cap was placed over the spill area on December 7, 1982 at the direction of the Maine DEP. This measure was intended as a temporary covering to prevent the contamination from spreading. The cap may have the effect of impeding vertical migration of the contamination by restricting the downward infiltration of rainfall. Horizontal migration of the PCB-laden oil may also be restrained by the diversion of rainfall runoff away from the spill area. However, there is insufficient data available to adequately assess the effectiveness of the cap. Details of the cap are presented in Figure 2-3.

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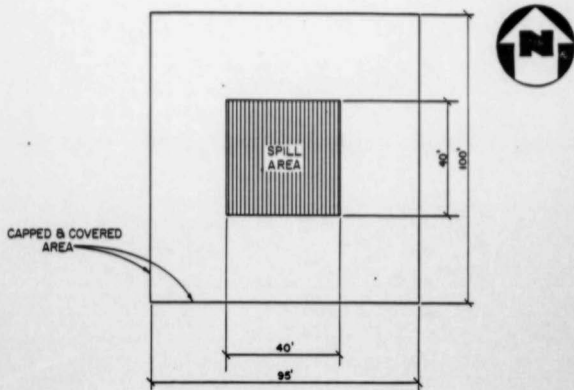
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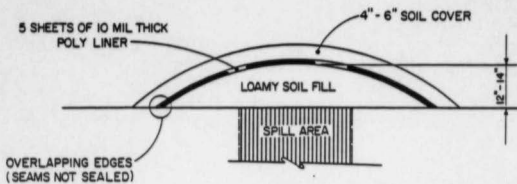
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PLAN
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SECTION
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SKETCH OF CAP OVER SPILL AREA
AT WASHBURN SITE

FIGURE 2-3

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3.0 ENVIRONMENTAL SETTING

3.1 Surface Waters

The site lies on the north side of the Aroostook River valley. West Branch Salmon Brook is approximately 1/2 mile to the east and an unnamed tributary to the river is about 1/4 mile to the west. The back channel of the Aroostook River around Stratton Island is about 1/4 mile south of the site.

There is a gaging station on the Aroostook River near Washburn. The highest water level was 454.18 ft due to an ice jam in 1951. The maximum discharge was 37,000 cfs on March 22, 1936 when the water reached elevation 452.60 ft.

The drainage area above the Washburn Station is 1,652 sq miles. The basin is regulated by Squa Pan Lake, capacity 2,893,000,000 ft³, and Millinocket Lake, capacity 1,100,000,000 ft³, operated for power generation by the Maine Public Service Company.

On site, a 50 ft diameter man-made pond, depth unknown, lies several hundred feet northeast (upgradient) of the spill area.

3.2 Geology and Soils

Pinette's Salvage Yard lies in the New England Physiographic Province. The bedrock is the Silurian and Ordovician Age Carys Mills Formation. The Carys Mills Formation is limestone calcareous shale and siltstone. The north-south trending Dudley Fault has been mapped about a half mile west of the site. The rocks in this area are highly structured by northeast-southwest trending anticlines and synclines. An outcrop northwest of the site indicates a northwest dip of 80° with a northeast strike.

The till in the valleys in this area was probably eroded to some extent from the valley floor, and outwash deposits (sand and gravel) were redeposited during the Pleistocene by the receding ice runoff. The Aroostook River Valley also has

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deposits of Holocene (more recent) alluvium reported to be up to 40 feet thick. Terraces along the valley sides are Pleistocene outwash. Some lacustrine deposits of impermeable silt and clay are reported to exist along the valley sides. Beneath the outwash deposits dense till usually occurs.

There is some potential for waste migration in the outwash deposits. Liquid waste can move in permeable outwash by the force of gravity. This movement can be enhanced by groundwater movement in the formation. The Pleistocene outwash deposits probably will allow some waste migration. The exact amount depends on soil adsorption properties, permeability and other water migration factors, all of which require investigation.

3.3 Groundwater

The existing information leads us to believe that there are three aquifers and two aquicludes in the Washburn area. The limited data available indicates that Pinette's Salvage Yard overlies the Pleistocene outwash aquifer. This aquifer is reported by Glenn C. Prescott, Jr. in U.S.G.S. Hydrologic Investigation Atlas HA-443 titled "Groundwater Favorability and Surficial Geology of the Lower Aroostook River Basin, Maine" to have yields of 10-50 gallons per minute. The relation of this aquifer to the other aquifers, Holocene outwash and bedrock, is not obvious. The Pleistocene outwash was deposited in areas where the till was eroded by ice melt runoff. Lacustrine deposits also accumulated in these areas. A later episode of erosion cut channels through the Pleistocene outwash, lacustrine deposits, and till. The Holocene outwash was deposited in these later channels. Glacial runoff and associated fluvial deposition often create complex sediment sequences that vary laterally and vertically, implying that without a site specific exploration program, it is impossible to determine the groundwater flow patterns.

The domestic wells east and west of the spill area confirm that an aquifer is present. The groundwater outbreak or spring south of Gardiner Creek Road could be an indication that there is an impermeable deposit beneath this aquifer. As a working hypothesis let us assume that the Pleistocene outwash aquifer is separated from the lower aquifers by either impermeable lacustrine deposits or glacial till.

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This fits the general description of the depositional history of the Pleistocene and Holocene periods in this area.

In general, fine grained lacustrine deposits and glacial till are considered barriers to waste migration. However, the subsurface should be explored to determine if there is an impermeable layer below the spill area. Geophysics or drilling can be used to establish the extent and depth of the water bearing zone beneath the spill area.

3.4 Climate and Meteorology

Washburn is in the Northern Division of Maine where long cold winters and short cool summers are common. The average yearly temperature is 38.4°F. The average monthly high temperature is 65.4°F and occurs in July. The average monthly low is 10.5°F in January. The first freeze often occurs in early September and the last freeze many times is as late as the end of May.

The normal annual total precipitation is approximately 36 inches. The 24-hour rainfall with a recurrence period of one year is expected to be 2.2 inches.

3.5 Land Use

The Washburn area consists of steep wooded hills rising north and south from the Aroostook River valley. Pinette's Salvage Yard sits on a land terrace just above historic flood levels. The terrace probably represents a glacial outwash erosion feature. The land directly adjacent the salvage yard is cropland and pasture. Further from the river, forestland is predominant. A detailed summary of land use in the Washburn area is presented in Table 3-1.

The salvage yard itself does not support any significant wildlife population due to the on-going human activity on site. There are no historical and archeological sites or endangered species habitats on or close to the salvage yard. There are some wetland areas about one mile to the northeast on West Branch Salmon Brook.

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TABLE 3-1
LAND USE IN THE WASHBURN AREA

<u>Land Use</u>	<u>Acres</u>	<u>% of Total</u>
Forestland	10,843	47.5
Cropland	8,196	35.9
Idle or Abandoned	1,572	6.9
Developed Land	1,071	4.7
Surface Water	571	2.5
Pasture or Hay	<u>564</u>	<u>2.5</u>
TOTAL	22,817	100
<u>Developed Land Use</u>		
Residential	425	39.7
Other	310	28.9
Farmsteads	117	10.9
Gravel Pits and Quarries	74	6.9
Warehousing	57	5.3
Industrial	41	3.8
Institutional	31	2.9
Retail	13	1.2
Recreation	<u>3</u>	<u>0.4</u>
TOTAL	1,071	100

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4.0 POTENTIAL RECEPTORS

4.1 Population Distributions

Pinette's Salvage yard, the site of the PCB spill, lies about 1/2 mile southwest of the most densely populated portion of the town of Washburn. Washburn has a population of 2208, a population density of 5.2 persons per acre, and a 1975 household density of 1.45 households per acre. About 2700 people are projected to be living in Washburn by 1990. The only other significant population centers in the area are Caribou (about 10 miles northeast) with a population of 9916 and Presque Isle City (about 11 miles to the southeast) with a population of 11,172. The area immediately surrounding the site is sparsely populated with only a scattering of dwellings. The exact number of homes which may be affected by the site is not known but is believed to be less than ten.

4.2 Water Users

4.2.1 Surface Water

The Aroostook River is the only major surface water body in the Washburn area and is used primarily as an industrial water supply. The McCains potato processing plant draws 1.0 million gallons per day from the river and lies within a 1/2 mile downstream of the Washburn Site. This plant is currently shut down due to poor economic conditions but is expected to reopen. The river is also used, to a limited extent, for fishing and waterfowl hunting.

4.2.2 Groundwater

The groundwater in the Washburn area is used both as a drinking water supply and an industrial water supply. The town of Washburn withdraws 0.37 million gallons per day for public water use from the valley floor aquifer that is hydraulically connected to the Aroostook River. In addition, there are a number of private drinking water wells on and around the site. These wells are identified in Table 6-1 as to their owner by virtue of samples taken from their wells.

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Water for industrial purposes is withdrawn at the rate of 0.36 million gallons per day from the gravel aquifer by R. T. French, a food processing plant. R. T. French is located near McCains and like McCains, is currently shut down due to poor economic conditions but is expected to reopen.

4.3 Land Users

The area immediately surrounding Pinette's Salvage Yard is devoted to farming and grazing. Thus, the land users who most likely will be affected by the release of hazardous substances from the site are those engaged in agriculture. Other users who may be affected include residential land owners, and unauthorized entrants such as hikers or hunters.

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5.0 HAZARDOUS SUBSTANCES

5.1 Physical, Chemical and Hazardous Characteristics

5.1.1 Form and Physical State

The hazardous substances found at the Washburn Site were originally contained within transformers in liquid state. The liquid contents of the transformers spilled onto the ground and saturated the soil. Since the soil has sorbed or "soaked up" most of the liquid, the hazardous substances can effectively be handled as a solid or sludge.

5.1.2 Chemical Compounds

The transformers whose contents spilled onto the ground were filled with a commercial dielectric cooling fluid known as Pyranol. Chemical analyses of samples taken from the spill area confirm that Pyranol is a mixture of polychlorinated biphenyl (PCB), dichlorobenzene and trichlorobenzene. The particular PCB detected at the site is Arochlor 1260 which is a chlorobiphenyl isomer containing approximately sixty percent by weight of chlorine.

5.1.3 Hazardous Characteristics

PCB's such as Arochlor 1260 are toxic if ingested or inhaled in sufficient quantities. Direct skin contact may result in a form of acne. Of greater health significance, though, is the stability of PCB's and their ability to accumulate within living tissue. Once released to the environment, PCB's will persist almost indefinitely unless physically removed. This characteristic increases the chance that PCB's may enter the human food chain. Once ingested, PCB's will accumulate within the body and possibly build to toxic levels. For this reason, PCB contaminated soil should not be used to cultivate food crops or graze livestock.

Dichlorobenzene and trichlorobenzene are toxic if ingested or inhaled and may result in damage to the lungs, liver or kidneys. The chlorobenzene compounds are

irritating to eyes and mucous membranes and may cause dermatitis if in direct contact with the skin.

5.2 Source, Quantity, Location and Concentrations

The only known source of contamination at the Washburn Site are the three transformers whose contents (Pyranol) were spilled onto the ground. Although the possibility of other substances being dumped on the site also exists, there is no current information to support other sources of contamination.

The quantity of PCB-contaminated oil spilled at the site is estimated to be 780 gallons. This determination is based upon existing information (see references) which suggest that each of the three transformers contained approximately 260 gallons of Pyranol.

The approximate areal extent of the bulk spill of PCB-contaminated oils is noted in Figure 2-2. Analyses of soil samples taken in the spill area reveal that the soil at the surface contains about 20,000 parts per million (ppm) of PCB. (The unit parts per million is often expressed in metric units as milligrams of contaminant per kilogram of soil or (mg/kg). The soil at a depth of 24 inches contains approximately 3500 ppm (mg/kg) of PCB.

Lesser amounts of contamination are present in the soil and sediments outside of the spill area. About 20 to 30 feet south of the spill at a 3 foot depth, 7 ppm (mg/kg) of trichlorobenzene was found. Similar levels of trichlorobenzene were detected 30 to 40 feet east and southeast of the spill at varying depths. Some contamination is also evident near the storage shed which lies about 60 feet northeast of the spill. Here both PCB and trichlorobenzene were found in maximum concentrations of 1.8 and 4.2 ppm or (mg/kg), respectively. In the drainage ditch along Gardiner Creek Road, PCB was detected at a relatively higher concentration of 172 ppm (mg/kg). Soil near the groundwater breakout or spring observed on the slope across the road leading to the Aroostook River showed a PCB concentration of 0.5 ppm (mg/kg).

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The appearance of contaminants near the shed may have been caused by the dragging of the contaminated parts of the three disassembled transformers there. The detection of hazardous substances outside of the spill area, especially the drainage ditch sediments, may be due to surface erosion of the soil by rainfall and subsequent migration.

