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June 1993

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Superfund Record of Decision:

American Crossarm & Conduit, WA

50272-101

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15. Supplementary Notes

PB94-964623

16. Abstract (Limit: 200 words)

The 14-acre American Crossarm & Conduit site is an inactive wood treatment facility in Chehalis, Lewis County, Washington. Land use in the area is predominantly a combination of commercial, light industrial, residential, and recreational. Several wetlands are located directly south of the facility which drain into a tributary of the Chehalis River, one of two major rivers in the area. In addition, the site lies within the 100-year floodplain of the Chehalis and Newaukum rivers in a marshy lowland, one mile east of the Chehalis River. The estimated 6,500 people who reside in Chehalis use the Newaukum River, at a location approximately 17 miles upstream of the American Crossarm & Conduit (ACC), to obtain their primary drinking water supply. From the early 1930s to 1985, ACC used the site for wood cutting, milling, and treating operations. The facility is composed of four areas: a landfill, a mill, kilns, and a wood treatment works. Wastewater from wood processing operations, at three of these areas, was discharged directly to the environment until 1983, when the State determined that the ACC facility was not in compliance with the State's waste handling requirements. The State required the ACC to eliminate wastewater discharges to the environment, redirect all boiler blow down to the sanitary sewer collection system, and prepare a wastewater treatment and disposal plan. In late 1983, ACC ceased the onsite

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - American Crossarm & Conduit, WA
First Remedial Action - Final
Contaminated Media: soil, sediment, gw, sw
Key Contaminants: organics (dioxins, PAHs, PCPs)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 72
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

Abstract (Continued)

wood milling and treatment operations. The improper discharges have resulted in both onsite and offsite contamination, due to runoff via natural site drainage features. The periodic flooding of the site by the Chehalis River also has transported site contaminants offsite and resulted in adjacent areas of contamination (AOC) directly related to the ACC. In 1985, PCP-contaminated soil was removed from the facility and used as fill in residential yards located to the east of the facility. The State ordered ACC to remove the contaminated soil and clean up the affected areas to a level of PCP 100 ug/kg. In 1986, one of the periodic Chehalis River floods caused the release of 10,000 gallons of an organic solution to the AOC. This discharge prompted an EPA removal action, which involved excavation or removal of contaminated soil, debris, furniture, and other material from the AOC, and consolidation of this material on the ACC facility. In 1988, an onsite incinerator was installed by EPA to treat this material. In 1992, a second removal action involved the removal of liquid wood treating wastes and laboratory chemicals from the facility, and containment of this material in sealed drums, located on the ACC facility. This investigation revealed that unacceptable risks to human health and environment exist from the remaining contamination in soil, sediment, debris, ground water, and surface water. This ROD addresses these media as the final remedial action for the site. The primary contaminants of concern affecting the soil, sediment, debris, ground water, and surface water are organics, including dioxin, PAHs, and PCP.

The selected remedial action for this site includes demolishing, removing, and recycling, if appropriate, all existing structures on the ACC facility; excavating 20,000 yd^3 of surface and subsurface soil from the most highly-contaminated areas of the ACC facility, with offsite solidification followed by offsite disposal in an approved landfill; excavating and consolidating onsite 14,300 yd^3 of soil from the AOC with the incinerator ash from the earlier incineration of contaminated soil and debris; backfilling the excavated areas of the ACC with the consolidated material, filling the ACC and AOC to the surrounding grade with soil and fill, and revegetating the area; removing and disposing of sediment from the stormwater discharge lagoon and the stormwater sewer, with offsite disposal in an approved landfill; implementing runoff/run-on controls to prevent contaminated ground water from entering the wetlands; treating wastewater generated from site activities, with onsite or offsite disposal; abandoning unnecessary onsite wells; removing any floating product from ground water under the facility, with offsite disposal at a hazardous waste facility; conducting performance monitoring; and implementing institutional controls, including deed restrictions, and site access restrictions, including fencing. The estimated present worth cost for this remedial action is $9,700,000, which includes an estimated total O&M cost of $250,000 for 1 year.

PERFORMANCE STANDARDS OR GOALS:

Soil and ground water cleanup goals are based on State standards. Chemical-specific soil excavation goals include dioxins 0.0066 ug/kg; PAHs 172 ug/kg; and PCP 8,330 ug/kg. These levels are consistent with human health-based risk levels of 10^{-6} in the AOC and 10^{-5} at the ACC facility. Chemical-specific ground water cleanup goals include dioxins 0.00058 ug/l; PAHs 0.012 ug/l; and PCP 0.729 ug/l.

AMERICAN CROSSARM & CONDUIT RECORD OF DECISION

May 1993

DECLARATION

SITE NAME AND LOCATION

American Crossarm and Conduit (ACC)
Chehalis, Lewis County, Washington

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected final remedial action for the American Crossarm & Conduit (ACC) site, in Chehalis, Lewis County, Washington, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record.

The Washington State Department of Ecology (Ecology) concurs with the selected remedy.

ASSESSMENT OF THE FACILITY AND ADJACENT AREAS OF CONTAMINATION

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

DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this Record of Decision represents a final remedy, which includes the ACC facility and adjacent ares of contamination (AOC). Previous removal actions have been completed. An emergency removal action was initiated during late 1986 to remove contamination distributed during a flood in the Chehalis Avenue area. In 1988, an incinerator was brought on the facility to incinerate the principle threat (e.g. contaminated material from that cleanup). The remedial action presented in this ROD addresses the remaining low-level threats (to human health and environment) by 1) demolish, remove and recycle existing facility structures, 2) removing the most highly contaminated soil on the facility to prevent human contact and future dispersion into the environment, 3) excavate soil from the Chehalis Ave. Area and consolidate it on the facility, 4) reducing gross floating product in groundwater beneath the facility to meet applicable or relevant and appropriate requirements (ARARs) at the facility boundary and prevent migration, 5) covering the facility with clean soil and vegetation to prevent human contact with and dispersion of the lessor contaminated soil, 6) invoking institutional controls at the facility to warn future property owners of potential threats and limit the use of the property (specifically to prevent intrusive activities), and 7) implementing performance monitoring to assess the effectiveness of the remedial action.

The major components of the selected remedy include:

- Excavation of contaminated soil from the Chehalis Avenue commercial/residential AOC and consolidation of this material on the ACC facility. Excavated areas would undergo confirmatory sampling and be backfilled with clean soil and revegetated or covered as appropriate.

- Demolition of the ACC facility (e.g., treatment works, mill, kilns, above and below ground storage tanks, and all other structures).

- Excavation of the ACC facility surface and subsurface soil from the most highly contaminated areas.

- Removal of floating oil from groundwater under the facility (treatment works) as a short-term source control activity.

- Removal of contaminated sediment from the stormwater discharge lagoon and stormwater sewer for off-site disposal.

- Disposal of the most highly contaminated excavated material at an approved off-site hazardous waste landfill. The material would be solidified at the off-site landfill prior to disposal.

- Covering the ACC facility with clean soil, sloping and contouring land, and planting grass.

- Implementing fencing and deed restrictions at the ACC facility.

- Maintenance of soil cover and other institutional controls.

- Performance monitoring and five year reviews

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this facility and AOC. Because treatment of the low-level threat was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element of the final remedy. The ACC facility and AOC lie in an active flood plain, making the installation and operation of any remedial treatment process is technically impractical. In addition, the cost for treatment off-site was found to be excessive in comparison to the environmental benefits. These conditions precluded selecting a remedy in which contaminants of concern would be treated on-site.

Because this remedy will result in hazardous substances remaining on the facility above health-based levels, a review of the facility will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

for Charles Findley
Signature (Regional Administrator/
Assistant Administrator)

Date: June 30, 1993

Carol L. Fleskes
Signature (State)

Date: May 10, 1993

DECISION SUMMARY

INTRODUCTION

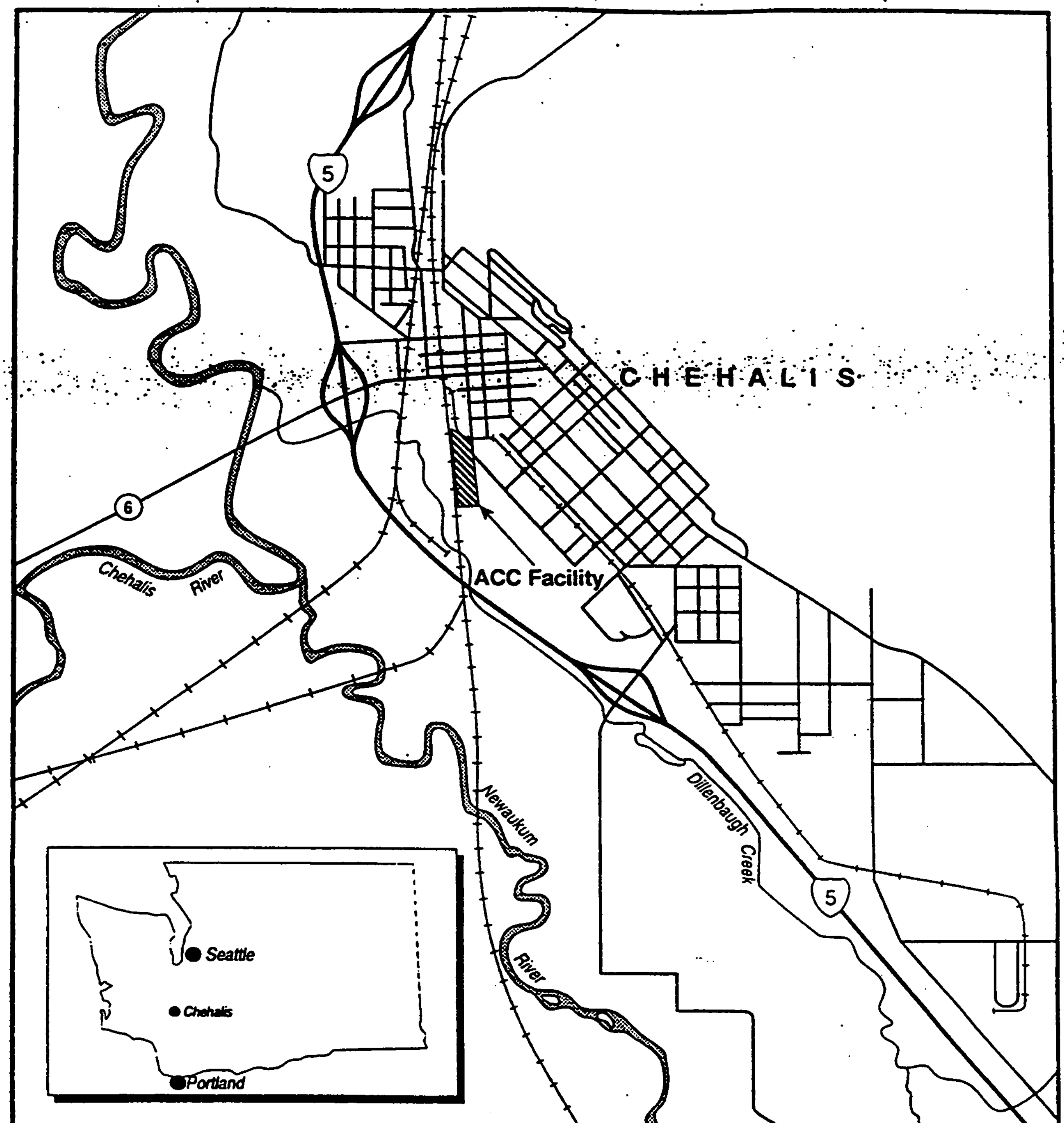
The American Crossarm & Conduit (ACC) facility, Chehalis, Lewis County, Washington was nominated to the National Priorities List (NPL) in 1989. The nomination was based on a Hazard Ranking System (HRS) score from a site assessment performed by the United States Environmental Protection Agency (EPA) in 1988 pursuant to Section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. Section 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA or Superfund).