Groundwater from nearby drinking water wells and surface waters in the vicinity show no detected amounts of PCB, dichlorobenzene or trichlorobenzene except for the water in the drainage ditch along Gardiner Creek Road. Water in the drainage ditch was shown to contain 0.005 ppm or milligrams per liter (mg/l) of PCB. Sampling locations are depicted in Figure 6-1 and all analytical data is tabulated in Table 6-1.

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6.0 ENVIRONMENTAL CONCENTRATIONS

6.1 Air

Polychlorinated biphenyl compounds have a low vapor pressure and, therefore, do not readily volatilize or cause air contamination. Trichlorobenzene and dichlorobenzene, however, are somewhat more volatile and, if present in sufficient quantities, could present an air contamination problem. The lack of air contamination within the spill area was confirmed by air monitoring conducted with a photoionization detector at the undisturbed soil-air interface. Readings taken at the soil and air interface of disturbed soil in the area of gross contamination showed only 8 parts per million (ppm). A few inches away from the disturbed soil, no hydrocarbons were detected. Most of the di- and trichlorobenzene contained in the transformers probably volatilized shortly after the spill occurred so that the potential for air contamination is slight. Thus, it appears that no significant air contamination is present at the site.

6.2 Soil

Obvious soil contamination in the spill area was present and was confirmed by sampling prior to installation of the cap. Table 6-1 summarizes the results of these sample analyses. PCB contamination was found to be greatest at the soil surface (as high as 58,000 ppm or mg/kg) but was less pronounced at a depth of 24 inches (3,533 ppm or mg/kg). No analytical data exists which defines the levels of dichlorobenzene and trichlorobenzene within the soil of the spill area. However, levels for these compounds would be expected to be less than the levels of PCB found, given the composition of Pyranol and the volatility of the chlorobenzenes.

Sample analysis of soils outside the spill area revealed significantly less contamination. Analyses were performed for both PCB and trichlorobenzene for most of the samples indicating concentrations generally in the range of 0 to 10 mg/kg. A soil sample of the surface of the drainage ditch along Gardiner Creek Road, however, showed a relatively high concentration of PCB (172 ppm or mg/kg). This result indicates that wastes may have migrated somewhat from the spill area.

TABLE 6-1

WASHBURN ANALYTICAL SUMMARY

A. Soil Sampling within the Spill Area

Sample ^a Designation	Sampling Date	Laboratory	Analytical Results (ppm or mg/kg)			Description/Location
			PCB Arochlor 1260	Trichloro- benzene	Dichloro- benzene	
S-1	4/80	MEDEP, Augusta	58,000	NA	NA	Surface soil
S-2	4/80	MEDEP, Augusta	30,000	NA	NA	Surface soil
S-3	11/82	Unknown	3,533	NA	NA	Soil at 24-inch depth
S-4	11/82	Unknown	22,900	NA	NA	Surface soil
S-5	12/82	USEPA	16,900	NA	NA	Surface soil
S-6	12/82	USEPA	17,400	NA	NA	Surface soil

B.

B. Soil Sampling Outside the Spill Area

S-7	4/80	MEDEP, Augusta	ND	NA	NA	Surface soil, location unknown
S-8	7/81	MEDEP	ND	7.0	NA	Soil south of the spill at 3-foot depth
S-9	7/81	MEDEP	ND	11.0	NA	Soil southeast of spill at 7-foot depth
S-10	7/81	MEDEP	ND	7.4	NA	Soil east of spill at 4-foot depth
S-11	7/81	MEDEP	0.9	4.2	NA	Soil south of shed at 15-foot depth
S-12	7/81	MEDEP	1.8	0.6	NA	Soil south of shed at 4-foot depth
S-13	7/81	MEDEP	0.6	0.2	NA	Soil west of spill at 0.2 foot depth
S-14	11/82	Unknown	0.5	NA	NA	Surface soil near groundwater breakout
S-15	11/82	Unknown	172	NA	NA	Surface soil in drainage ditch along road

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TABLE 6-1
 WASHINGTON ANALYTICAL SUMMARY
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C. Groundwater Sampling

Sample* Designation	Sampling Date	Laboratory	Analytical Results (ppm or mg/l)			Description/Location
			PCB Arochlor 1260	Trichloro- benzene	Dichloro- benzene	
W-1	7/81	MEDEP	ND	ND	ND	Roger Pinette well
W-2	7/81	MEDEP	ND	ND	ND	Rita Pinette well
	12/82	USEPA	ND	NA	NA	
W-3	7/81	MEDEP	ND	ND	ND	F. A. Drost well
W-4	7/81	MEDEP	ND	ND	ND	Washburn town water
W-5	7/81	MEDEP	ND	ND	ND	Ella Dahlgren well
W-6	7/81	MEDEP	NA	2.3	0.18	Southeast of spill at 7-foot depth

D. Surface Water Sampling

SW-1	7/81	MEDEP	ND	ND	ND	"Pond behind Pinette's"
SW-2	12/82	USEPA	0.005	NA	NA	Water in drainage ditch
SW-3	7/81	MEDEP	NA	ND	ND	"Stream below Pinette's" (Aroostook River)

NA: Not Analyzed

ND: Not Detected

* The approximate locations of the sampling points are shown in Figure 6-1 by their sample designation.

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Locations of all sampling locations are shown on Figure 6-1.

6.3 Groundwater

No monitoring wells have been installed on site, so the presence and extent of groundwater contamination is unknown. However, as shown in Table 6-1, samples taken from shallow drinking water wells located nearby revealed no contamination.

6.4 Surface Water

Three surface water samples were collected and analyzed. The samples designated as the "Stream Below Pinette's" (believed to refer to the Aroostook River) and the "Pond Behind Pinette's" showed "Not detected" for PCB, dichlorobenzene and trichlorobenzene. Surface runoff water that drained from the site to the drainage ditch running alongside Gardiner Creek Road showed a trace of contamination (0.005 ppm or mg/kg of PCB). See Table 6-1. With the installation of the cap in December 1982, further surface migration of the wastes should be mitigated.

6.5 Biota

Prior to the installation of the cap, an obvious area of dead grass outlined the extent of gross contamination. No other areas of stressed vegetation or adverse ecological effects were noted during the site inspections. However, no specific plant or animal studies were undertaken to assess the effect of the spill upon the local biota. It was noted, that the area to the south of Gardiner Creek Road had been cultivated or used as pasture. Since the potential for migration of the wastes still exists (particularly through groundwater seeps or springs) this area may become affected.

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7.0 PUBLIC HEALTH CONCERNS

7.1 Air Pollution

On May 13, 1982, USEPA and MEDEP inspected Pinettes's Salvage Yard. Monitoring with a photo-ionization analyzer showed no detectable levels of hydrocarbons at the soil-air interface prior to disturbing the soil. A 3-foot deep test hole was dug in the contaminated area and hydrocarbon levels were detected up to 8 ppm in the hole and in the soil dug from it. A few inches away from the hole and the disturbed soil, no hydrocarbons were detected.

The detection of hydrocarbons indicates that contaminants other than PCB's are present within the spill area. Di- and trichlorobenzenes are probably included in those hydrocarbons since they have been measured in the soil outside the spill area.

It is unlikely that inhalation of PCB's in gaseous form would occur since PCB's are not highly volatile. However, inhalation of dust particles, to which PCB's readily adhere, is a possibility.

7.2 Soil Contamination

Some soil samples have been taken of the contaminated soil area. PCB's remain in the soil at concentrations as high as 17,400 ppm (confirmed by 12/82 sample analyses). The horizontal extent is an area of approximately 40 feet by 40 feet dimensions. The vertical extent of soil contamination is not known. The area has been capped (whose dimensions are about 100 feet by 95 feet) to prevent direct contact with the spill, and to restrict further horizontal migration. The cap may also serve to decrease vertical migration by preventing the penetration of rainfall through the contaminated area. In the absence of a cap, rain could seep through the soil, pickup leachable contaminants and carry them through to the groundwater.

The principal public health concerns regarding the soil are contamination via direct contact with the soil and contamination via food crops grown in the soil. Capping

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the spill area serves to prevent direct contact with the soil, thus alleviating that health concern. However, because the spill area is in the midst of a primarily agricultural community, the latter health concern still exists. Farming, gardening, and grazing in the area could result in the introduction of hazardous substances to the food chain via the soil. Ingestion of contaminated food stuffs could have adverse health consequences.

Another public health concern is the possible contamination of the groundwater which serves as drinking water for nearby residences. The vertical migration of the wastes may not be adequately contained by the cap thus presenting an opportunity for groundwater contamination.

7.3 Groundwater Contamination

Since few groundwater samples have been taken at the site, the extent of groundwater contamination is unknown. The Rita Pinette home is within 150 yards of the spill site. A very shallow well, thought to be a spring, is the drinking water source here. The well is northeast of the spill area and testing showed no contamination of the well. A second drinking water well lies several hundred yards to the west of the spill area and services the Roger Pinette mobile home. Testing of this water likewise revealed no contamination. The available information does not indicate the location of the wells sampled with the exception of the Pinette wells (shown on Figure 2-2). Several residences in the vicinity also rely upon wells for their drinking water, some of which have been sampled indicating no contamination.

7.4 Surface Water Contamination

The only surface waters of any concern at or near the Washburn Site are the Aroostook River which is about one-fourth mile to the south; West Branch Salmon Brook, one-half mile to the east; an unnamed tributary to the river, about one-fourth mile to the west; and a 50-foot diameter, pond just a couple hundred feet north of the spill area. Contamination of the Aroostook River is a public health concern because it is a source of industrial water for a local potato processing

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plant. Analysis of samples taken of the Aroostook River and the pond revealed no contamination with PCB's, dichlorobenzene, or trichlorobenzene. No samples of West Branch Salmon Brook or the unnamed tributary have been taken. Since the spill area has been mounded and capped with a synthetic liner, further extensive horizontal migration is not expected. However, samples should be taken of the pond and the Aroostook River during the remedial investigation to confirm the lack of contamination. In conjunction with the water samples, additional sediment samples should be taken due to the high affinity of PCB's for the soil.

7.5 Fire and Explosion

The three hazardous contaminants known to be present at the Washburn Site, PCB, trichlorobenzene, and dichlorobenzene pose no fire hazard and consequently no threat of explosion. Even in pure form, these three compounds are only a slight to moderate fire hazard when exposed to heat or flame. The flash points of the polychlorinated biphenyls all exceed 286°F. The lowest flashpoints for the dichlorobenzenes and trichlorobenzenes are 150°F and 225°F, respectively. In addition, the risk of fire or explosion is greatly reduced when these compounds become entrained in a solid matrix (soil) as is the case with the Washburn Site. Coupled with the fact that these compounds have been exposed to the elements over a period of several years and their volatile fractions dissipated, the possibility of fire or hazard is virtually nonexistent.

7.6 General Risk Assessment

The principal public health concern for the Washburn Site is the leaching of contaminants into the groundwater. As evidenced by water sampling (Section 6.0), PCB's and chlorobenzenes have migrated somewhat from the initial spill area. Thus, the contaminants may threaten the public drinking water via groundwater wells used by area residents.

Other public health concerns, those associated with contaminated soil, have been discussed in Section 7.2. The concern for direct exposure to the soil has been principally alleviated by capping the site. In addition, this temporary measure may

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stem the migration of the wastes. As discussed in Section 7.2, the public health concern associated with contaminants entering the food chain still exists.

In sum, the Washburn Site poses some public health concerns. The nature of the wastes and their proximity to water supplies, particularly groundwater, suggests that appropriate action be taken as outlined in Section 10.0.

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8.0 EVALUATION OF EXISTING INFORMATION

The purpose of this section is to evaluate the adequacy of the technical data currently available for the Washburn Site. Recommendations for future data-gathering efforts are presented based upon this evaluation.

The technical data was assessed on the basis of currency, consistency, completeness, representativeness, accuracy, and comparability, in addition to professional engineering and scientific judgment. Specific criteria used include document control; sample chain-of-custody; calibration; sampling, sample preservation, testing procedures; reporting, and other QA/QC factors. It is strongly emphasized, though, that the data adequacy determination presented in this section, is a technical evaluation, not a legal one. A legal evaluation of evidentiary information with respect to admissibility, relevancy, expert witness testimony, hearsay, authentication, is not within the scope of this RAMP.

8.1 Sampling and Analysis

The analytical data available for the Washburn Site is somewhat limited, consisting solely of the results of four separate sampling investigations:

- Maine Department of Environmental Protection (MEDEP), April 16, 1980;
- MEDEP, July 29, 1981;
- USEPA Region I, Boston, May 13, 1982;
- USEPA Region I, Boston, November 10, 1982.

Although the analytical reports themselves did not provide much detail on chain-of-custody, quality assurance, and quality control procedures, the analyses were performed by reputable laboratories who implement such procedures as a matter of routine. As such, the data can be assumed to be of reliable quality.

The available analytical data are adequate to identify the types of hazardous substances at the Washburn Site and the location of the spill area. In addition, this data provides a firm foundation from which to plan and perform remedial

investigative work. Generally, additional sampling and analysis is required to delineate the extent and degree of contamination, and to confirm the types of hazardous substances at the site. Acquisition of these data will enable a more accurate determination of appropriate long-term remedial measures and the scope of their implementation. Further discussion is provided below. Details concerning the sampling and analysis phase of the remedial investigation are presented in Appendix B.

8.1.1 Soil and Sediment

Most of the sampling and analysis performed for the Washburn Site has been directed towards characterizing the soil. Samples taken of the soil within the spill area have been analyzed for polychlorinated biphenyls (PCB's). The available data (presented and discussed in Sections 5.0 and 6.0) indicate that there are high concentrations (on the order of 20,000 ppm or mg/kg) of Arochlor 1260 in the spill area soil. There is no information concerning the presence of other hazardous substances in the spill area. However, given the high concentrations of PCB and the composition of Pyranol (the dielectric cooling fluid spilled at the site), one might expect that dichlorobenzene and trichlorobenzene are also present.

Outside of the spill area, samples have been taken of soil and sediments in several locations and at varying depths. Samples include:

- Subsurface soil at points 10-50 feet west, south and east of the spill area
- Subsurface soil near the storage shed
- Surface sediments from the drainage ditch along Gardiner Creek Road, and
- Surface sediments at the groundwater breakout or spring located on the slope leading to the Aroostook River.

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Most of these samples were analyzed for PCB and trichlorobenzene. The data indicate that the hazardous substances have migrated somewhat from the spill area.

Additional samples should be collected in selected areas during the remedial investigation to more fully define the areal extent of contamination. Initially, these samples will be analyzed for only a limited number of "indicator" organic pollutants (described in Appendix B) in order to minimize laboratory costs. This limited analysis, though, will be sufficient to demonstrate whether hazardous substances are present. If additional information is desired, the samples can be analyzed for an expanded list of pollutants (e.g., priority pollutant list).

The additional data will allow a determination as to the location and the quantity of contaminated soil and sediments. Also, selection of a long-term remedial measure is dependent upon the levels of hazardous substances present in the soil. High concentrations of PCB's in the soil, as in the spill area, will likely require excavation and offsite disposal. Soil containing lower concentrations (below 50 ppm or mg/kg) could possibly be secured onsite in an imperviously lined pit. Soil sampling and analysis, therefore, will play an important role in the selection of a cost effective solution.

8.1.2 Surface Water

The surface waters which have been sampled at the Washburn Site are:

- The pond which is approximately one hundred feet northeast of the spill area.
- The water in the drainage ditch which runs parallel to Gardiner Creek Road, and
- The stream below Pinette's.

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The sample designated as "the stream below Pinette's" is believed to represent the Aroostook River. Laboratory analysis of the above mentioned samples indicated that the water in the drainage ditch contained low levels of PCB. The pond and the Aroostook River samples were analyzed for di- and trichlorobezene and showed no detectable levels of those compounds. The drainage ditch sample was not analyzed for chlorobenzenes. The presence of PCB in the drainage ditch water coupled with the results of the sediment samples mentioned above indicate that some migration of the wastes in the spill area has occurred.

Additional surface water samples of the drainage ditch are proposed for the remedial investigation. These samples will be taken in conjunction with sediment samples from the ditch. The presence of PCB in the parts per million range in the drainage ditch water (although unlikely based upon existing data) may indicate the need for containment and treatment. Also, samples of the pond and the Aroostook River will be collected and analyzed to determine whether contamination has occurred since they were last investigated.

8.1.3 Groundwater

Recent samples (July 1981) from the two private wells in the immediate vicinity of the spill area (the Roger Pinette and Rita Pinette wells) showed no detectable levels of contamination. Likewise, sample analysis of private and public water supplies offsite revealed no contamination.

Sampling of the Pinette wells near the spill area is proposed for the remedial investigation to determine whether the local groundwater has become contaminated. Samples of the other wells will be taken for analysis if the Pinette wells show contamination. A finding that any drinking water supply is contaminated may necessitate provision of alternate water supplies.

In addition, onsite monitoring wells are planned for installation during the remedial investigation to assist in the hydrogeologic and geologic characterization of the site. Samples will be taken from these wells to determine if the groundwater is contaminated.

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8.1.4 Biota

As noted earlier in Section 6.0, little effort has been directed towards an ecological evaluation of the site. With the exception of observations made during site visits, no studies have been undertaken to evaluate the effects of the spill upon plant and animal life. At this time, no such studies are proposed as part of the remedial investigation. The spill area has been capped thus minimizing the threat to wildlife and reducing the potential for hazardous substances entering the human food chain.

8.2 Geology and Hydrogeology

The geologic data gathered thus far is only regional in scope and lacks the specificity needed to perform a thorough evaluation of the site. Less is known about the site's hydrogeology. For these reasons, a portion of the remedial investigation is devoted to acquiring additional geologic and hydrogeologic data.

Prior to on-site investigations, local well drilling companies can be contacted to determine whether any well logs exist for the private wells adjacent to the site. Also, site-specific or area-specific geological and soil information will be gathered from local and county offices or other available sources. This information may assist in the placement of on-site monitoring wells. Installation of wells on site will provide information concerning groundwater movement and subsurface geology. This information will prove valuable in defining the possible pathways for waste migration via the groundwater. Also the necessity or technical requirements of long-term remedial measures (such as groundwater barriers) can be evaluated.

8.3 Other

Other information can be gathered which could be useful for the remedial investigation and feasibility study. This information may be available in local and county offices and includes:

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- Ownership of affected properties (slope leading to the Aroostook River as well as the salvage yard) and location of property boundaries.
- Location of and design conditions (e.g. depth of frost penetration) for a possible extension to the existing town water supply system.

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9.0 HEALTH AND SAFETY PROCEDURES

9.1 Personal Health and Safety Protection

9.1.1 Level of Protection Used in Previous Investigation

No data is available on protective gear used during previous site investigations.

9.1.2 Level of Protection Recommended for Future Work

Potential hazards to be expected at this site are the absorption of PCB's, dichlorobenzene, and trichlorobenzene from contact with contaminated soil. Exposure can occur when soil is picked up or when dust blows onto the skin. Protective overalls, boots, gloves, and hood capable of protecting against particle penetration may be required. Disturbance of the ground during site work could cause dust and, therefore, chemicals to become airborne. Respirators may be required to prevent the inhalation of these airborne particles. The combination of skin and respiratory protection suggested during monitoring work is Level C. If monitoring results indicate negligible levels of PCB's and chlorobenzenes in air and dust collections, the protection required may be decreased to Level D. The health and safety equipment associated with each level of protection is listed in Figure 9-1.

9.2 Health and Safety Monitoring

9.2.1 Site Monitoring Used for Previous Investigations

Past monitoring at the Washburn Site has consisted of soil and water sampling and the use of monitoring instruments during site investigations. Sampling at the Washburn Site has included soil, sediment, groundwater, and surface water sampling. This sampling was performed by the Maine Department of Environmental Protection (DEP) and by the Region I Office of the Environmental

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Protection Agency on four occasions in 1980 through 1982 (see Section 2.0 and Section 6.0). Sampling results indicate the presence of PCB'S, di- and trichlorobenzenes in the site area.

Air monitoring with a photoionization detector (HNU) in September of 1982 showed no detectable levels of airborne contaminants except in a shallow hole dug at that time in the spill area. Readings of up to 8 ppm of volatile substances were obtained. The material used to calibrate the meter was not specified.

9.2.2 Site Monitoring Recommended for Future Work

Monitoring is required to select suitable respiratory protection against chemicals released from the contaminated site. Survey instruments are to be used to determine whether contamination is present before, during, and after site work. The HNU photoionization detector will be used to monitor the air in and around the spill area. Based upon these readings, a decision can be made as to the levels of respiratory protection that is required while working on the site. An Organic Vapor Analyzer (OVA) maybe used in place of the HNU. The OVA is also capable of operating as a portable gas chromatograph and can be used to analyze the headspace of collected samples for organics.

In addition to survey instrument monitoring, samples will be collected and analyzed to monitor the presence of hazardous substances in the groundwater. This monitoring is part of the remedial investigation and is described in more detail in Appendix B.

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TABLE 9-1

HEALTH AND SAFETY PROTECTIVE EQUIPMENT

Level A protection should be worn when the highest level of respiratory, skin, eye, and mucous membrane protection is needed.

a. Personal Protective Equipment

- Positive-pressure (pressure demand), self-contained breathing apparatus (MSHA/NIOSH approved).
- Fully-encapsulating chemical resistant suit.
- Gloves, inner, chemical resistant.
- Gloves, outer, chemical resistant.
- Boots, chemical resistant, steel toe and shank; (depending on suit boot construction, worn over or under suit boot).
- Underwear, cotton, long-john type.*
- Hardhat (under suit).*
- Coveralls (under suit).*
- Two-way radio communications (intrinsically safe).*

* Optional

Level B protection should be selected when the highest level of respiratory protection is needed but a lesser level of skin and eye protection is required. Level B protection is the minimum level recommended on initial site entries until hazards have been further identified and defined by monitoring, sampling, and other reliable methods of analysis, and personnel equipment corresponding with those findings utilized.

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TABLE 9-1
HEALTH AND SAFETY PROTECTIVE EQUIPMENT
PAGE TWO

a. Personal Protective Equipment

- Positive-pressure (pressure demand), self-contained breathing apparatus (MSHA/NIOSH approved).
- Chemical resistant clothing (coveralls and long-sleeved jacket, coveralls, hooded two-piece chemical splash suit, or disposable chemical resistant coveralls).
- Coveralls (under splash suit).*
- Gloves, outer, chemical resistant.
- Gloves, inner, chemical resistant.
- Boots, outer, chemical resistant, steel toe and shank.
- Boots, outer, chemical resistant.*
- Two-way radio communications (intrinsically safe).*
- Hard hat.*

* Optional

Level C protection should be selected when the type of airborne substance is known, concentration measured, criteria for using air-purifying respirators met, and skin and eye exposure is unlikely. Periodic monitoring of the air must be performed.

a. Personal Protective Equipment

- Full-face, air-purifying respirator (MSHA/NIOSH approved).
- Chemical resistant clothing (one-piece coverall, hooded two-piece chemical splash suit, chemical resistant hood and apron, disposable chemical resistant coveralls).

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TABLE 9-1
HEALTH AND SAFETY PROTECTIVE EQUIPMENT
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- Gloves, outer, chemical resistant.
- Gloves, inner, chemical resistant.
- Boots, steel toe and shank, chemical resistant.
- Cloth coveralls (inside chemical protective clothing).*
- Two-way radio communications (intrinsically safe).*
- Hard hat.*
- Escape mask.*

* Optional

Level D is a work uniform. It should not be worn on any site where respiratory or skin hazards exist.

a. Personal Protective Equipment

- Cloth coveralls and protective gloves.
- Boots or shoe, steel toe and shank.
- Hard hat.*
- Safety eye wear.*

* Optional

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10.0 REMEDIAL ACTION PLANNING ACTIVITIES

The following discussion is an overview of remedial measures for the Washburn Site. Details concerning the design and implementation of these measures are presented in Appendix B, Work Plan Outline.

10.1 Objectives and Criteria

Section 10 identifies the types and alternatives of remedial activities to be enacted at the Washburn Site. Later sections will discuss the sequence, estimated costs, and correlations of activities to be implemented. Remedial activities may be:

- Initial remedial measures: actions that are implemented on a "fast-track" schedule
- Long-term remedial measures: detailed investigations and studies used to evaluate and implement source control and offsite remedial measures.

IRMs may be appropriate if such measures are determined to be feasible and necessary to limit exposure or the threat of exposure to a significant health or environmental hazard. An IRM is appropriate if it is also cost effective, limited in scope and requires a minimum of planning. Factors to be considered in determining whether initial remedial measures are warranted include: the potential for human contact with wastes, amount and form of the hazardous substances, hazardous properties of the waste, fire and explosion threat, and the likelihood of interference with water and land use.