Pursuant to Executive Order 12580 (Superfund Implementation) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, EPA performed a Remedial Investigation/Feasibility Study (RI/FS). The Remedial Investigation (RI) characterized contamination in soil, surface water and groundwater at the facility and adjacent ares of contamination (AOC). A (baseline) risk assessment was completed as part of the RI and evaluated potential effects of the contamination on human health and the environment. The Feasibility Study (FS) completed in September 1992, evaluated alternatives for remediating contamination.

NAME, LOCATION, AND DESCRIPTION

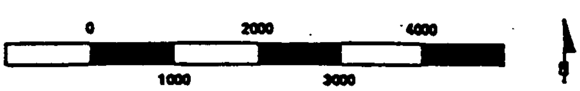
The American Crossarm & Conduit facility is located in Chehalis, Lewis County, Washington in Section 32, Township 14 North, Range 2 West, of the Centralia Quadrangle. The 14-acre inactive wood treating facility is located on the south edge of Chehalis within the 100-year floodplain of the Chehalis and Newaukum rivers, Figure 2-1. Areas of contamination adjacent to the facility contaminated from release from the facility are also illustrated.

The facility is constructed east of the elevated Burlington Northern-Union Pacific (BN-UP) railroad tracks and placed on pilings and fill in a low-lying marsh. The facility is composed of four areas including a wood treatment works, kilns, mill, and a landfill, Figure 2-2. The wood treatment area is enclosed by a fence and contains underground tanks, sumps, a former surface impoundment, and a control room which were used to treat wood with a mixture of diesel and pentachlorophenol (PCP).. A city of Chehalis storm drain runs from Chehalis Avenue across the treatment area and discharges to a stormwater discharge lagoon contiguous to Dillenbaugh Creek. The facility also includes an elevated crane-way and 8 kilns used to dry timber prior to treatment. The mill is a large wooden structure that contained wood crossbars and conduit manufacturing equipment. It



Source: USGS Centralia, Washington 75 Series Provisional Edition, 1985

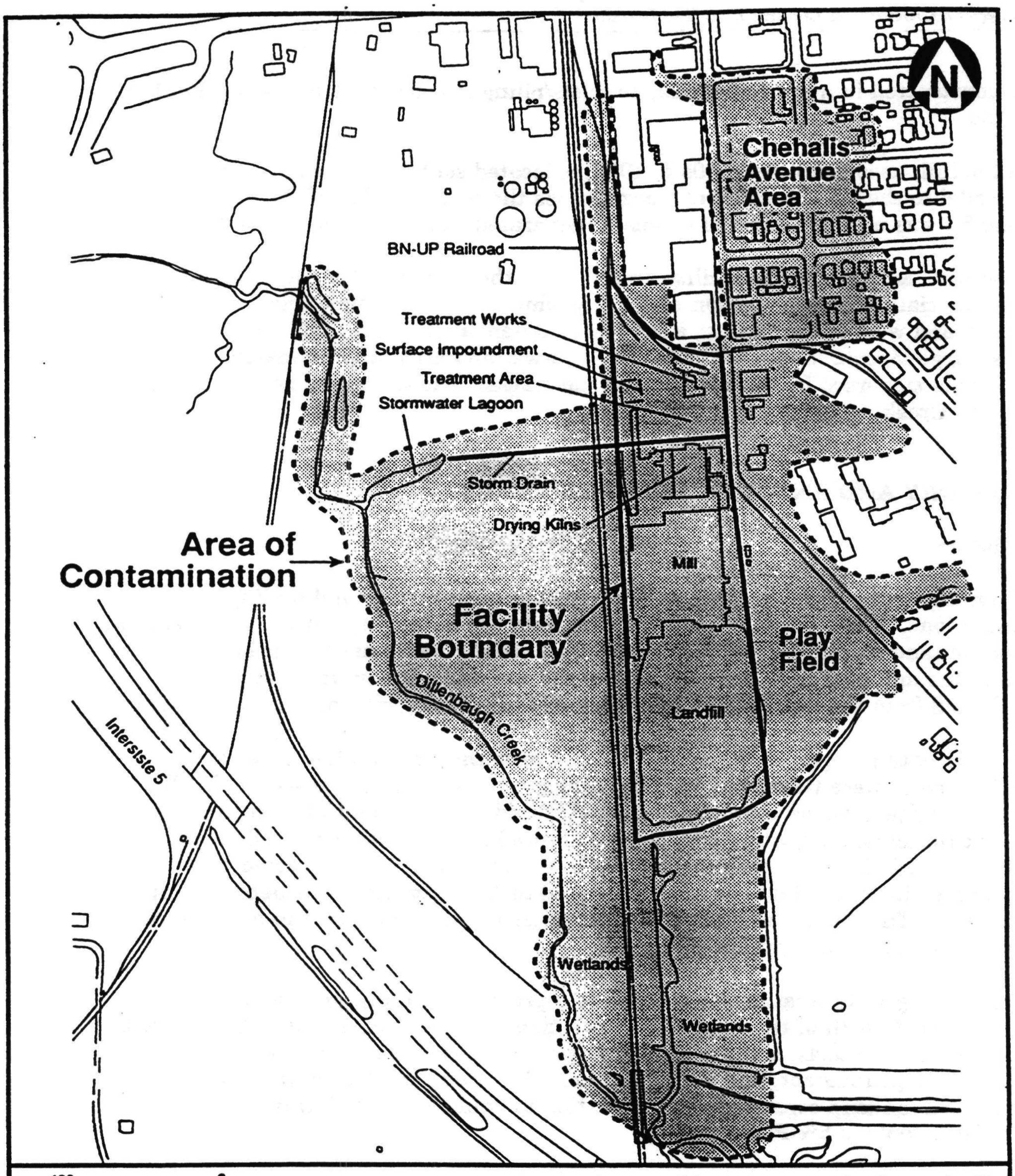
Scale in Feet



American Crossarm & Conduit Site Location

FIGURE

2-1



American Crossarm & Conduit Facility and AOC Features

FIGURE **2-2**

WESTON

Project Number: 4000-01-32-0001 Date: March 1993 is constructed in a low-lying area, on posts/pilings to elevate it to the height of the kilns.

A landfill, used from the 1930s to 1985, is located south of the mill. A ditch parallel to the BN-UP railroad track defines the western edge of the landfill. The landfill was used for disposal of wastes generated from operation of the facility.

The AOC adjacent to the facility area include the Chehalis Avenue area (a commercial/residential section of the city which includes a play field), wetland south and west of the facility, a section of Dillenbaugh Creek, and a stormwater discharge lagoon. South of the facility is a wetland area (approximately 37 acres) which is traversed by the BN-UP railroad tracks. The wetland discharges to Dillenbaugh Creek.

HISTORY AND ENFORCEMENT ACTIVITIES

History

From the early 1930s to 1985, ACC conducted wood cutting and milling operations. Wood waste, a waste stream from the milling operation, was placed in the wetland creating a landfill. Noncontact cooling water and boiler blowdown from the mill operation were drained to the wetland. Other waste streams released from the facility may have included lubricating oils, diesel and gasoline.

Wood treating began in the early 1930s. Crossarms and conduit for electrical utility poles were treated in open dip tanks with hot or cold creosote and PCP. Tank sludge is suspected to have been disposed of in the landfill. Solvents, paints, paint thinners, lubricating oils, petroleum products, and other miscellaneous wastes may also have been disposed of in the landfill. (It is suspected that granular fill from off-site sources unrelated to ACC activities was deposited in the landfill.) The landfill was not designed, constructed, or operated in accordance with current landfill practices.

ACC changed its treatment operation to a pressure-treating process which was constructed north of the kilns. The operation included a chemical make up area, two pressure retorts, a vapor recovery system, a separation tank, two sumps, a surface impoundment, and a drag out area for drying treated lumber. The chemical makeup consisted of an operation in which solid PCP was mixed with diesel to make a 5% PCP solution.

Contamination during plant operations resulted from the wood treatment process primarily through five methods:

- Discharge of liquids from the vapor recovery system to the city stormsewer, which subsequently discharged to the stormwater discharge lagoon west of the facility.

- Discharge of wastewater from the process building sumps to the surface impoundment.

- Removal and disposal of sludge from the bottom of the surface impoundment to the landfill south of the mill.

- Dispersion of contaminants in the treatment works tanks, pipes and sumps around the facility due to flooding.

- Miscellaneous leaks and spills around the facility.