Long-term remedial measures include investigations and studies as well as source control and offsite measures. Source control measures contain or detoxify the hazardous substances where they are located or eliminate potential contamination by transporting the hazardous substances to a new location for proper disposal. Such measures may be appropriate if a substantial concentration of hazardous substances remain at or near the area they were originally located and inadequate barriers exist to retard migration of substances into the environment. Examples of

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source control measures include groundwater control, leachate collection and treatment, and excavation and offsite disposal of contaminated substances. Offsite measures minimize and mitigate further migration of hazardous substances and the effects of such migration. These measures are implemented in situations where contamination has already migrated beyond the area where hazardous substances were originally located. Examples of offsite remedial measures include provision of permanent alternate drinking water supplies, control of a contaminated aquifer, and groundwater treatment.

The objectives for selecting initial remedial measures at the Washburn Site were the reduction or elimination of the potential for human contact with onsite wastes and the containment or removal of the hazardous substances.

Long term remedial measures were chosen to provide an economical and technically sound approach for eliminating the threat to the environment posed by hazardous substances present at the Washburn Site. Both initial remedial measures and long term remedial measures are necessary to alleviate environmental problems at the site; the difference, however, is in the scheduling of these responses.

10.2 Identification of Remedial Measures

The remedial measures identified for the Washburn Site are presented below. These measures are consistent with the provisions of the National Contingency Plan (40 CFR), specifically Sections 300.67(b) and 300.68 (e)(1).

10.2.1 Initial Remedial Measures

- Delineate the extent of the capped area by visual inspection and establish a perimeter around the capped area to prevent inadvertent disturbance of, or contact with, the contaminated soil.
- Place signs, which indicate the hazardous nature of the substances on site, around the contaminated area.

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- Notify local officials and residents that the spill area and the slope leading to the Aroostook River (across Gardiner Creek Road) should not be used for growing crops or grazing livestock.

10.2.2 Long Term Remedial Measures

The long term remedial measures which should be investigated may include but are not limited to:

- Source Control Measures
 - No action
 - Excavation and removal of contaminated soil
 - Onsite disposal of the contaminated soil in an imperviously lined pit
 - Groundwater barriers (containment-isolation)
 - In-situ decontamination: elutriation of soil and treatment of "wash" water
 - In-situ decontamination: chemical or biological degradation
- Offsite Measures
 - Provision of alternate water supply (extension of town water supply system)
 - Groundwater treatment.

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10.3 Initial Remedial Measures (IRM)

10.3.1 Objective

Perimeter Marker and Signs

The immediate spill area has been mounded and capped with an impervious liner to restrict further migration of hazardous substances by rainfall runoff. In addition, this measure serves to minimize the potential for direct contact with the wastes. However, contact with contaminated soils as well as disruption of the protective covering could still occur should unwary persons have cause to disturb the spill area by driving vehicles across the area, farming or gardening, continued pedestrian traffic, grading for construction, etc. Thus, a need exists to establish the boundaries of the contaminated area and to serve notice to unsuspecting persons that the area contains hazardous substances. This can best be accomplished by simply roping off the area and placing signs around the perimeter. The more costly alternative of constructing a fence and securing the area is not warranted in light of measures which have been implemented (i.e. mounding and capping with an impervious liner).

Notification of Local Officials and Residents

As noted in Section 7.0, the potential exists for the hazardous substances present at the Washburn site to enter the food chain. Of particular concern is the immediate spill area and the area south of the site where several groundwater seeps have been observed. These areas were once cultivated or used for grazing and might in the future be used again for similar purposes. To guard against this possibility before and during corrective action, local officials and residents should be made aware that such a danger exists.

Appropriate warning signs can be erected in the vicinity of observed groundwater seeps as well as throughout the field between Gardiner Creek Road and the

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Aroostook River. In addition, notices can be placed in the local newspapers and property owners in the vicinity of the site can be contacted by letter, telephone or personal interview.

10.3.2 Data Acquisition

Perimeter Markers and Signs

Placement of the boundary and the signs will be determined at the time of implementation. The boundary perimeter will be established visually to encompass the extent of the capped area.

Notification of Local Officials and Residents

Placement of signs between Gardiner Creek Road and the Aroostook River will be determined during this phase. In addition, initial contacts will be made with local officials (such as the Township Manager) and a list compiled of persons to be notified and of local newspapers.

10.3.3 Engineering Study

Perimeter Markers and Signs

No engineering study is required.

Notification of Local Officials and Residents

Likewise, an engineering study is inapplicable for this IRM.

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10.3.4 Design

Perimeter Marker and Signs

Specifications for the boundary and signs will include size, quantity, materials and content. Preliminary specifications are provided in Appendix B.

Notification of Local Officials and Residents

Specifications for the signs will include size, materials, and content. Preliminary specifications are given in Appendix B.

10.3.5 Implementation

Perimeter Marker and Signs

Preparation of the signs will be performed by a qualified contractor. Delineation of the perimeter and placement of the signs can be undertaken by EPA Region I, Maine Department of Environmental Protection (MEDEP), or NUS personnel depending upon availability. If unavailable, a qualified local contractor will be obtained to perform the work.

Notification of Local Officials and Residents

Placement of newspaper notices and contacts with local residents will be closely coordinated among EPA Region I, Maine DEP and local officials.

10.4 Scope of Remedial Investigations

Generally, remedial investigations are undertaken to acquire data which will supplement an existing database, and to provide the necessary input towards an evaluation and selection of a remedial measure. For the Washburn Site, the purpose of the remedial investigation is

- To characterize the nature and extent of soil, surface water, and groundwater contamination; and
- To explore and define the geology and hydrogeology of the site.

The above data should be sufficient to allow for an evaluation of long-term remedial measures during the feasibility study.

The following is a brief description of appropriate remedial investigations for the Washburn Site. Greater detail and further discussion concerning these investigations are provided in Section 8.0 and Appendix B.

10.4.1 Preliminary Activities

Prior to initiating any remedial investigations, several preliminary support activities must first be undertaken. These activities include the preparation of four site-specific documents: a detailed work plan, a health and safety plan, a quality assurance (QA) plan, and a community relations plan. Other preliminary activities may include acquisition of supplemental data, procurement of subcontractors, and mobilization of field equipment.

The supplemental data which can be acquired includes:

- Site-specific or area-specified geologic and soil information from local and county offices or other available information sources,
- Well logs of the wells adjacent or near to the site from local well drilling companies, and
- Ownership of affected properties (slope leading to the Aroostook River as well as the salvage yard) and location of property boundaries.

This information will prove useful in designing the remedial investigation particularly in regards to the proposed monitoring wells. Specific tasks and details

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concerning the preliminary activities phase of the remedial investigation are contained in Appendix B.

10.4.2 Groundwater Investigation

Investigation of the Washburn Site's hydrogeology is needed to assess the presence and extent of groundwater contamination. In addition, knowledge of the site's hydrogeology will be required for evaluation of long-term remedial measures. For instance, depth, rate, and direction of groundwater flow; the chemical characteristics of the groundwater; soil permeability; amount of soil stratification; and depth to bedrock or an impervious layer; are all design considerations for the implementation of a groundwater barrier such as a slurry wall. A thorough hydrogeologic and geotechnical investigation will provide this information.

The requisite information will be gathered through a field investigation and drilling program. The program will proceed in five tasks, the first of which involves a visual examination of overburden characteristics and installation of several onsite monitoring wells into the shallow aquifer. The second task is an evaluation of the data gained from the first task to determine the necessity for or location of deep aquifer monitoring wells. Task 3 is the installation of the deeper monitoring wells if required. The fourth task involves the determination of the elevation and horizontal location of the installed monitoring wells through field survey. Lastly, a final report will be prepared detailing the results of the foregoing groundwater investigations as Task 5. Additional discussion of the groundwater investigation and the various tasks proposed for it are presented in Appendix B.

10.4.3 Sampling and Analysis

Additional samples will be obtained and analyzed to supplement the existing data base and thereby to determine the extent of contamination. This information will be used in the evaluation of long-term remedial measures during the feasibility study. The data will be particularly useful in determining the location and amount of contaminated soil.

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Surface and subsurface samples of the soil around the capped area and across Gardiner Creek Road are proposed for the remedial investigation. In addition, sediment samples of the drainage ditches running along and across the road are planned. Samples of the two potable wells adjacent to the site and any monitoring wells installed on site are recommended to assess groundwater quality. Details as to the number, location, and analysis of the samples are presented in Appendix B.

Obtaining samples of the soil beneath the liner in the capped area was considered for the purpose of determining the extent of contamination. Such data would be useful in minimizing the amount of soil for removal from the spill area if excavation and offsite disposal are adopted as the long-term remedial measure. However, augering through the liner to obtain samples would disrupt the integrity of the liner and lessen its effectiveness as an impermeable water barrier. The cost of obtaining and analyzing these samples as well as the cost of resealing the holes in the liner may outweigh the benefits of obtaining this additional data. Existing data is probably sufficient to estimate the perimeter of the spill (although not the depth of penetration) with the same degree of accuracy as additional sampling would provide. Therefore, no sampling of the spill area is proposed at this time.

10.5 Engineering Feasibility Study

The engineering feasibility study is conducted upon completion of the remedial investigation for the purpose of developing and evaluating alternatives, conducting cost-benefit analyses, undertaking laboratory treatability studies, preparing an environmental and public health assessment, and developing conceptual designs.

The feasibility study is an evaluation of remedial alternatives which

- Prevent any additional release of hazardous substances from the site, and
- Restrict the migration of hazardous substances already released from the site.

The long-term remedial measures which should be considered are identified and briefly discussed in the following paragraphs. It is important to note that other long-term responses may or may not be identified after the remedial investigation is completed. A "no action" or "minimum action" alternative should also be considered in order to properly assess the benefits gained by implementation of the proposed remedial measures versus the costs incurred (including noneconomic costs).

10.5.1 Source Control Measures

Excavation and Removal of Contaminated Soil

Since the heavily contaminated area at the Washburn Site is relatively small (40 ft x 40 ft), excavation and removal of the soil appears to be a reasonable, cost-effective, and permanent solution. The proposed cleanup proceeds in five basic stages:

1. Remove cap (impervious liner) from spill area to permit access to the contaminated soil.
2. Excavate the contaminated soil.
3. Obtain samples of outer perimeter of excavated area and analyze to confirm the absence of organics (i.e., PCBs).
4. Dispose of the contaminated soil.
5. Refill the excavated area, fertilize and seed.

The first stage involves removal of or excavation through the cap which covers the spill area in order to reach the contaminated soil beneath. The most effective and least disruptive approach would be to "cut" through the cap above the area of contamination. This approach dispenses with the use of a bulldozer to scrape off the cap which may disturb and relocate contaminated soil.

The first requirement of the second stage is a determination of the perimeter of the proposed, excavated pit. The perimeter must be established such that contaminated soil will be removed without removing a large quantity of uncontaminated soil. However, the spill area, which measured approximately 40 ft by 40 ft, has been covered with an impervious liner whose dimensions are 100 ft by 95 ft. The presence of the cap precludes a visual determination of the horizontal extent of contaminated soil. One method of determining the horizontal and vertical boundaries would be to collect and analyze a series of samples (an estimated minimum of 20 samples) in the spill area during the remedial investigation. The disadvantages of this approach are:

- Disruption and possible destruction of the integrity of the impervious liner due to augering through the liner to collect samples.
- The costs of repairing and resealing the damaged liner.
- The costs of sample collection and analysis, and
- The fact there is no guarantee that the boundary of the contaminated area will be defined with the desired amount of certainty.

Instead, the recommended approach is to rely on existing data in determining the boundaries of contamination within the spill area. Since the horizontal dimensions of the spill area were known to be about 40 ft by 40 ft, the boundary can be set as a circle of 40 to 45 ft radius from the approximate center of the spill. Analysis of samples from the spill area have shown that the soil contains high levels of PCB (3533 ppm or mg/kg) at a depth of at least two feet. The vertical boundary should then be set as the depth at which the shallowest impermeable deposit lies. This depth can be determined from the drilling program proposed for the remedial investigation. The above approach has the attribute of preserving the effectiveness of the cap until actual excavation and removal of the soil.

The third stage of this remedial measure involves a limited sampling and analysis program to confirm that excavation has removed the contaminated soil.

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Approximately five to ten samples should be obtained and analyzed for PCB's, dichloro- and trichlorobenzene. Preferably, the analyses should be performed by a readily accessible qualified laboratory under special contract to provide quick turnaround (one week) on the samples. Should analysis reveal that an undesirable level of contamination is still present, additional sampling of a similar nature can be undertaken with the goal of determining the extent of further excavation.

The fourth stage is disposal of the excavated soil at a USEPA-approved facility. Upon excavation, the contaminated soil could either be drummed or transported in bulk to a hazardous waste storage or disposal facility. Disposal options which may be considered include burial in a secure hazardous waste landfill and incineration.