Wood from the mill was dried in kilns until 1983. Discharges from the kilns may have contained wood lignin, tannic acids, and other naturally occurring wood constituents. The kilns are believed to have been heated by burning scrap wood and other combustible material (although auxiliary diesel fuel was available). Asbestos containing materials and electrical equipment containing polychlorinated biphenyls were also present in the mill, but were removed in 1992. Property to the east of the facility previously housed milling operations. Historical air photographs indicate that these facilities were torn down between 1960 and 1974. The demolition debris was placed in the landfill south of the mill.

History of State and Federal Investigations and Removals

In early 1983, the Washington State Department of Ecology (Ecology) conducted a compliance inspection of the ACC facility. The inspection determined the facility was not in compliance with state waste handling requirements. Ecology required ACC to eliminate discharges of wastewater to the environment, to prepare a wastewater treatment and disposal plan and to redirect all boiler blowdown to the sanitary sewer collection system. In late 1983, ACC stopped the wood milling and treatment operations.

In 1985, soil contaminated with PCP was removed from the facility and used as fill in residential yards located east of the facility. Ecology ordered ACC to remove the contaminated soil and clean up the affected areas to a level of 100 ug/Kg PCP. The company complied with the order and removed the contaminated soil to the levels specified.

Several floods occurred in the next few years which released contamination to the surrounding area. In 1986, the Chehalis river flooded ACC spreading approximately 10,000 gallons of PCP-diesel solution to the Chehalis Avenue Area (see Figure 2-10 for observed limits of flood born limits of this release) and potentially to the wetlands and Dillenbaugh creek. An emergency action was taken to clean up contamination from this flood. Contaminated soil, debris, furniture, and other material generated from the cleanup which constituted the principle threat to human health and the environment were placed on the facility. In 1987, contaminated sludge and sediment were removed from the surface impoundment.

In 1988 an incinerator was brought on the facility to incinerate the principle threat (e.g. contaminated soil and debris generated from the cleanup efforts). Incineration generated approximately 207 tons of ash which is presently stored on the facility.

The American Crossarm & Conduit company, which owned and operated this facility, is no longer solvent. There are no other viable potentially responsible parties (PRPs). In 1989, the U.S. EPA initiated an RI/FS. The remedial investigation was performed in 1990 and 1991. The feasibility study was completed in September 1992. The RI and FS reports have been placed in the Administrative Record.

In 1991 and 1992, the EPA undertook an action to further reduce the potential for spread of contaminants. In 1991, gravel was spread over the treatment area to keep fugitive dust containing wood treating chemicals from becoming airborne. Above ground tanks and piping in the treatment works were decontaminated and the steel taken to a recycler in 1992. Laboratory chemicals and PCB containing electrical equipment were collected from various buildings and secured by placing them in an overpack. Asbestos was removed from exposed pipe and placed in sealed drums.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan for the ACC site was published on 28 September 1992, and was subject to public comment from 30 September through 30 October 1992. To notify the community of the opportunity for public comment, the Proposed Plan was mailed to individuals on EPA's mailing list for the ACC site and a newspaper notice was published on 30 September 1992 in the Centralia Daily Chronicle.

During the public comment period EPA held a public meeting to provide additional information about the Proposed Plan and to take public comments. The public meeting was held on 21 October 1992 at the Lewis County PUD auditorium in Chehalis. The comments and questions raised at the meeting were documented in a transcript and have been responded to in the Responsiveness Summary, which is an attachment to this ROD.

In September of 1989, EPA initiated a community involvement effort to keep the public informed and address community concerns regarding the Remedial Investigation at ACC. EPA developed a revised Community Relations Plan for the site based on interviews with citizens and community leaders. The revised Community Relations Plan built on activities begun during EPA's emergency response efforts at the site (1986-1989). EPA published fact sheets during the investigation to apprise the community of developments.

The following is a summary of activities conducted by EPA to support community involvement for remedial activities at the ACC Superfund site:

- November 1989—EPA conducted community interviews, which included meetings with local citizens and business owners, County Commissioners and the County Assessor's Office, the Lewis County Health District, City of Chehalis officials, and the Lewis County Economic Development Council and Chamber of Commerce. In addition, EPA held an open house for other interested members of the community. The purpose of the interviews was for EPA to learn about community concerns related to the ACC site.

- March 1990—EPA published a fact sheet describing site investigation plans.

- April 1990—EPA revised its Community Relations Plan to reflect new community concerns and to identify public involvement activities and future site investigation and cleanup activities.

- April 1990—EPA meet with the Lewis County Health Department to discuss residential yard sampling.

- September 1990—EPA met with Ecology, County Health, and City of Chehalis officials from the department of public works, city manager's office and fire department to update them on site investigation developments and plans.

- September 1990—EPA published fact sheet on the preliminary Phase 1 sampling activities.

- February 1991-EPA published a fact sheet summarizing sample results to date and announcing the second phase of sampling.

- October 1991—EPA presented an update on site activities to the Twin Cities Chamber of Commerce.

- April 1992—EPA published a fact sheet updating activities and describing some interim cleanup actions.

- September 1992—EPA published the Remedial Investigation and Feasibility Study (RI/FS) report and Proposed Plan for cleanup for public comment.

- October 1992—EPA held a 30-day public comment period from October 1st through 31st. During the comment period EPA held a public meeting on October 21, 1992.

SCOPE AND ROLE OF RESPONSE ACTION WITHIN THE STRATEGY

The selected remedy is the third and final response action to be conducted at ACC. EPA performed an emergency response action beginning in late 1986 when the principle threat (10,000 gallons of PCP-diesel solution) spread from the facility to the Chehalis Avenue Area during a flood. EPA determined that this response action was necessary to eliminate the potential risks from human contact with contaminated soil and debris. Soil, debris, furniture and other material was excavated or removed from the AOC and was consolidated on the ACC facility. In 1988 an incinerator was set up on the facility to incinerate the contaminated soil and debris and contaminated sludge which were removed from the surface impoundment in 1987.

In 1992, remaining potential sources of contamination were secured by removing liquid wood treating wastes from tanks and piping and confining the materials along with laboratory chemicals in sealed drums. Above ground tanks and piping in the treatment works were removed. The drums of hazardous materials are presently located on the facility.

While the emergency removals eliminated the most immediate health risks, low-level contamination still exists. The contaminants of concern are carcinogenic polyaromatic hydrocarbons (CPAHs), pentachlorophenol (PCP), and dioxin/furans. The bulk of the low-level contamination is on the ACC facility itself. Surface soil in the Chehalis Avenue Area shows contamination to a much lesser degree. Groundwater beneath the facility is contaminated with PCPs and CPAHs. A layer of oil floating on the groundwater (floating product) is present beneath the treatment works in one well. No plume has been identified. Low permeability soil has this product isolated to a small area beneath the former tanks. Surface water in Dillenbaugh Creek and the stormwater discharge lagoon are contaminated by surface runoff from the facility.

Potential risks exist from contact with contaminated soil, future worker exposure at the facility itself, and potential ecological impacts from contamination in the AOC (Dillenbaugh Creek and the stormwater discharge lagoon). Although groundwater beneath the facility is currently not used for drinking purposes, the contaminants in the soil above the groundwater table and the presence of the floating product layer presents a potential threat to this resource.

SUMMARY OF FACILITY AND AOC CHARACTERISTICS

General Characteristics

Most of the facility rests in a marshy lowland adjacent to Dillenbaugh Creek, one mile east of the Chehalis River. This lowland is on the east margin of a two- to three-mile-wide alluvial valley formed at the confluence of the Chehalis and Newaukum rivers. Elevations in the Chehalis area range from 560 feet above mean sea level (MSL) in the hills to the east, to 168 feet MSL which is slightly less than the 100-year floodplain (182 feet MSL). Most of the facility falls within the 100-year floodplain.

The geology consists of a veneer of alluvium resting on bedrock. Locally manmade fill has been placed on the alluvium. The alluvium is approximately 40 feet thick and is predominantly clayey to sandy silt. The silt has a narrow range of physical characteristics and can generally be described as tight silt. Coarse grained alluvium is present under the treatment area which is typically dense to very dense interbedded silty sand to clayey sandy gravel.

The bedrock is an indurated low permeability siltstone with good bearing capacity that occurs at fairly consistent elevation (approximately 135 feet MSL) beneath the site. Fill is variable in thickness, texture, and grain size. Granular fill in the treatment area is 4 to 6 feet thick and consists of clayey gravelly sand. The landfill contents range from cobble-size gravel to sawdust, wood chips, timbers, metal fragments, and tires. Fill accumulated in the stormwater discharge lagoon consists of very soft, fine sediment and organic matter.

Adjacent Land Use and Use of Natural Resources

Adjacent lands are used for commercial, residential, and light industrial purposes, as well as for playfields. The city of Chehalis has a population of approximately 6,500 and an economy that is based largely on the timber industry. The Chehalis Avenue commercial/residential area as well as a playfield lie directly east and adjacent to the ACC facility. A dairy products packaging plant is immediately north of the facility. The primary municipal drinking water supply is drawn from the Newaukum River roughly 17 miles upstream from the facility. The secondary drinking water supply is drawn from the Chehalis River upstream from its confluence with Dillenbaugh Creek. The secondary water supply line passes beneath the southern portion of the facility. Three private irrigation (only) water supply wells are present up gradient from the facility.

Surface Water and Groundwater Resources

Surface Water

Dillenbaugh Creek provides local drainage from areas to the east and southeast of the facility. The creek joins the lowland 2.5 miles southeast of Chehalis and flows north-northwest parallel to the Newaukum River south of the facility as shown in Figure 2-1.

The creek flows northwest of the facility and under Interstate 5 where it joins the Chehalis River. The creek was rechanneled over its lowland reach during construction of Interstate 5. Dillenbaugh Creek has a low gradient, silty and weedy bottom, moderate to low velocity, and is prone to flooding during winter months due to culvert restrictions and backwater from the Chehalis River.

Other major surface water features include wetlands that border the ACC facility to the south as shown in Figure 2-2. The wetlands drain into Dillenbaugh Creek.

Groundwater

Thirty-three domestic, irrigation, and municipal wells are located within a two miles radius from the facility. The majority of these wells are located in the outlying areas of the city to the south and southwest, and are geographically separated from the facility by the Chehalis and Newaukum rivers and Dillenbaugh Creek. According to well logs provided by Ecology, well water levels range from 30 to 110 feet below ground surface, with approximately 75% of the wells used for domestic purposes. The wells closest to the facility (within a 1/4-mile radius) are used for irrigation only.

The AOC consists of the Chehalis Avenue Area (a residential/commercial section of the city of Chehalis, including a play field), wetland south of the facility, a reach of Dillenbaugh Creek and a storm water discharge lagoon and attendant storm drain. The Chehalis Avenue Area consists of several city blocks of which about 20% is commercial, and over one-half of the balance is open space. The wetland south of the facility functions poorly as a habitat due to man-made constriction to flow, and it receives run-of from city streets. The storm water discharge lagoon is not engineered and is basically a steep-sided settling pond adjacent to the creek that was constructed by excavation into native soil and fill. The storm drain exhibits infiltration at joints.

Facility features (see Figure 2-11) include:

- 8 kilns (14 feet x 15 feet x 140 feet each)
- mill (250 feet x 260 feet x 36 feet high)
- landfill (250 feet x 600 feet x 10 to 14 feet high)
- 4 underground tanks/piping
- spur rail lines
- treatment works sumps
- former surface impoundment
- treatment works control room
- boiler control room
- elevated craneway
- stormdrain
- chemical laboratory building
- kiln shop
- fuel shed
- production well
- ash from the incineration of emergency removal debris and soil
- drummed investigation derived waste (soil), overpacked facility chemicals and miscellaneous hazardous substances

Known or Suspected Sources of Contamination

Current sources of contamination were identified in the RI/FS and include:

- Discharges of waste streams, noncontact cooling water, and boiler blowdown from milling operations to the wetlands or storm runoff area which drained to the wetlands.

- Releases of other mill operation waste streams such as lubricating oils, diesel, and gasoline.

- Disposal of waste streams from the hot dip tank wood treatment operations. These include tank sludge and solvents, paints, paint thinners, lubricating oils, petroleum products and other miscellaneous waste which were deposited in the landfill.

- Discharges and disposal of waste streams from the wood pressure treatment process. These include:

  - discharge of vapor recovery system liquids to the city stormsewer

  - discharges of wastewater from the building sumps to the surface impoundment

  - disposal of sludge from the bottom of the surface impoundment to the landfill
  - dispersion of contaminants in the treatment works tanks, pipes, and sumps around the facility due to flooding.

- Discharges from kiln operations.
- Miscellaneous leaks and spills around the facility.
- Suspected discharges from abandoned and demolished mill and kiln operation east of the facility. Demolition debris was placed in the landfill.
- Flooding which released contamination from the facility to the surrounding AOC.

Types of Contamination and Affected Media

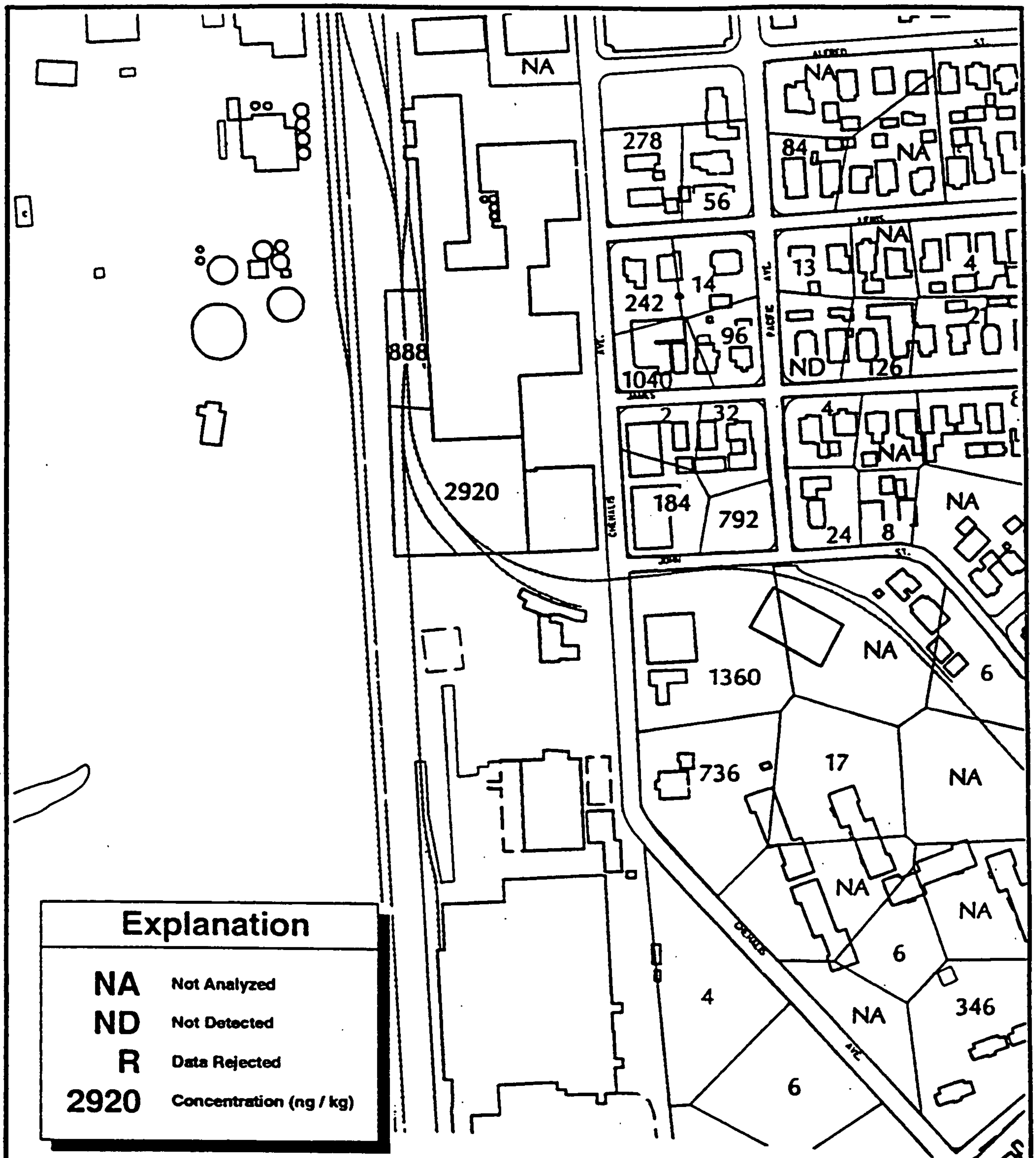
The ACC RI involved the collection of 257 biased and systematic, discrete and composite surface and subsurface soil samples, 18 discrete surface water samples, and 50 groundwater samples at the facility and in the AOC. The intent of the sampling was to characterize the extent of contamination. The results of the sampling efforts for each medium are presented in the RI report and are summarized below. All references to dioxin concentrations are in terms of 2, 3, 7, 8-TCDD and were converted using Toxic Equivalency Factors (TEF).

Surface Soil (0–6 inches)

The remedial investigation found pentachlorophenol (PCP), carcinogenic polycyclic aromatic hydrocarbons (CPAH), and dioxin/furans (dioxins) in the majority of areas sampled (Table 2-1). Figures 2-3 through 2-8 illustrate the spatial distribution and concentration of the contaminants of concern.

Subsurface Soil

The remedial investigation found PCP and CPAH in subsurface soil in the Treatment Area, Mill Area, Landfill Area, and Lagoon. Subsurface soil in the Chehalis Avenue area was not contaminated by the surficial application of flooding and is not of concern. Subsurface soil contamination ranges are summarized in Table 2-2.