Finally, the excavated area will be refilled to the surrounding grade level with suitable fill material (borrow and topsoil). The area should then be seeded and fertilized to reestablish an erosion resistant vegetative cover.

Onsite Disposal (encapsulation)

A second remedial measure which can be evaluated during the feasibility study is onsite disposal. This approach involves excavating the contaminated soil, lining the excavated area with an impervious liner, and returning the soil to the lined pit. The area is then permanently capped and the site secured as a hazardous waste landfill. The advantage of onsite disposal is that the high cost of transporting the contaminated soils to a remote disposal facility is eliminated. The amount of soil which needs to be secured must still be determined by sampling and analysis. Also, a liner must be chosen that has the proven ability to withstand contact with PCBs, dichlorobenzene, and trichlorobenzene and still retain its impermeability.

There are, however, at least two major drawbacks to this proposal. They are the ability and the cost of complying with applicable regulations and permitting requirements (particularly those of TSCA and RCRA). The site's hydrogeology may be such that it is unsuitable as a hazardous waste landfill. The groundwater phase of the remedial investigation will provide the necessary data for this evaluation. Secondly, the costs of obtaining permits and complying with the stringent

requirements for hazardous waste landfills may be prohibitive. Included in these costs is the maintenance required for the life of the landfill (usually 20 to 30 years). The above considerations will be fully addressed in the feasibility study along with others that may be identified.

Containment and Isolation by the Use of Groundwater Barriers

Groundwater barriers, constructed as either:

- A bentonite slurry wall,
- A cement or chemical grout curtain, and
- A sheet piling cut-off wall

can be installed to prevent contaminated groundwater from migrating away from the site or to divert groundwater so that contact with the contaminated soil is prevented. Groundwater barriers can take the place of other waste containment methods such as construction of a secure hazardous waste landfill. Properly constructed groundwater barriers also have the advantage of minimal maintenance.

For the Washburn Site, a groundwater barrier installed upgradient of the spill area would be appropriate in light of the small area involved. Also, a groundwater barrier may be an effective complement to the impermeable cap which is presently in place over the contaminated soil. Since the groundwater at the site may be moving through soil or loose overburden, a grout curtain may not be suitable for installation because of its high cost. The other methods, slurry wall and sheet piling, are less costly and just as effective under such conditions. Another consideration is whether the barrier should be designed as a complete water cut-off or as a means to lower the water table below the depth of the contaminated soil. For the Washburn Site, an impermeable layer or bedrock may lie sufficiently close to the surface such that complete water cut-off is feasible through installation of the barrier to this depth.

Additional data will be gathered during the remedial investigation to support a decision regarding the use of groundwater barriers. The data which will be

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collected during the groundwater investigation includes depth, rate, and direction of groundwater flow; soil permeability and stratification; and depth to bedrock or an impermeable layer. Also, the feasibility study will evaluate the chemical compatibility of the groundwater with barrier materials as well as other pertinent factors.

In-situ Decontamination: elutriation of soil and disposal of "wash" water

This remedial measure, proposed by the Maine DEP in 1981, accomplishes decontamination of the contaminated soil without removal of the soil. Very simply, water is flushed through the soil to "wash" it of contaminants and collected by a network of trenches dug in the affected area. The water is then treated by a carbon adsorption system and recirculated to the contaminated area. This system must be allowed to operate continuously for several months to purge the soil of contaminants. The effectiveness of this measure in removing PCBs is not known and must be fully evaluated during the feasibility study. Additional details of this system are contained in Appendix C in the form of a letter from the Maine DEP. Once decontamination is complete (as confirmed by sampling and analysis), the site will be restored to its original surface contour, fertilized, and seeded to establish a vegetative cover.

In-situ Decontamination: chemical or biological degradation

Although not yet commercially available, there are several methods of decontaminating PCB-laden soils without the need for excavation or removal. These methods use various chemical and biological agents to gradually degrade the polychlorinated biphenyls entrained in the soil. One chemical agent which has shown promising results is sodium polyethylene glucoate. Research is currently underway towards its commercial development. Other such compounds and biological agents are in various stages of research and development and should be considered during the feasibility study.

In-situ decontamination by chemical or biological means involves cultivation of the contaminated soil and application of the activating agent. Degradation of the

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wastes to nontoxic byproducts is a gradual process requiring several months to a year for effective detoxification. During this time, the soil must be periodically cultivated to mix the wastes with the activating agent as well as to provide aeration. Once decontamination is complete, a vegetative cover will be established over the site to prevent erosion. Implementation of this remedial measure would of course entail removal of the impervious liner currently in place over the spill area. Should this alternative prove technically feasible, it offers the advantages of relatively low cost and overall minimal disturbance of the site.

10.5.2 Offsite Control Measures

Provision of Alternate Drinking Water Supplies

One of the principle concerns at the Washburn Site is the possibility that the groundwater may become contaminated and thus threaten the water supply of several nearby residences. In the event of contamination, an alternate drinking water supply can be provided to negate this public health concern. The most logical approach would be to connect affected residences to the Washburn water system. Town water lines lie within a mile of most of the homes that would require an alternate source of water. The use of town water could be an effective solution to the drinking water problem since the town water is probably unaffected by contaminants at the Washburn Site.

One consideration which must be taken into account during the feasibility study is the depth to which frost penetrates the soil in northern Maine. Some references indicate a frost depth of 5 to 7 ft in this area. Construction of a water line at increasing depths adds to the overall cost. During the remedial investigation, information will be gathered concerning the location and design specifics of existing water lines.

Treatment of Groundwater

A groundwater pumping and treatment system can be installed to treat contaminated groundwater supplies. This approach involves the installation of a

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series of extraction and injection wells to enable removal, treatment, and reintroduction of groundwater to the aquifer. The groundwater treatment system may include dual media filters for suspended solids removal, and carbon adsorption units for removal of organics (including PCBs). A pipeline from the wells is needed to deliver the groundwater to and from the treatment system.

At this time, there is no evidence of groundwater contamination at the Washburn Site. Therefore, the offsite measures discussed above do not deserve serious attention until after the remedial investigation. The proposed remedial investigation will demonstrate whether the groundwater is contaminated and provide sufficient hydrogeologic data to evaluate the offsite measures in the event of contamination.

10.6 Conceptual Design of Remedial Measures

The engineering feasibility study will result in a conceptual design of the selected alternative(s). During the remedial action design, a more detailed plan to include construction drawings, specifications, and detailed cost estimates will be developed.

10.7 Implementation of Remedial Measures

The remedial action design will be used as the basis for implementation of the selected remedial alternative(s). Qualified contractors and subcontractors will be retained to implement selected remedial actions.

10.8 Operation, Maintenance, and Monitoring

Depending upon the selected remedial measure, operation, maintenance, and monitoring activities may be required to effectively implement a long-term solution to the contamination problem at the Washburn Site.

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10.8.1 Operation

Three of the above mentioned remedial measures have operation activities associated with them. These activities will be undertaken during the implementation phase. One measure is in-situ decontamination by elutriation of the soil. As described in Appendix C, the pumping and treatment system will have to be operated for several months for complete elutriation of the soil. Similar activities will have to be undertaken for the offsite control measure, groundwater treatment, but for a potentially longer period of time. Operation activities will also be required for in-situ decontamination by chemical or biological degradation. The principal activity will involve periodic cultivation of the soil for mixing and aeration.

10.8.2 Maintenance

Maintenance may be required for onsite landfill disposal and for the extension of the town water supply line. The landfill may develop breaks in its impervious liner which will require repair (probably by heat sealed patches or partial replacement). Sufficient cover (vegetation) must be maintained over the landfill to prevent erosion and subsequent exposure of the liner to the elements. The town water line extension may experience service disruption due to water breaks occasioned by freezing or pipe failure. Maintenance of the water line, therefore, will likely involve corrective actions such as excavation and repair.

Maintenance will also be needed for the pumps and treatment components associated with the groundwater treatment and soil elutriation remedial measures. Such maintenance, though, is of a short-term basis required only during implementation.

10.8.3 Monitoring

Regardless of the remedial measure implemented, monitoring will be required to determine whether the site has been effectively secured and to gain advance information on any further contaminant migration. In all cases, monitoring will

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consist of periodic (e.g. every six months) collection and analysis of samples from upgradient and downgradient monitoring wells on the Washburn Site. The frequency and duration of sampling will be determined during the feasibility study when all site investigations and studies will have been completed. Samples will be screened for the presence of PCBs or other organic contaminants through TOH and TOC analysis.

Also, monitoring will consist of periodic onsite inspections (e.g. every year) for several years after implementation of the remedial measure (20 to 30 years for onsite disposal in a secured landfill). Inspection is recommended for the onsite disposal and groundwater barrier remedial measures to:

- Check for cracks in the protective cover over the site.
- Monitor the presence of new groundwater seeps or springs, and
- Observe the general appearance of the surrounding vegetation.

Further specifics regarding operation, maintenance, and monitoring activities will be developed following selection of a remedial measure.

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11.0 MASTER SITE SCHEDULE

The schedule for the implementation of all remedial activities recommended for the Washburn Site is shown in Figure 11-1. This schedule begins following public comment, U.S. Environmental Protection Agency (USEPA) and State approval of this RAMP, and work authorization from USEPA to an approved contractor. It is emphasized that the schedule in Figure 11-1 is only a preliminary planning schedule and may be revised during the work plan phase of the Remedial Investigation.

12.0 COST ESTIMATES FOR REMEDIAL ACTIONS

The costs for the proposed remedial actions at the Washburn Site are presented in Table 12-1. The costs for design, construction, long-term maintenance, and monitoring will be developed and presented in the feasibility study.

The costs presented in Table 12-1 were not developed from detailed or highly accurate information. In most cases, unit costs and other rough estimating techniques were used. These costs should be used for general planning purposes only.

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TABLE 12-1
COST ESTIMATES FOR REMEDIAL ACTIONS
(JANUARY 1983 COSTS)

	<u>Total Cost</u>
A. Initial Remedial Measures	
1. Perimeter Marker Installation	\$ 5,450
2. Signs	1,220
3. Notification of Local Officials and Residents	<u>1,500</u>
Total IRMs	\$ 8,170
B. Remedial Investigation and Feasibility Study (RIFS)	
1. Initial Activities	\$ 15,940
2. Groundwater Investigation	43,430
3. Sampling and Analysis	
a. All tasks except analysis	20,320
b. CLP analysis	40,400
4. Report Preparation	<u>7,800</u>
Total Remedial Investigation ⁽¹⁾	\$ 87,490
5. Feasibility Study	\$ 25,900
Total RIFS ⁽¹⁾	\$113,390
C. Remedial Measure Implementation	(2)
D. Maintenance and Monitoring	(2)

(1) CLP costs are not included in the totals.

(2) To be developed in the Feasibility Study

Note: A cost breakdown by task is presented in Appendix C. Above costs are based on the assumption that the present contractor to the USEPA for Region I (NUS Corporation) will perform most or all of the work. Since NUS is not located in Maine, travel and living cost estimates are substantially higher than if the State of Maine or USEPA Region I were to undertake the work.

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APPENDIX A
SITE CHRONOLOGY

- February 14, 1979 The Loring Air Force Base contracted with Avon C. Brown, Inc. for replacement of the Central Heating Plant Substation transformers.
- February 1979 W. J. Gibbs, former President of Avon C. Brown, Inc., an electrical contractor company, contacted Joe Bellanceau, an operator of a salvaging business in Washburn and informed him that he could have the transformers at no cost as long as he removed them from Loring Air Force Base (LAFB).
- June 21, 1979 Three electrical transformers were removed from the Central Heating Plant Substation and placed outside the Station at Loring Air Force Base for removal by Bellanceau.
- June 22, 1979 The transformers were picked up by Kirk Soderberg, subcontractor, (hauler) from the Loring Air Force Base and transferred to Pinette's Salvage Yard in Washburn.
- 1) During unloading, at least two of the transformers ruptured spilling their contents of PCB contaminated oil onto the ground.
 - 2) Roger Pinette and Joseph Bellanceau dismantled the transformers on Pinette's property and sold all salvageable material.
- November 1, 1979 The Department of Environmental Protection (Portland Field Office) received a call from Attorney Kurr, the attorney representing Avon C. Brown, Inc., concerning the dumping of PCB's and transformer oil in Washburn.