Dioxins/Furans Concentrations in Surface Soil for the Chehalis Avenue Area

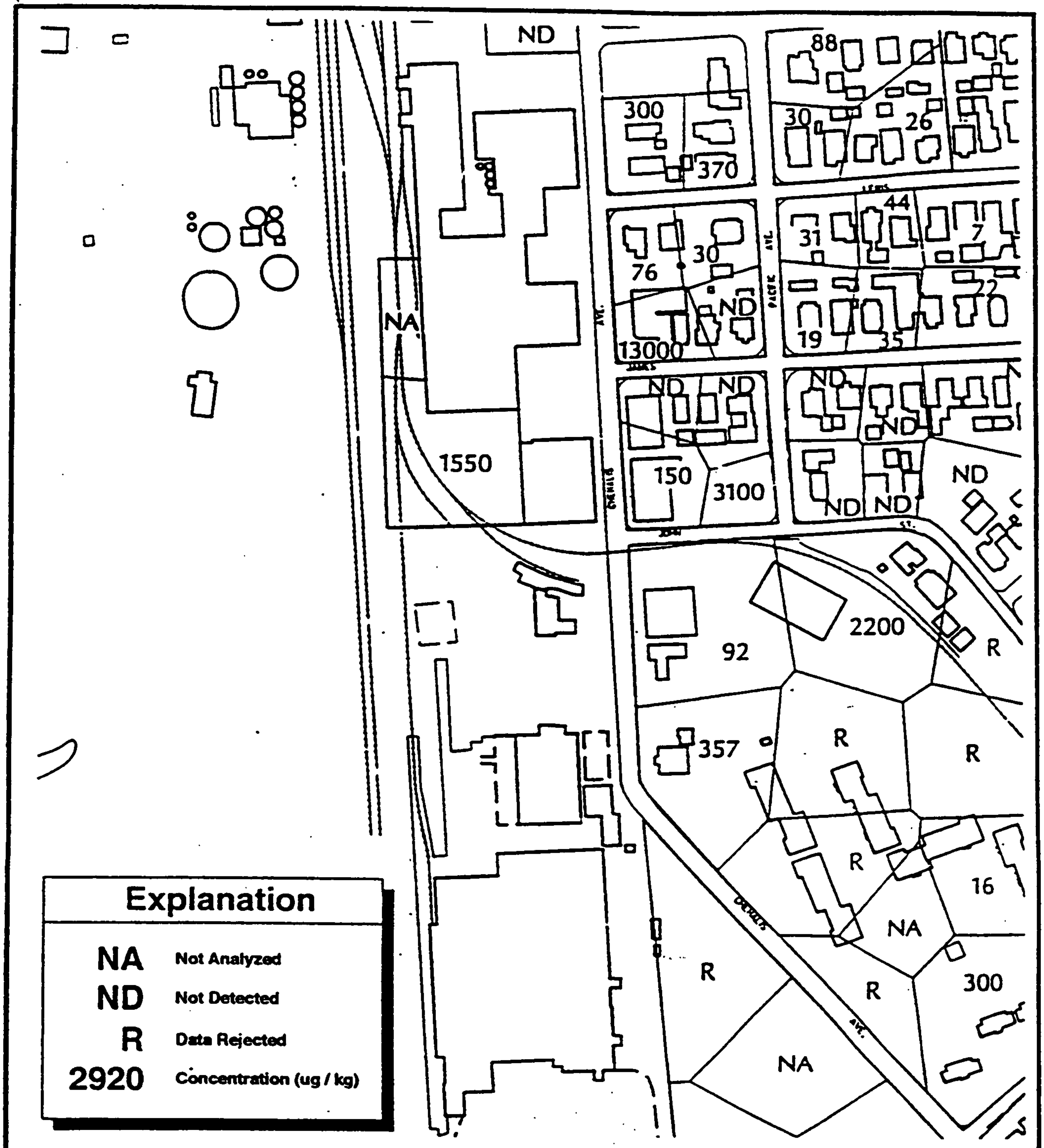
Scale in Feet

200 0 200

100

FIGURE

2-3



Scale in Feet

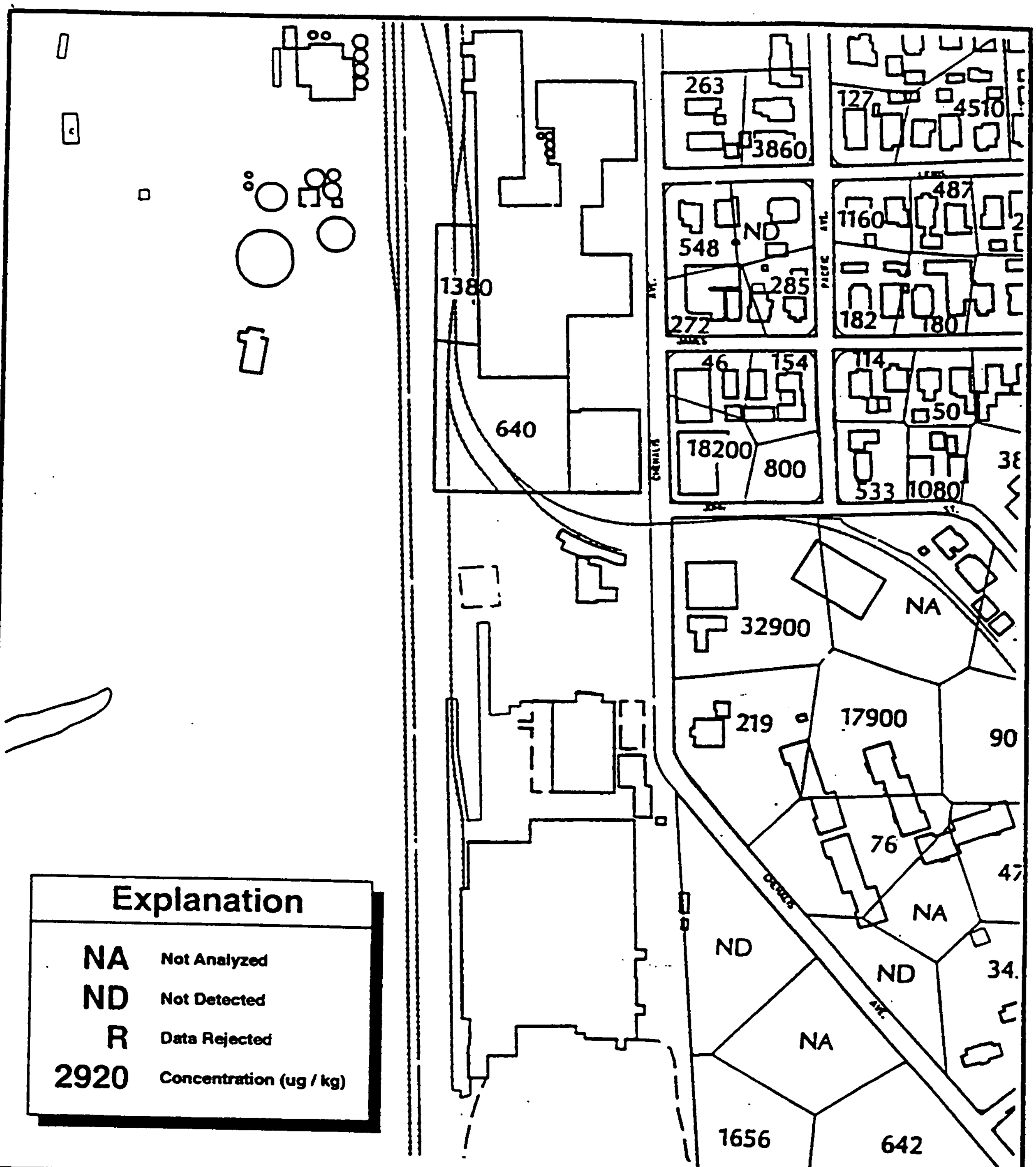
200 0 200

100

Pentachlorophenol Concentrations in Surface Soil for Chehalis Avenue Area

FIGURE

2-4



Scale in Feet

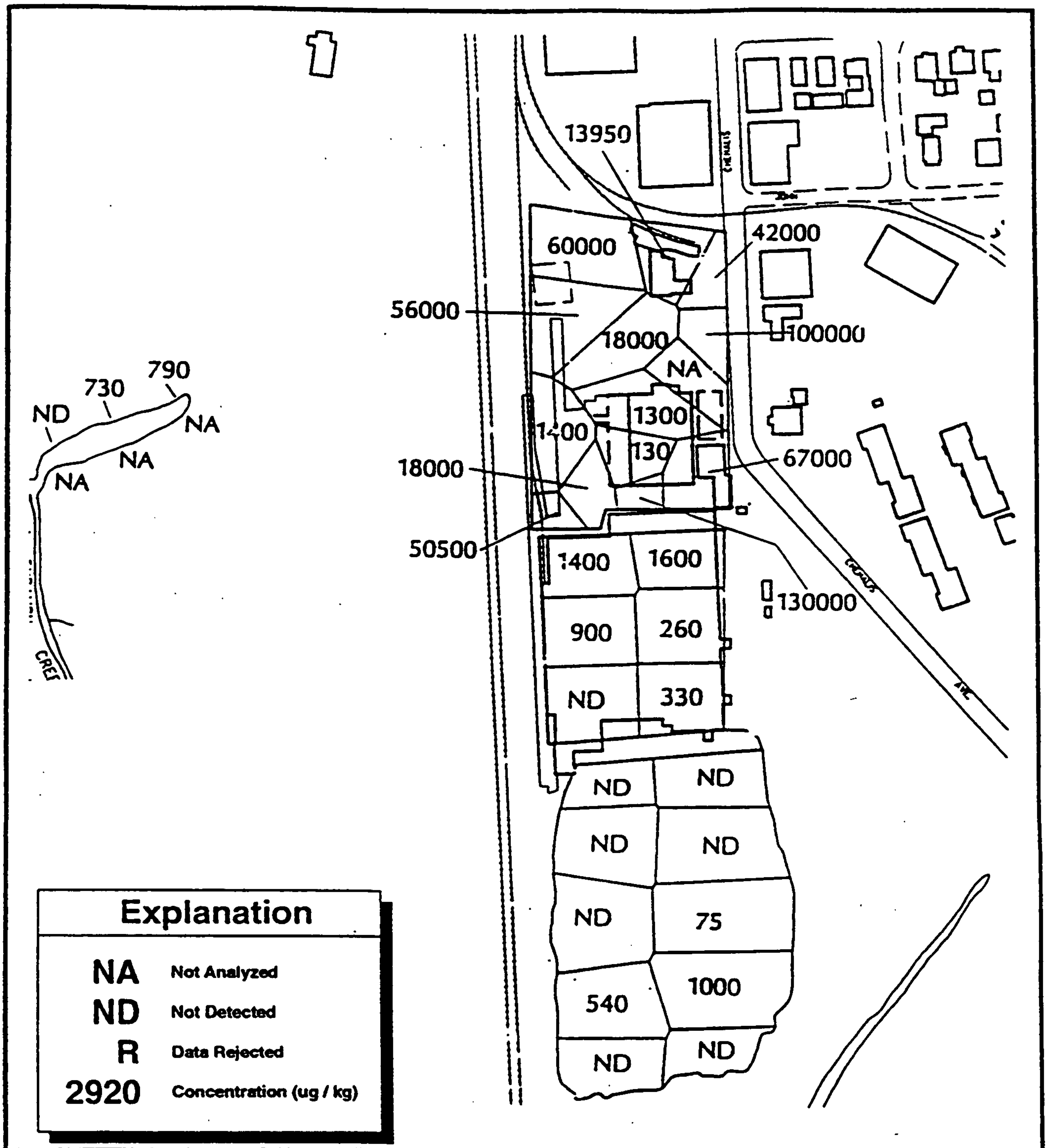
200 0 200

100

Total Carcinogenic PAH Concentrations in Surface Soil for the Chehalis Avenue Area

FIGURE

2-5



Pentachlorophenol Concentrations in Surface Soil for Treatment, Mill, Landfill, and Stormwater Discharge Lagoon Areas

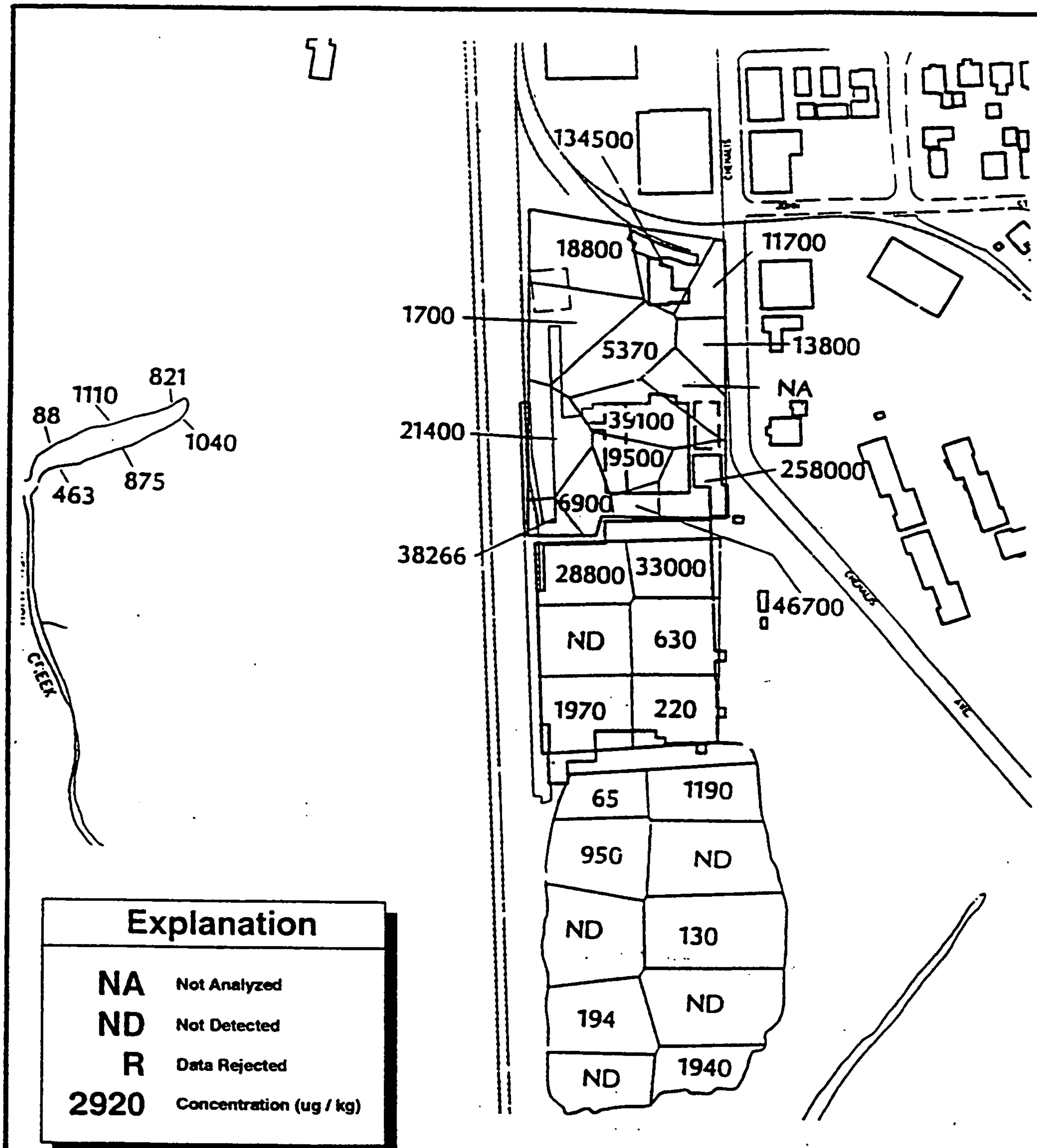
Scale in Feet

200 0 200

100

FIGURE

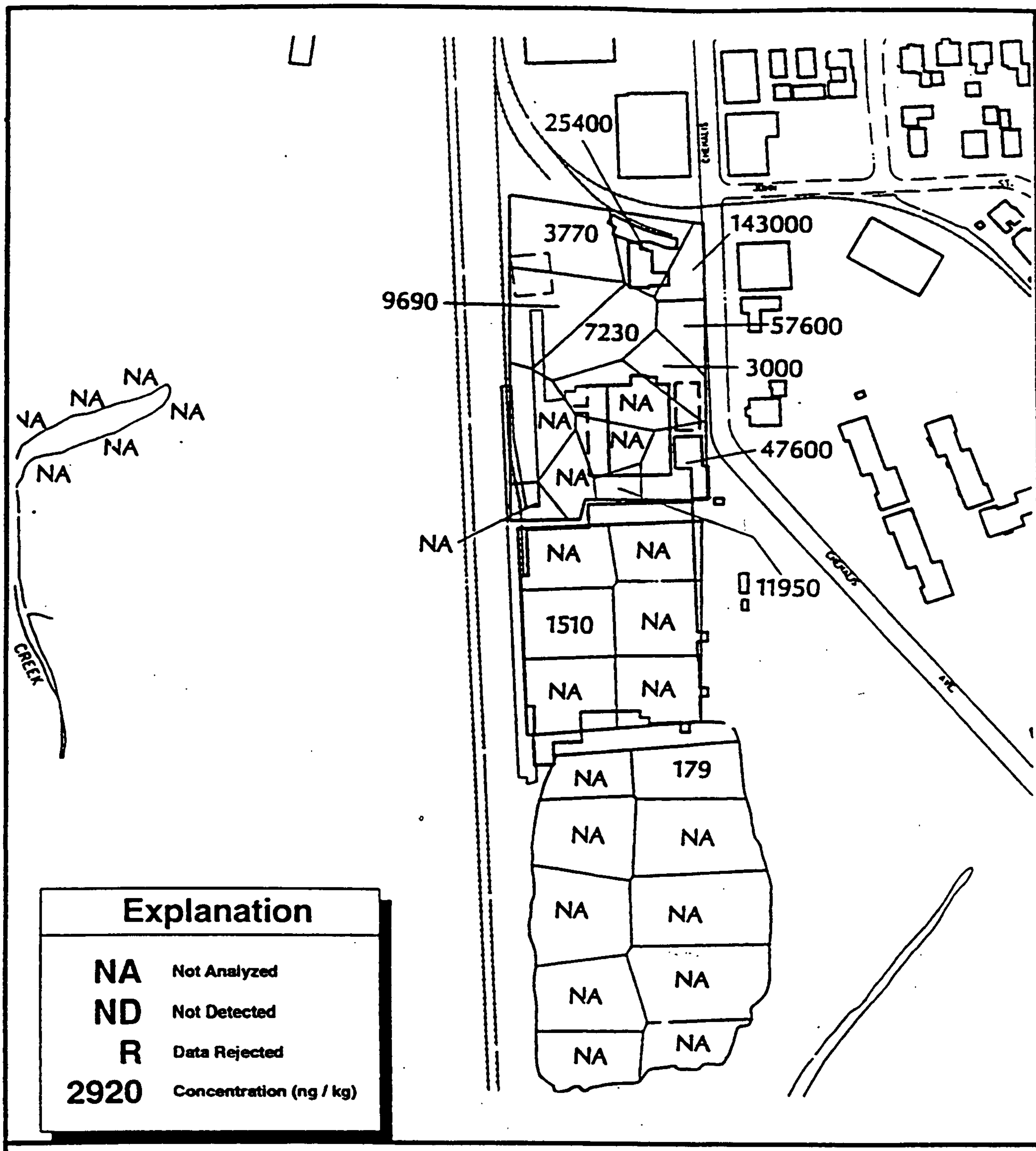
2-6



Total Carcinogenic PAH Concentrations in Surface Soil for Treatment, Mill, Landfill, and Stormwater Discharge Lagoon Areas

FIGURE

2-7



Dioxins / Furans Concentrations in Surface Soil for Treatment, Mill, Landfill, and Stormwater Discharge Lagoon Areas

FIGURE

2-8

Table 2-1—Summary of Surface Soil Results

Area	Pentachlorophenol (ug/kg)		Carcinogenic Polyaromatic Hydrocarbons (ug/kg)		Dioxin (ng/kg)	
	Range	Average	Range	Average	Range	Average
Chehalis Avenue	ND-13,000	689	ND-32,900	2,190	ND-1,360	184
Treatment Area	130-130,000	36,200	1,700-258,000	30,400	3,000-143,000	26,900
Mill Area	ND-1,600	689	ND-33,000	9,260	1,510	1,510
Landfill	ND-1,000	147	ND-1,940	406	179	179
Lagoon	ND-790	507	88-1,100	733	NA	NA

ND = Non detect.
NA = Not analyzed.

Table 2-2—Summary of Subsurface Soil Results

Area	Pentachlorophenol (ug/kg)	Carcinogenic Polyaromatic Hydrocarbons (ug/kg)
	Range	Range
Treatment Area	ND-250,000	ND-54,590
Mill Area	18-1,124	ND
Landfill	ND-74,000	ND-7,000
Lagoon	ND-1,800	ND-8,450

ND = Non detect.

Surface Water

Water samples were collected from the Chehalis River, Dillenbaugh Creek, and the stormwater discharge lagoon to assess surface water contamination. PAHs, PCP, and dioxin were detected in the Dillenbaugh Creek surface water samples. PAH concentrations ranged from nondetectable to 0.8 ug/L. PCP concentrations ranged from nondetectable to 19.0 ug/L. Dioxin had a maximum concentration of 0.8 ng/L.

Surface water samples were collected from the Chehalis River downstream of its confluence with the Newaukum River. PAHs and PCP were not detected in the samples. Dioxin was found in the surface water at concentrations ranging from 0.008 to 0.023 ng/L.

Dioxin was found in the majority of samples taken from the storm water discharge lagoon and ranged from nondetectable to 0.61 ng/L. PAHs were found in one of two surface water sample locations with a concentration of 3.6 ug/L. PCP was detected in all surface water samples and ranged from 0.14 ug/L to 68.0 ug/L.

Groundwater

PAHs, PCP, and BTEX are groundwater contaminants attributed to operations at the ACC facility. Groundwater contamination is present at three discrete localized areas located beneath the treatment area within the facility boundary. These locations are under the treatment works, near the surface impoundment and south-west of the kilns.

PCP is present near the treatment works in a dissolved phase and as a floating phase mixed with diesel. The floating phase has PCP concentrations as high as 12,000 mg/L. A dissolved PCP concentration of 91 mg/L was detected in groundwater below the floating product.

Samples from monitoring wells west of the kilns were found to be contaminated with PAHs and BTEX. Samples from one well were found to contain naphthalene (19 mg/L), phenanthrene (12 mg/L), acenaphthene (7.8 mg/L), fluorene (6.3 mg/L), as well as fluoranthene, pyrene and anthracene in concentrations ranging from 1 to 5 mg/L. The same well had the highest concentrations of individual BTEX compounds in the range of 0.2 to 4.4 mg/L.

Wells west of the surface impoundment found groundwater to be contaminated with PCP. Samples from these wells had concentrations ranging from 0.03 to 2.9 mg/L PCP.