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- November 2, 1979 The Maine Department of Environmental Protection (MEDEP) -Portland Field Office reported the telephone call (November 1, 1979) to the MEDEP - Bangor Field Office. Attorney Kurr also talked to the MEDEP - Bangor field office. He requested the DEP's assistance in determining:
- Exactly what the transformer oil (PYRONAL) is and how toxic it is.
 - Where the material is located or was disposed of.
- November 5, 1979 Mr. Philbrick, President of Avon C. Brown, Inc., informed MEDEP that Pyronal is only a trade name. The product is manufactured by General Electric and also by Texaco. He was informed by General Electric in Portland, that PYRONAL is also known as ASKEREL or PCB's.
- April 16, 1980 Samples were obtained of the Washburn spill area by the Maine DEP.
- April 26, 1980 A second site investigation involving only visual inspection was undertaken by the Maine DEP.
- May 7, 1980 information on site investigation and sampling results were sent to Division of Enforcement, USEPA Region I from the Bureau of Water Quality Control of the Maine DEP.
- July 29, 1981 MEDEP visited the site for observations and sampling.
- August 11, 1981 Results of soil, water and hazardous waste samples were sent to MEDEP.
- August 20, 1981 In a letter to Loring Air Force Base, (LAFB) MEDEP stated that the immediate environmental threat in Washburn was

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manageable and had not spread to any water supplies.
MEDEP also requested that LAFB assist in the cleanup.

- August 1981 The Washburn area received an exceptionally severe rain storm, which spread the PCB contamination from the spill area.
- September 8, 1981 The Air Force expressed willingness to lend assistance for site clean-up.
- September 21, 1981 Loring Air Force Base drafted a recommendation and sent it to the Air Force in Washington.
- October 7, 1981 The Air Force reportedly received authorization for money to clean up the site. The Air Force feels the State should also contribute to the clean-up.
- October 29, 1981 The Air Force received the proposal from DEP concerning the PCB clean-up.
- May 1982 The Maine Department of Environmental Protection (MEDEP) requested USEPA Superfund assistance.
- May 13, 1982 USEPA and MEDEP conducted an inspection of Pinette's Junk Yard, Washburn, Maine site. The recommendation from this visit was clean-up of the site as soon as possible.
- September 23, 1982 The report from the May 13 visit was completed:
Recommendations: Clean-up of the site. Since the PCB's have migrated from the initial spill site, the sooner action is taken, the less area of contamination will have to be dealt with. In the interim, fence and signs should be erected to prevent the unknowing and possibly unintentional entry into the highly contaminated area.

- December 7, 1982 The PCB spill area at Pinette's Salvage Yard in Washburn was capped with a temporary impervious liner.
- December 1982 The Washburn Site was listed and ranked on the National Priorities List of 418 sites.
- January 10, 1983 USEPA's contractor and the Maine DEP conducted a joint site inspection.
- July 8, 1983 A Draft Remedial Action Master Plan (RAMP) was completed and forwarded to EPA Region I.

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APPENDIX B
WORK PLAN OUTLINE(S)

Introduction

Included in Appendix B are work plan outlines and descriptions for future remedial measures to be conducted at the Washburn Site. Not provided in these descriptions are Health and Safety Plans or Quality Assurance Plans which will be provided in detailed work plans to be submitted by the contractor following project authorization by the USEPA. Work plans for Initial Remedial Measures (IRMs) and the next two remedial actions, Remedial Investigation and Engineering Feasibility Study, are provided. Remedial Action Design, Remedial Action Implementation, and Maintenance and Monitoring Program work plans will be prepared following the Engineering Feasibility Study.

The following work plan outlines are provided:

- B.1 Initial Remedial Measures
 - B.1.1 Perimeter Marker Installation
 - B.1.2 Sign Construction
 - B.1.3 Notification of Local Officials and Residents
- B.2 Remedial Investigation
 - B.2.1 Groundwater Investigation
 - B.2.2 Sampling and Analysis
- B.3 Feasibility Study

B.1 Initial Remedial Measures

The initial remedial measures (IRM's) identified for the Washburn Site are the installation of a perimeter marker and signs to safeguard against potential disturbance of, or contact with, the contaminated soil. Notification of local

officials and residents of possible hazards connected with land use in and downgradient of the spill area, is also recommended.

B.1.1 Perimeter Marker Installation

Purpose

The purpose of the perimeter marker IRM is to establish a visible boundary around the capped contaminated area to warn unsuspecting persons of the hazard present.

Task 1 - Remedial Measure Design

The perimeter boundary for the Washburn Site shall be designed according to the following preliminary specifications:

- Nylon rope connected to channel posts with U-clamps will surround the area (approximately 95' x 100') covered by the liner cap.
- Channel posts will be spaced at 12.5' intervals.

Task 2 - Installation

The rope boundary will be installed by NUS, EPA Region I, or state personnel according to the above specifications. If these personnel are unavailable, a local qualified contractor will be obtained.

B.1.2 Sign Construction

Purpose

The purpose of the signs is to warn of the hazardous nature of substances contained on site and the potential hazard of any contaminants which may have migrated off site.

Task 1 - Determination of Sign Locations

Eight signs will be placed on the rope perimeter, two on each side of the 400' boundary.

Task 2 - Determination of Sign Specifications

Each of the eight signs to be placed on the rope perimeter, by approval of the USEPA, and Maine DEP will be of the following material, size, and color, respectively:

- Metal
- 14" x 10"
- Red, black, and white

The wording for all the signs will be determined by the lead agency and will be in accordance with USEPA requirements.

Task 3 - Sign Construction and Installation

The signs will be obtained by the contractor according to the specifications listed above. Installation of the signs will be performed by USEPA Region I, NUS, state personnel, or qualified subcontractors.

B.1.3 Notification of Local Officials and Residents

Purpose

The purpose of notifying local officials and residents is to warn of the potential threat to public health posed by the Washburn Site. In particular, residents must be warned of the danger of growing crops or grazing animals in areas where the soil has been or may be contaminated with hazardous substances.

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Task 1 - Initial Contact of Local Officials

During the Washburn Site remedial investigation, township officials will be contacted by NUS personnel. They will be informed of the possibility of present contamination of the soil in areas south of the spill area and the potential for further migration. This activity will be undertaken pursuant to a comprehensive community relations plan.

Task 2 - Records Search

NUS personnel shall obtain pertinent documents from the Aroostook County Courthouse, the Town Manager's Office, or other appropriate source to identify property owners in the vicinity of the Washburn Site. A list of residents to be contacted will be compiled. A list of all local newspapers in which to place notices will also be compiled.

Task 3 - Notification of Affected Residents

This process may include one or all of the following:

- Holding a public or town meeting.
- Issuing a press release.
- Writing and placing notices in local newspapers, and
- Sending written notices (preferably registered letters) to residents.

This notification will be closely coordinated among NUS, USEPA Region I, Maine DEP, and local officials.

B.2 Remedial Investigation

The following is a preliminary work plan outline for the remedial investigation to be conducted at the Washburn Site. Not provided in this preliminary work plan are

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Health and Safety, Quality Assurance, and Community Relation Plans which will be developed in the detailed work plan by the contractor following project authorization by the lead agency.

The purpose of the remedial investigation at the Washburn Site is

- To characterize the nature and extent of soil, surface water, and groundwater contamination.
- To explore and define the geology and hydrogeology of the site, and generally.
- To collect sufficient data to allow for an evaluation of long-term remedial measures during the feasibility study.

The remedial investigation has been subdivided into several detailed tasks for the purposes of budget control and scheduling as presented below.

8.2.1 Initial Activities

A total of nine tasks have been identified for the initial remedial investigation activities phase. These activities should precede the actual remedial investigation.

Task 1 - Work Plan Preparation

A detailed work plan will be prepared to define the project organization, task assignments, personnel and resource requirements, project schedule, budget costs, procurement, interface, and training requirements. Revisions might be required following lead agency (USEPA or MEDEP) review and comment.

Task 2 - Determination of Site Layout

A site reconnaissance to determine site layout, identify obvious or suspected contaminated areas, and to locate health and safety hazards may become necessary

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If the information contained within this RAMP is determined to be incomplete. However, it is believed that sufficient information concerning the layout of the site is presented in the RAMP and should suffice in light of the currently proposed remedial investigation.

Task 3 - Collection and Evaluation of Additional Existing Data

It may become necessary to collect and evaluate additional information which was not available during preparation of this work plan. At least three other sources of information have been identified which could provide additional insight for the remedial investigation and feasibility study. These sources are:

- Local, county, and state offices.
- Local well drilling companies who may have installed the drinking water wells located near the site, and
- Local residents.

Local, county, or state offices may be repositories of site-specific or area-specific geologic or soil data. Also, these offices may have information relating to the location and installation of an extension to the Washburn town water line. Local well drilling companies may possess boring logs of wells in the vicinity which would provide additional information regarding the subsurface geology in the site area. Interviews with local residents may provide the necessary input to properly assess community relations. Other sources may be identified later which could deserve attention.

Task 4 - Health and Safety Plan Preparation

A site-specific Health and Safety Plan will be developed for the Washburn Site. The plan will be based on guidelines contained in the current version of the NUS Superfund Division Health and Safety Manual and will be in accordance with USEPA requirements.

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The purpose of the plan will be to:

- Establish minimum safety protection requirements and procedures for onsite field crews and subcontractors,
- Ensure adequate training and equipment to perform expected tasks,
- Provide ongoing site monitoring to verify preliminary safety requirements and revise specific protection levels when required, and
- Protect the general public and the environment.

Task 5 - Quality Assurance Plan Preparation

A Quality Assurance Plan will also be developed for the Washburn Site. The plan will address the basic elements of the remedial investigation and will refer to or include site-specific details on sampling; field testing; surveying; chain-of-custody; sample handling, packaging, preservation, and shipping; recordkeeping and documentation. Analytical requirements in addition to those listed in the Contract Laboratory Program (CLP) will be given along with any other procedures needed for the remedial investigation or feasibility study.

Task 6 - Community Relations Plan Preparation

At the request of the lead agency (USEPA or MEDEP), an assessment of community relations concerning the site will be undertaken. On the basis of this assessment, a plan for ensuring the public is kept informed and has input will be developed by the contractor and approved by the lead agency.

Task 7 - Subcontractor Procurement

Competitive bids will be solicited from prequalified firms for each task to be subcontracted. The process of advertising for and evaluating bids will begin upon receipt of authorization. The contractor will review the bids and select the

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subcontractor. The lead agency will review and approve the subcontractor selection prior to award of the subcontract. At present, subcontracts are contemplated only for monitoring well installation.

Task 8 - Procurement of Permits, Rights of Entry, and Other Authorizations

Rights of entry to the site will be obtained by the contractor for all parties involved in the remedial investigation (RI) and for the time specified for completion of the RI. The need for permits for installation of monitoring wells will be investigated by the contractor. The requirement of any rights-of-way or utility easements will also be determined.

Task 9 - Mobilization of Field Equipment

The equipment needed during the remedial investigation will be mobilized by the contractor or subcontractors. The following equipment may be needed at the Washburn Site during the remedial investigation:

- Field office trailer
- Surveying equipment
- Sampling tools and equipment
- Health and safety equipment
- Decontamination equipment, and
- Drilling equipment.

Equipment will be stored on site in a secure field office trailer. The placement of the trailer will be specified in the site-specific health and safety plan.

B.2.2 Groundwater Investigation

Purpose

Before the extent of groundwater contamination and the potential for further contamination can be addressed, the subsurface geology and hydrogeology of the groundwater aquifers involved must first be investigated.

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The information needed includes:

- Structure and nature of geologic formations in the site area.
- Locations of aquifers and aquitards within the unconsolidated deposits.
- Horizontal and vertical pattern of groundwater flow in the contaminated aquifer(s), and
- Soil stratification and permeability.

This data is necessary input for the evaluation and design of all the remedial measures proposed and discussed in Section 10.0.

A drilling program, involving the installation of monitoring wells, and geologic field investigation of the area will be required to obtain this information. This program is divided into five tasks as described below.

Task 1 - Water Table Aquifer Evaluation

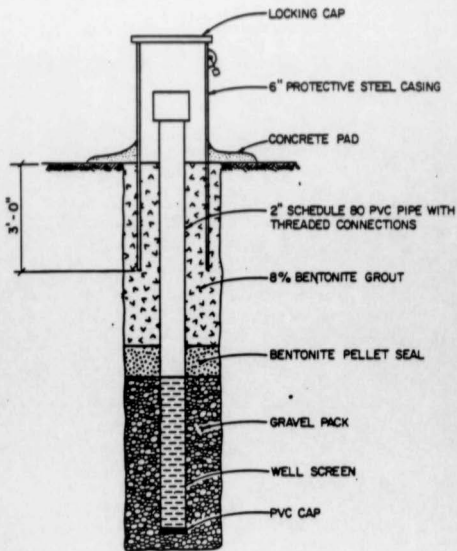
Four monitoring wells will be installed in the water table aquifer to an approximate depth of 15 feet. Three wells will be installed downgradient of the spill area and one upgradient for background evaluation. Figure B-1 depicts a typical shallow monitoring well. Figure B-2 shows the location of all monitoring wells on a sketch of the site.