Sediment

Sediment from Dillenbaugh Creek, stormwater discharge lagoon, wetlands and the Chehalis River were collected and analyzed for organic and inorganic contaminants.

The major contaminants in Dillenbaugh Creek sediment were dioxin, PAHs, and PCP. Dioxin and PAHs were found in the majority of samples with maximum concentrations of 593 ng/kg, and 36,650 ug/kg, respectively. PCP was detected in less than half the sediment samples and had a maximum concentration of 190 ug/kg. Dioxin, PAH, and PCP concentrations in the creek were highest immediately downstream of the stormwater discharge lagoon and under the Burlington Northern railroad bridge.

Sediment from the wetlands were found to be contaminated primarily with PAHs, dioxin, and PCP. PAHs and dioxin were detected in nearly all samples and had maximum concentrations of 11,700 ug/kg and 155 ng/kg, respectively. The maximum concentration of PCP detected was 280 ug/kg. Inorganic contaminants consisted of beryllium, cadmium, and mercury at maximum concentrations of 1.8 mg/kg, 1.9 mg/kg, and 1.1 mg/kg, respectively. Contaminants in the Chehalis River sediment consisted mainly of PAHs and PCP with maximum concentrations of 100 ug/kg and 400 ug/kg, respectively.

Route of Migration

The fate of contaminants originating from ACC depends on site-specific migration pathways and on the chemical and physical properties of each contaminant. This section focuses on the contaminants of concern [dioxins/furans (dioxin), pentachlorophenol (PCP), and polycyclic aromatic hydrocarbons (PAHs)], and identifies their probable routes of migration in soil, surface water, sediment, and groundwater.

Surface Soil

The principal transport mechanisms of the contaminants are as suspended soil in surface and flood water runoff. Contaminated soil in suspended surface water runoff is expected to travel downhill from the Chehalis Avenue area and the facility to the wetland or stormwater discharge lagoon and eventually to Dillenbaugh Creek and the Chehalis River. Contaminated soil suspended in flood water may be carried to the north and east into the Chehalis Avenue area before receding into the wetland to the south. Windblown fugitive dust and plant uptake are not considered principal mechanisms of transport. Bound to surface soil, the primary contaminants have half-lives of a few days to years, depending on available degradation processes.

Subsurface Soil

The probable transport mechanisms of the primary contaminants in subsurface soil are vertical transport of free liquid by gravity and vertical transport of contaminants by percolation of rainfall. The contaminants, which would be strongly sorbed in the interstices of soil grains, are unlikely to be readily mobilized by gravity, rainfall, or groundwater without undergoing significant degradation, although small amounts would continuously leach. In addition, the low permeability of the fill greatly retards transport. Therefore, *in situ* degradation is the likely ultimate fate of the majority of the subsurface contaminants. As mentioned above for surface soil, the time required for degradation depends on the available degradation processes. Because photolysis, a relatively short-term degradative process, is not available for contaminants in subsurface soil, the half-life of the primary contaminants in subsurface soil is expected to be longer than for surface soil.

Surface Water

Transport of contaminants via surface water occurs through flooding, surface runoff, and water flow to Dillenbaugh Creek and between Dillenbaugh Creek and the Chehalis River. Surface water may spread contaminants in liquid phase when contaminants dissolve, through transport of bulk liquid contaminants, or as suspended particles when contaminants adhere to soil.

Sediment

Sediment contaminated with the primary contaminants was found in the Chehalis River, Dillenbaugh Creek, in adjacent wetlands, and in the stormwater discharge lagoon. Mass movement is the mode of transport of contaminated sediment.

Chehalis River—The primary contaminants in Chehalis River sediment are PCP and PAHs. Mass movement of sediment along the river bed is active because of the frequent high flows. The half-life of PCP and PAHs in sediment is expected to be short, and redistribution through mass movement will dilute contaminants. Therefore, sediment-bound PCP and PAHs in the Chehalis River are not expected to be very persistent. Mobilized sediment will eventually enter Grays Harbor.

Dillenbaugh Creek—All of the primary contaminants were widespread in surface sediment and sediment at depths of 5 and 10 inches in Dillenbaugh Creek. The sediment dynamics of Dillenbaugh Creek are unknown, but flooding and high flow are periodic events that could potentially erode contaminated sediment from the creek bed. Dioxin could persist in sediment for many years. Lighter molecular weight PAHs and PCP are expected to be less persistent. Mobilized sediment will move downstream into the Chehalis River.

Wetlands—The primary contaminants found in wetland sediment are PCP and PAHs. Mass movement of wetland soil is limited due to the dense vegetative cover and relatively low water flow rate. PCP and lighter molecular weight PAHs are expected to degrade relatively rapidly. Eroded sediment will migrate into Dillenbaugh Creek.

Stormwater Discharge Lagoon—The primary contaminants found in the stormwater discharge lagoon sediment are dioxin and PAHs. Because of the intermittent nature of flow from the stormsewer outfall and the function of the lagoon as a settling basin, mass movement of contaminated sediment from the lagoon will be less than that from Dillenbaugh Creek. Dioxin is expected to persist for many years in the sediment, while light molecular weight PAHs will be less persistent.

Mobilized sediment will move into the lower reaches of Dillenbaugh Creek and eventually into the Chehalis River.

Groundwater

PCP and PAHs are the primary contaminants identified in groundwater. In groundwater, these contaminants are typically transported as either dissolved constituents, as light nonaqueous phase liquids (LNAPL), or as dense nonaqueous phase liquids (DNAPL). PCP was tentatively identified in three possible forms: as a dissolved constituent, combined in a diesel-based carrier as a LNAPL, and possibly as a DNAPL.

Dissolved PCP will be preferentially adsorbed to organic materials in the subsurface. Solubilization of PCP from the adsorbed phase and from LNAPL and DNAPL may provide a continuing source of dissolved PCP for many years. The dissolved phase may eventually be transported to the river; however, the rate of mass loading to the river will be slow because of the extremely slow rate of groundwater movement (3 to 30 meters per year).

The layer of LNAPL PCP and PAHs in the treatment area floats within a hydraulically unconfined portion of the groundwater system. Any net migration of the center of mass of the LNAPL pool would be laterally, becoming thinner in the process. Some contaminants will be resolubalized into the water column, and some will be degraded by biotic and abiotic mechanisms. These degradation mechanisms will become more efficient as the layer becomes thinner. Long-distance transport to Chehalis River is very unlikely.

PAHs can be expected to undergo a fate similar to PCP. Many of the PAHs are even more strongly absorbed than is PCP, so long-distance transport in groundwater is unlikely.

DNAPL PCP will probably collect within topographic lows in the bedrock surface where it will be slowly degraded by biotic and abiotic mechanisms and resolubalized into the surrounding groundwater. Long-distance transport of DNAPL PCP can occur only under a restrictive set of geologic conditions and probably can be disregarded at ACC.

Potentially Exposed Populations

Current human populations potentially exposed to contamination include children and adults in the Chehalis Avenue area who might be exposed to contamination in surface soil through dermal exposure (skin contact) or incidental ingestion during recreational activities on Dillenbaugh Creek. Trespassers on the facility would also be exposed through the same pathways. Future workers on the facility or future development would be exposed through the same pathways.

SUMMARY OF RISKS

An assessment of the risks to public health and the environment under existing conditions at the facility and in the AOC involved a 4-step process including the identification of contaminants of concern, an assessment of contaminant toxicity, an exposure assessment of the population at-risk, and a characterization of the magnitude of risk. The results of this assessment are described below.

Human Health Risks

Persons who may incidentally ingest soil through hand-to-mouth contact were identified as the population most at risk of adverse health effects. Inhalation is not a significant pathway from the facility. Dioxin and carcinogenic PAHs were recognized as the contaminants of concern. The excess lifetime cancer risk from the reasonable maximum exposure to dioxin and carcinogenic PAHs is two in ten thousand for persons living in the Chehalis Avenue area and ranges from two in one hundred thousand to two in one thousand for persons who might work on the facility under current conditions. Non-carcinogenic adverse health effects are not expected.

Contaminants of Concern

The Remedial Investigation identified soil as the exposure media of greatest concern. Human exposure via other media such as air, sediment, and surface water are considered less significant by comparison.

A total of 18 contaminants were identified for evaluation in the Chehalis Avenue area. These included bis(2-ethylhexyl)phthalate, carbazole, pentachlorophenol, seven polynuclear aromatic hydrocarbons (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene), PCBs, alpha-chlordane, gamma-chlordane, dieldrin, dioxin (including all detected dioxin/furan cogeners), and three metals (beryllium, cadmium, and manganese). Of these, dioxin and PAHs are considered the contaminants of concern because of their respective contribution to the risk. Soil concentrations used for the risk assessment in the Chehalis Avenue area were 0.4 ug/Kg for dioxin (including all dioxin/furan cogeners) and 4 ug/kg for PAHs (total of all PAHs). These concentrations represent the upper 95% confidence limit of the mean concentration.

A total of 17 contaminants were identified for evaluation (including the landfill, mill, and treatment areas). These included carbazole, pentachlorophenol, seven polynuclear aromatic hydrocarbons (benzo(a)anthracene, chrysene, benzo(b)flouranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene), alpha-chlordane, gamma-chlordane, dieldrin, dioxin (including all detected dioxin/furan cogeners), DDT, heptachlor epoxide, and two metals (arsenic and beryllium). Of these, dioxin and PAHs are considered the contaminants of concern because of there relative contribution to the risk. Soil concentrations used in the risk assessment ranged from 0.2 ug/kg to 50 ug/kg for dioxin (including all dioxin/furan cogeners) and 7 ug/kg to 60 ug/kg for PAHs (total of all PAHs). These concentrations represent the upper 95% confidence limit of the mean concentration. The highest concentration of chemicals of concern were found in the treatment area.

Dioxin and PAHs account for the overwhelming majority of carcinogenic risk. Although lead was found in localized areas on the facility, it is not a facility contaminant and was not evaluated because the toxicological criteria for lead are being revised and no reference doses or cancer potency factors are available for risk assessment purposes. Target remediation levels for lead in soil are evaluated using data from the Agency for Toxic Substances and Disease Registry (ATSDR). Lead levels in soil ranging from 500 ug/kg to 1000 ug/kg are being suggested as the point of departure for establishing cleanup levels. Remediation of dioxin and PAH contaminated soil is expected to effectively address the areas of lead contamination. Consequently, this discussion focuses on carcinogenic risk from dioxin and PAH exposures only.