Borings will be advanced with hollow stem augers with standard 2-inch split barrel samples taken continuously to a major change of soil type. These soil samples will be used to further define site stratigraphy. Samples will be analyzed for the presence of volatile organics with an Organic Vapor Analyzer (OVA) on site and stored for possible future laboratory analysis. Soil permeabilities will be determined by the slug method at appropriate levels. After the screen evaluation of the monitoring well is selected by the site hydrogeologist, the bottom of the hole will be backfilled with a layer of bentonite.

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TYPICAL SHALLOW WELL

NOT TO SCALE

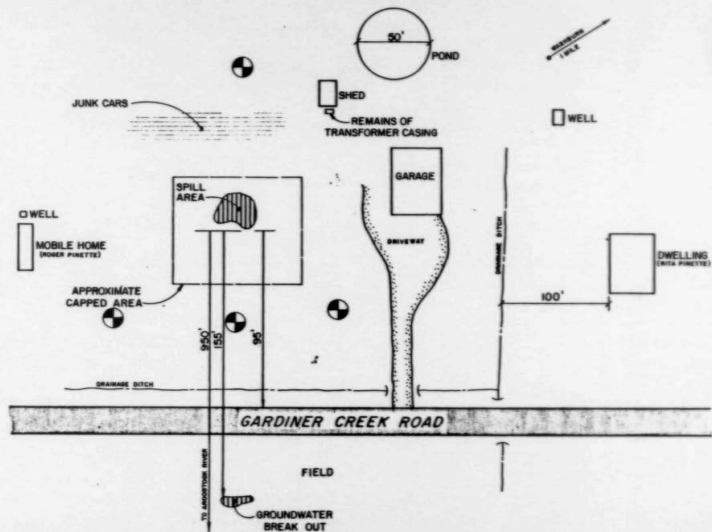
B-10

FIGURE B-1

 **NUS**
CORPORATION

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B-11



LEGEND

⊕ PROPOSED MONITORING WELL LOCATION

**LOCATION OF SHALLOW MONITORING WELLS
WASHBURN SITE, WASHBURN, ME
NOT TO SCALE**

FIGURE B-2



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An additional consideration is the potential for cross contamination of the wells during drilling. To reduce that potential, all drilling and sampling equipment will be decontaminated prior to their removal off site and after each boring is completed.

Monitoring wells will be 2-inch nominal diameter and constructed of PVC schedule 80 pipe with slotted wellscreens. Wellscreens will be 5 or 10 feet long and sections of pipe will have threaded connections. The lengths of wellscreens will be determined by the site hydrogeologist. The monitoring wells will be assembled (as much as possible) on a suitable work table or similar work area so that the wellscreens and riser pipe do not come into contact with the ground or other contaminant source. Monitoring wells will be installed in the completed boreholes and the annular space around the wellscreens will be backfilled with clean, coarse sand/gravel to 3 feet above the top of the wellscreens if the natural soils do not collapse as the augers are pulled back. A layer of bentonite pellets, about 5 feet thick, will be placed above the sand/gravel pack. The annulus between the well and borehole wall will be filled with bentonite grout. The grout will be placed with tremie pipe placed to just above the top of the bentonite layer. The grout will be pumped through this pipe to the bottom of the annulus until undiluted grout flows from the hole at the ground surface. A protective steel casing will be placed over the well pipe at each location.

The wells will be developed by purging with a stainless steel bailer to remove cuttings and to clean the well screens. Water will be removed from a well until it is visibly free of sediment. Removed water will be collected for suitable treatment or disposal. If a well contains excessive fines, a clean pipe or drill rod may be lowered to the bottom of the well and fresh water pumped into the well. The water shall be pumped into the well until the return flow is clean. The well will then be pumped or bailed until the removed water is free of visible sediment.

Developed monitoring wells will be tested to determine if they are functioning properly. Most of the standing water will be bailed or pumped out of the well and the rate of water level rise will be measured. If the water level rises at a rate which is compatible with the estimated hydraulic conductivity of the soil unit in

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which the well was completed, it will be assumed that the well is functioning properly. If the water rises slower than expected, the well will be redeveloped and retested. If required, a cleaned surge block may be used to develop the well. After the surge block is used, fines may again be flushed out of the well with clean water, and the well will be pumped or bailed until the return water is free of visible sediment. The well will then be retested. To minimize the potential for contamination of the wells during sampling, a bailer will be dedicated to each well. When the well has sufficiently recharged, enough water will be removed with the bailer to fulfill Sampling Management Office (SMO) sampling requirements. (Note: In the event that recovery time of the well is very slow, 24 hours or more, attempts to collect samples can be delayed until the following day.) If the well has been bailed early in the morning, sufficient water may be standing in the well by the end of the day to permit sample collection. If the well is incapable of producing a sufficient volume of sample at any time, the largest quantity available will be taken and recorded in the log book. After the wells have had time to stabilize, water levels will be measured and samples collected. Sample collection and analysis are discussed in Section B.2.3.

A visual examination of the surficial geology and soils will be performed concurrently with the above well installation to provide additional insight to the geology of the site.

Task 2 - Data Evaluation

Results from the investigation conducted under Task 1 will be tabulated and evaluated.

Groundwater flow direction in each aquifer will be established through well log interpretation. The extent of groundwater contamination will be assessed. To the extent possible, geologic field mapping; delineation of till zones, plotting of rock outcrops (if any are found), and plotting of sand and gravel areas, will also be performed under this task.

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Task 3 - Deep Groundwater Evaluation

Task 3 will not be necessary if the till or lacustrine deposits below the water table aquifer are found to be impermeable or if an upward vertical hydraulic gradient is found which would prevent surface contamination from affecting any deeper aquifer system.

If necessary, this task will allow for the determination of the extent of deep groundwater contamination. Drilling, well installation techniques, testing, development, and sampling will be the same as in Task 1, except that holes will be drilled beyond the base of the lower aquifer down to bedrock. The locations of Task 3 wells will be determined when the task is initiated. Four monitoring wells are anticipated.

Task 4 - Monitoring Well Location

Following monitoring well installation, the elevation and horizontal location of all wells will be established through field survey. These elevations and locations will aid in the determination of hydrogeologic conditions beneath the site.

Task 5 - Final Evaluation

Information gathered in Tasks 4 and 5 will be incorporated into the existing data base and a final evaluation of groundwater flow and the extent and direction of groundwater contamination will be made. Geologic cross sections will be determined and permeabilities calculated from field data and well logs. After evaluation, a data summary will be submitted presenting the results of this investigation.

Note: Report is intended only as a tabulation of data which some brief discussion. This submittal will be incorporated in the final RIFS report.

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B.2.3 Sampling and Analysis

Purpose

The purpose of sampling and analysis is to better define the nature and extent of contamination on and off the Washburn Site. This data will aid in the selection and design of long-term remedial measures.

This site activity has been divided into six principal tasks: soil and sediment sampling, surface water sampling, potable well sampling, monitoring well sampling, decontamination of sampling equipment/documentation of work, and laboratory analysis.

Table B-1 summarizes the number, location, and type of samples, and the analytical protocol proposed for each of the sampling tasks. Table B-2 lists the pollutants proposed for analysis under each of the protocols. Figure B-3 shows the proposed sampling locations on a sketch of the site.

Task 1 - Soil Sampling

Results of previous sampling investigations indicate that soils and sediments in several areas of the site are contaminated with polychlorinated biphenyls as well as other organic compounds (di- and trichlorobenzene). As discussed in Section 6.0, samples taken of the spill area conclusively show that high concentrations of PCB (as high as 58,000 ppm or mg/kg) reside in the soil there. However, the horizontal and vertical extent of contamination within the spill area is not fully defined. It would be desirable to conduct an intensive sampling program for the soil within the spill area to accurately quantify the amount of contaminated soil. In Section 10.0, it was pointed out that such a program would entail augering through the liner currently in place over the spill area. Not only would this activity be damaging to the liner but the costs involved may not justify the limited additional data which could be gained from this endeavor. Existing data is probably sufficient to define the perimeter of the spill area with reasonable accuracy. Therefore, additional samples of the soil within the spill area are not proposed at this time.

TABLE B-1
SAMPLING AND ANALYSIS

<u>Task</u>	<u>Sample Location</u>	<u>Sample Type</u>	<u>Sample Designation</u>	<u>Number of Samples</u>	<u>Analytical⁽¹⁾ Protocol</u>
Task 1	area near shed	surface and subsurface soil	S-1 and S-2	10 (2 locations at 5 depths)	A-2, B, C*, D*
	area surrounding spill	surface and subsurface soil	S-3 through S-9	35 (7 locations at 5 depths)	A-2, B, C*, D*
	drainage ditches	sediments	S-10 through S-13	4	A-2, B, C*, D*
	field across road	surface and subsurface soil	S-14 and S-16	6 (2 locations at 3 depths)	A-2, B, C*, D*
	groundwater breakout or spring	sediments	S-15	1	A-2, B, C*, D*
	Aroostook River	sediments	S-17	1	A-1, B, C*, D*
	onsite pond	sediments	S-18	1	A-1, B, C*, D*
	north of spill	background; surface and subsurface soil	B-1 and B-2	4 (2 locations at 2 depths)	A-1, B, C*, D*
Task 2	drainage ditches	surface water	SW-1 through SW-4	4	A-2, B, C*, D*
	groundwater breakout or spring	surface water	SW-5	1	A-2, B, C*, D*
	Aroostook River	surface water	SW-6	1	A-1, B, C*, D*
	onsite pond	surface water	SW-7	1	A-1, B, C*, D*

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TABLE B-1
 SAMPLING AND ANALYSIS
 PAGE TWO

<u>Task</u>	<u>Sample Location</u>	<u>Sample Type</u>	<u>Sample Designation</u>	<u>Number of Samples</u>	<u>Analytical⁽¹⁾ Protocol</u>
Task 3	private wells	potable well water	W-1 and W-2	2	A-2, B, C*, D*
			W-3 through W-5	3	A-1, B, C*, D*
Task 4	onsite monitoring wells	well water	M-1 through M-8	8 (initial sampling)	A-2, B, C*, D*
				8 (6 months return sampling)	A-2, B, C*, D*

(1) Refer to Table B-2 for the list of pollutants to be analyzed under the various protocols.

* Verification protocol will be run only if screening indicates the presence of contaminants and additional data is desired.

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TABLE B-2
ANALYTICAL PROTOCOLS

A. Organic Screening

- | | | | |
|----|--------------------------------|----|--------------------|
| 1. | • Total Organic Carbon (TOC) | 2. | • TOC and TOH |
| | • Total Organic Halogens (TOH) | | • PCB |
| | | | • dichlorobenzene |
| | | | • trichlorobenzene |

B. Inorganics Screening

- Chromium
- Cadmium
- Lead
- Zinc
- pH

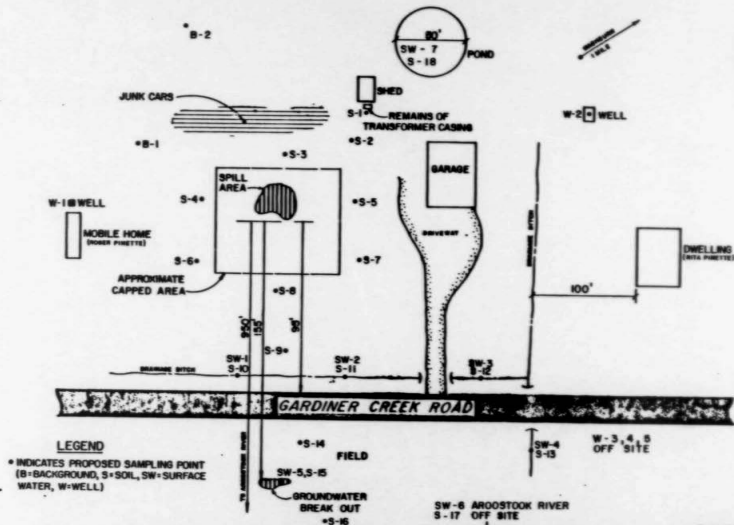
C. Organics Verification

- Priority pollutant organics (#1 through #113 on the priority pollutant list; includes volatile organics, acid extractables, base/neutrals, and PCBs).

D. Inorganics Verification

- | | |
|-------------|-------------|
| • Aluminum | • Manganese |
| • Antimony | • Mercury |
| • Arsenic | • Nickel |
| • Asbestos | • Selenium |
| • Beryllium | • Silver |
| • Copper | • Thallium |
| • Cyanides | |
| • Iron | |

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**PROPOSED SAMPLING LOCATIONS FOR REMEDIAL INVESTIGATION
 WASHBURN SITE, WASHBURN, ME
 NOT TO SCALE**

FIGURE B-3



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Samples outside of the spill area will be collected, though, to determine the extent to which hazardous substances have migrated. In the areas surrounding the spill and near the shed (refer to Figure B-1), a grid system will be established to assist in locating the sample points and delineating the extent of contamination. Sample points will be selected so as to augment the data obtained during previous investigations and select those locations which have not been characterized. At each sampling location, within these areas, soil samples will be collected at the surface, and at 1-foot, 3-foot, 5-foot, and 7-foot depths. Surface samples will be taken by trowel while subsurface samples will be obtained with a soil auger.

Soil samples will be taken of other areas on site as well, but without the aid of a grid system. Samples across Gardiner Creek Road, along the slope leading to the Aroostook River (suspected grazing area) will be collected of the soil at the surface and at 1-foot and 3-foot depths. (Samples at 5-foot and 7-foot depths are not warranted since minimal or no contamination is expected at this distance from the spill area.) Also, two background soil samples will be collected upgradient from the spill area. Samples will be obtained of the surface and at a 1-foot depth. Also, sediment samples will be collected from the drainage ditches running along and across Gardiner Creek Road, the pond on site, the Aroostook River, and the groundwater seep or spring. These samples will be collected in conjunction with surface water samples taken from the same point.

Task 2 - Surface Water Sampling

Previous sampling investigations have shown no detectable levels of hazardous substances in the pond on site and the Aroostook River. Additional samples will be collected and screened for the presence of organics to confirm there has been no change in status. Samples will be collected of surface sediments with a long handled stainless steel scoop or bucket.

In November of 1982, a sample of the water in drainage ditch running along Gardiner Creek Road revealed low levels of PCB. Additional water samples (if possible) at three points along the stretch of this ditch and one of the ditch perpendicular to the road will be collected. These samples will be taken in

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coordination with sediment samples from the same points. The data which will result from this exercise will help to define the partitioning characteristics of contaminated sediments. In addition, the data may highlight the need for removal of the sediments or containment and treatment of the drainage ditch water. Samples will be collected from the surface with a trowel.

Task 3 - Potable Well Sampling

In July of 1981, two private wells on the site (Rita and Roger Pinette wells), two private wells near the site, and the Washburn town water (which draws its water from wells) were sampled and analyzed for PCB, dichlorobenzene, and trichlorobenzene. The results of the laboratory analysis showed no detectable level of contamination. The Pinette wells will be resampled to determine whether they have become contaminated since that time. The other wells will be resampled if the onsite wells are contaminated. In addition, this task will be repeated if, six months subsequent, samples taken during the second stage of sampling for the onsite monitoring wells (Task 4 below) indicate the presence of hazardous samples.

Sampling will be performed after purging the wells of at least 3 to 5 well volumes and allowing the wells to recharge and stabilize. A stainless steel bailer will then be used to collect the sample. The bailer must be thoroughly cleaned prior to use on another well in order to prevent cross contamination.

Task 4 - Monitoring Well Sampling

Once installed, the onsite monitoring wells will be sampled to determine the presence of hazardous substances in the groundwater. Installation of the wells is more fully discussed in Section B.2.2. This sampling task will be repeated six months after the initial sampling to monitor any change in groundwater condition.

Sampling will be conducted in the same manner as for the private wells discussed in Task 3. The only differences are that a dedicated bailer will be used to purge the wells and to collect the samples in order to eliminate the potential for cross contamination of the wells.

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Task 5 - Decontamination and Documentation

Once sampling is completed, all equipment must be properly decontaminated to minimize the transfer of hazardous substances off site. . Cleaning will be accomplished using the following procedure:

- Equipment will be brushed with a wire brush to remove soil particles.
- Equipment which has been in contact with oily materials will be wiped with absorbent cloth.
- Equipment which has not come into contact with oily materials will be wiped with a dry cloth.
- Equipment will be washed with a warm detergent solution (Liquinox or Alconox).
- Equipment will be rinsed three (3) times with tap water.
- Equipment will be rinsed with reagent-grade methanol.

In addition, decontamination procedures will be employed during the course of sampling. Any equipment which is to be used at more than one sampling location will be cleaned in between samplings. This is particularly applicable to the trowel and auger used for soil samples. A dedicated bailer will be provided for each monitoring well to prevent any cross contamination of the wells.

Also during this task, all documentation and recordkeeping requirements will be adhered to in accordance with the Quality Assurance Plan developed in Task 5 of the initial remedial investigation activities. Included in this task are the following:

- Making entries in the field logbook.
- Initiating chain-of-custody records.

- Completing Contract Laboratory Program (CLP) traffic reports, and
- Preparing samples for shipment (labeling bottles and boxes, completing shipping documents, packaging samples).

Task 6 - Laboratory Analysis

The samples will be shipped to the designated laboratory and analyzed for the indicated parameters. As mentioned earlier, Table B-1 identifies the desired analytical protocols for each group of samples to be collected. Table B-2 lists the pollutants for analysis under each of the five protocols.

Three "screening" and two "verification" analytical protocols were developed in an attempt to minimize the number of analyses and, consequently, the costs associated with the sampling and analysis program. The large number of samples needed precludes a complete analysis on every sample from the standpoint of cost-effectiveness. The "screening" protocols, therefore, make use of a limited number of "indicator" pollutants to define the existence and nature of contamination. If screening analysis reveals the presence of contamination, and additional information is desired, the "verification" protocol, which contains an expanded list of pollutants, will be utilized to more fully define the problem.

An alternative to the organics screening protocols which may be considered is the use of an Organic Vapor Analyzer (OVA) instrument. The OVA is essentially a portable mini gas chromatograph which can be used to qualitatively characterize the headspace of samples collected. This determination can be made shortly after sample collection and before shipment to the laboratory. Use of the OVA could supplant the organics screening protocols described in Table B-2 and reduce the number of laboratory analyses.

B.2.4 Report Preparation

Upon completion of the remedial investigation, all pertinent field and laboratory data will be assembled into a detailed draft report. The report will include the following:

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- Objectives of the remedial investigation;
- A site description including environmental setting;
- Hydrogeologic conditions at the site, including the depth of the aquifers and the rates and direction of groundwater flow;
- Type and extent of contamination on site, including soil, groundwater, and surface water;
- Supporting test data, including soils data, well boring logs, chemical and analysis reports, and hydrogeologic test data;
- Conclusions and recommendations.

B.3 Feasibility Study

The purpose of the feasibility study is to identify and evaluate appropriate remedial measures and prepare a conceptual design of the selected alternative. The feasibility study will be based on existing site information and information obtained during the remedial investigation.

Task 1 - Feasibility Study Work Plan Preparation

A work plan for the Washburn Site feasibility study will be prepared. The work plan will present a detailed schedule and budget for the activities to be undertaken. The major tasks of the feasibility study are as follows:

- Establish objectives and criteria.
- Identify remedial alternatives.
- Perform treatability studies.
- Evaluate alternatives.
- Prepare conceptual designs of selected alternative(s), and
- Prepare a final report.

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Task 2 - Establish Objectives and Criteria for Remedial Action

The selection of objectives for remedial action must be based on public health protection and site-specific conditions. The selection of objectives and criteria will consider:

- The nature and extent of waste migration and type of media contamination (air, water, soil).
- Future site use considerations.
- Local land use and protection of investigative teams and construction crews, and
- EPA and Maine DEP Hazardous Waste Regulations, including National Contingency Plan, Subpart F.

Specific objectives will be determined after completion of the remedial investigation. However, based on available information, the following general objectives have been identified:

- Assure the health and safety of local residents and field crews,
- Prevent degradation of existing and potential groundwater supplies, and
- Prevent the release of airborne and waterborne contaminants from the site.

Criteria for selecting a remedial measure will be established and adhered to during evaluation. At a minimum, a remedial measure must be:

- Technically feasible,
- Responsive to the public needs,
- Responsive to site conditions,

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- An effective remedy,
- Legal,
- Safe, and
- Cost effective.

Task 3 - Identification of Alternatives

Appropriate remedial technologies will be identified for the determined site objectives. These technologies will be evaluated singly and in combinations to determine how well they meet the established project criteria. One or more appropriate remedial technologies will be grouped together as required to constitute the remedial measure.

The identification process for remedial technologies will take into account the type of media contamination, the site-specific conditions (soils, geology, etc.), public health and safety concerns, and the existing EPA and MEDEP Hazardous Waste and related regulations.

Listed below are the remedial options identified for the Washburn Site. These options were discussed in greater detail in Section 10.0. Other options may be identified or those listed below discarded depending upon the results of the remedial investigation. Potential source control remedial measures include:

- Excavation and removal of contaminated soil,
- Onsite disposal of the contaminated soil in an imperviously lined pit (encapsulation),
- Installation of groundwater barriers,
- In-situ decontamination by elutriation of the soil and treatment of the "wash" water.

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- In-situ decontamination by chemical and biological degradation, and
- No action.

Off site remedial measures may include provision for alternate drinking water supplies or treatment of the groundwater.

Task 4 - Treatability Studies

After the remedial investigation has been completed and the remedial alternatives have been identified, it may be necessary to conduct pilot or bench-scale treatability studies. This work would include any studies required to evaluate the effectiveness of remedial technologies and to establish engineering criteria necessary for design and implementation. Treatability studies would most likely be used to evaluate the effectiveness of chemical or biological degradation agents upon PCBs.

Because these studies are linked directly to the performance of tasks listed above, a separate Work Plan for any proposed Treatability Studies will be submitted to the lead agency for approval.

Task 5 - Evaluation of Alternatives

Evaluation and ranking of the candidate remedial measures will culminate in a presentation to the lead agency (USEPA or MEDEP) of the most desirable alternatives. The remedial alternatives will be evaluated for each project objective using the final criteria developed above.

Evaluation and ranking of each remedial measure for each project objective will be performed through a decision matrix. A ranking system will be developed in which each remedial measure will be given a value for each criteria, such as from 1 to 100, with 1 the least desirable and 100 the most desirable.

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The criteria can be weighted to reflect a ranking within the group. For instance, costs might carry more weight than implementation time and would be given a higher relative ranking number. Decisions about the definition and ranking of evaluation criteria will be made before the remedial measure evaluation during the review meetings with the lead agency.

All information specific to the remedial measure evaluation will be summarized and presented in a separate report. That report, together with the remedial investigation report, will serve as the basis for the conceptual design of the selected remedial measure.

Information to be included in the remedial evaluation report will include:

- Supporting references on the feasibility of the remedial measures chosen for evaluation,
- Specific procedures and supporting data used to rank each remedial measure for the evaluation criteria,
- Design calculations used in evaluating each remedial measure,
- Preliminary design drawings and sketches used to evaluate each remedial measure, and
- The cost estimates for each remedial measure with appropriate references provided.

The report will be prepared in a format that will be agreed upon in the preliminary review meetings. All documents collected in the remedial measure evaluation will be organized in a project file and will be available for later reference.

The report will be reviewed by the lead agency and then with the public at a community meeting. Following this, the USEPA will select and approve the remedial measure for implementation.

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Task 6 - Conceptual Design of Selected Remedial Measure

A conceptual design of the selected remedial measure will be prepared for use in development of detailed construction plans. The design will be based on the findings of the remedial investigations and evaluation of the remedial measures.

The conceptual design plan will include general arrangement drawings and specifications. The site investigation reports will be companion documents to the conceptual design plan. These reports will contain site information needed for construction design, such as test boring logs, borehole testing data, groundwater conditions, and soil and rock sample descriptions and analyses.

The conceptual design plan will also include the following:

- The selected engineering approach with implementation schedule
- Any special implementation requirements
- Applicable design criteria
- Preliminary site layouts
- Budget cost estimates including operation and maintenance cost figures
- Operation and maintenance requirements
- Safety plan including costs
- Equipment and construction functional specifications

Any additional information required as the basis for completion of the final remedial design will be included.

Task 7 - Final Report

A final report will be prepared for submission to the lead agency. The report, structured to enable the reader to cross-reference with ease, will include the results of the work tasks identified for the remedial investigation and feasibility study.

Appended information may include but will not be limited to:

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- Site topographic map with ground control data
- General arrangement drawings of remedial measure
- Typical geologic and design cross-sections
- Typical design details
- Design report with supporting calculations
- Erosion and sedimentation control plans
- Construction health and safety plan
- Preliminary cost estimates

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