Exposure Assessment

The population currently at greatest risk of adverse health effects from exposure to site-related contaminants are those persons living in the vicinity of the facility (i.e., the Chehalis Avenue area), who may incidentally ingest dioxin and PAHs in soil due to hand-to-mouth contact. Other populations who could potentially be at risk would include on-site workers in the future industrial scenario and persons living on-site under a future residential scenario. The primary route of exposure for workers and residents was incidental soil ingestion.

Other exposure pathways evaluated include inhalation of particulate matter (evaluated under both the residential and future industrial scenarios) and ingestion of water and sediment while swimming in Dillenbaugh creek (evaluated under the residential scenario). The risks due to these pathways were less than 1 chance in 1,000,000.

In the uncertainty analysis, the pathways of dermal absorption of contaminants bound to particulate (residential and future industrial scenarios) and ingestion of fruits and vegetables grown in the area (residential scenario) were evaluated. The risks due to these pathways were only considered in the uncertainty analysis section of the risk assessment due to the large degree of uncertainty involved with estimating exposure. These pathways are not further discussed.

Exposure to contaminants in groundwater was not evaluated for several reasons. The source of drinking water for Chehalis is located 17 miles upstream on the Newaukum River and there are no groundwater wells used for drinking water or other household purposes within the vicinity of the facility. Contaminated groundwater is limited to three small localized areas beneath the treatment area within the facility boundary. The soil is a tight silt and migration is not expected. Lastly, deed restrictions are anticipated to prevent future well installation.

Consumption of fish or invertebrates caught in the vicinity of the site (Dillenbaugh creek) was not evaluated since it is not fished by the local community, because it is not a viable fishery. It is more likely that a person fishing would be attracted to the nearby Chehalis and Newaukum Rivers.

Consumption of waterfowl that feed in the area was also not evaluated since waterfowl are only expected to be present in the area on a seasonal basis. As such, the duration of their exposure to contaminated media would be minimal.

Exposure point concentrations were determined using both monitoring and modeling data. For incidental soil ingestion, sediment ingestion, and surface water ingestion exposures, measured soil, sediment, and surface water concentrations were used for dose calculations, respectively. Doses from inhalation exposures were estimated using modeled exposure-point concentrations.

Two exposure scenarios were examined to estimate hypothetical risks associated with potential future site use and current use of the area in the vicinity of the site. These exposure scenarios cover residential and industrial use conditions. The assumptions used to calculate doses under each scenario are presented as follows.

Industrial Exposures

Reasonable maximum exposures were determined for the landfill, mill, and treatment areas on-site using upper-bound (95th percentile) soil concentrations of 7 mg/kg, 32 mg/kg, and 60 mg/kg, respectively for PAHs, and concentrations of 0.2 ug/kg, 2 ug/kg, and 50 ug/kg, respectively for dioxin. In calculating risk from hypothetical industrial exposures it was assumed that risks from incidental soil ingestion and inhalation were additive and contributed to the total body burden. Other key assumptions used were standard Region X assumptions.

Residential Exposures

In the residential scenario it was assumed that individuals would be exposed to contaminants in soil over a lifetime (75 years), and to contaminants in sediment and surface water for 6 years of their lifetime. The reasonable maximum exposure (RME) in the Chehalis Avenue area was determined using an upper-bound (95th percentile) value of 0.4 ug/kg for dioxin and 4 mg/kg for PAHs in surface soil. Risks from incidental soil ingestion, inhalation, and ingestion of surface water and sediment (evaluated for children age 6 to 18 only) were assumed to be additive and contributed to the total body burden.

Toxicity Assessment

The EPA uses a weight-of-evidence system to convey how likely a chemical is to be a human carcinogen, based on epidemiological studies, animal studies, and other supportive data. The classification scheme for characterization of weight-of-evidence for carcinogenicity includes: Group A-known human carcinogen, Group B-probable human carcinogen, Group C-possible human carcinogen, Group D-not classifiable as to human carcinogenicity, and Group E-evidence of non-carcinogenicity in humans.

Dioxin is classified by EPA as a probable human carcinogen based on evidence from laboratory animal studies. The potency factors used were obtained from EPA's Health Effects Assessment Summary Tables (HEAST).

Some PAHs (benzo(a)pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(k)fluoranthene) are classified as probable human carcinogens based on evidence from laboratory animal studies. The cancer potency factor to evaluate carcinogenic risk from oral exposures is 12 $(mg/kg\ day)^{-1}$, and the potency factor for inhalation exposures is 6 $(mg/kg\ day)^{-1}$. These potency factors were obtained from EPA's on-line computer database (IRIS). Toxicity information is currently not available to evaluate the noncancer health effects of the PAHs included in this risk assessment.

Cancer Potency Factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\ day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Toxicity information is currently not available to evaluate noncancer health effects of dioxin.

Risk Characterization

Excess lifetime cancer risks are determined by multiplying the estimated intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of exposure to site-related contaminants. Results of the carcinogenic risk calculations are contained in Table 2-3.

For both the industrial and residential scenarios, incidental ingestion of soil contributed the majority of the risk. For all exposure pathways, the majority of the carcinogenic risk was contributed by dioxin and carcinogenic PAHs. Total additional lifetime carcinogenic risk for the industrial scenario was determined to be 2 in 100,000 for the landfill, 1 in 10,000 for the mill, and 2 in 1,000 for the treatment area. Total additional carcinogenic risks for lifetime residential exposures from the highest sample in the Chehalis Avenue area are estimated at 2 chances in 10,000.

The estimate of potential noncancer health effects was below one for all exposure pathways and all scenarios.

Table 2-3—Results of Carcinogenic Risk Calculations

	Residential (Present)			Industrial (Future)		
	Age Groups					
Exposure Pathway	0 to 6	6 to 18	18 to 75	Landfill	Mill	Treatment
Incidental ingestion of soil	1 E-02	3 E-03	4 E-03	2 E-05	1 E-04	2 E-03
Inhalation of particulate	1 E-07	7 E-08	8 E-08	5 E-08	6 E-09	6 E-08
Incidental ingestion of surface water while swimming	—	7 E-07	—	—	—	—
Incidental sediment ingestion	—	2 E-05	—	—	—	—
Total	1 E-02	3 E-03	4 E-03	2 E-05	1 E-04	2 E-03
Total lifetime (added across age groups for residential scenario)		2 E-02				

— = Exposure pathway not evaluated.

Uncertainty

The accuracy of the risk characterization depends in large part on the accuracy and representativeness of the sampling, exposure, and toxicological data. Most assumptions are intentionally conservative so the risk assessment will be more likely to overestimate risk than to underestimate it.

One source of uncertainty is the analytical data. It should be recognized that all analytical results have a variability associated with them. This variability or uncertainty in the result is dependant on the sample matrix, analytical method, and laboratory performing the analysis.

Another source of uncertainty in the risk assessment is the assumptions used to arrive at exposure doses. Although the exposure scenarios are based on a number of standard assumptions, there are uncertainties inherent in them. In most cases, these assumptions tend to overestimate risk.

A final source of uncertainty relates to the methodology by which the cancer potency factors for dioxin and PAHs were developed. For both of these chemicals, the available data indicating their carcinogenic potency was derived from animal studies. From this data, carcinogenic potency to humans was estimated using uncertainty factors which span at least two orders of magnitude.

Ecological Evaluation

Summary of Approach

In addition to the human health risks discussed above, potential ecological effects were evaluated for the AOC. Soil, sediment, and water contaminant concentrations and modeling algorithms were used to predict an exposure dose to the ecological species of concern. Following exposure predictions, a quotient method was used to estimate potential impacts. In the quotient method, the estimated exposure dose is divided by a toxicity value (i.e., a dose considered "safe" to the ecological species of concern). A hazard quotient greater than 1 indicates a potential risk.

Exposure Assessment

To evaluate potential ecological impacts, the AOC adjacent to the facility was divided into aquatic and terrestrial habitats (wetland, Dillenbaugh Creek, Chehalis River, storm water discharge lagoon), and indicator species were identified for each habitat. For the aquatic habitat, a cutthroat trout and a fish-eating bird (kingfisher) were chosen as the species of concern; for the terrestrial habitat, a vole and a mallard duck were chosen.

Risk Characterization

In the aquatic habitat, hazard quotients greater than 1 were estimated for the cutthroat trout and the kingfisher in the lagoon, upstream Dillenbaugh creek, and Downstream Dillenbaugh Creek areas. By contrast, the downstream portion of the Chehalis River and the areas chosen as reference for Dillenbaugh Creek and the Chehalis River had hazard quotients less than 1 for these species.

In the terrestrial habitat, hazard quotients greater than 1 were estimated for the vole in the wetland. By contrast, the hazard quotients calculated for the mallard duck were less than 1 in all areas of the wetland.

In this evaluation, a deliberately conservative approach was taken so that potential impacts would not be underestimated. Results of this evaluation indicate the potential for negative impacts to ecological receptors exists, but the true magnitude or severity of these impacts is unknown due to the uncertainties inherent in the approach.

REMEDIAL ACTION OBJECTIVES

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

The remedial action objectives (RAOs) for final action are designed to remove the potential threats to public health and the environment by significantly reducing the volume of contaminated soil (mass of contaminant, see Table 2-4).

Table 2-4—Soil Volumes Exceeding Cleanup levels

Location	Volume (cubic yards)
Treatment Area	25,600[a]
Mill Area	1,800[a]
Landfill	55,500[a]
Chehalis Avenue Area	14,300[b]

[a] Soil exceeding risk threshold of 10^{-5}.
[b] Soil exceeding risk threshold of 10^{-4}.

The RAOs include:

- Protect human health in the Chehalis Avenue area by excavation of contaminated soil to meet MTCA Method B (residential) cleanup standards.

- Protect human health from physical and chemical hazards from the facility by demolition and removal of facility structures.

- Protect human health and the environment by source control through excavation of ACC facility soil from the most highly contaminated areas, and meeting MTCA cleanup standards through containment and institutional controls. RCRA subtitle C requirements are not applicable to remedies on the facility or within the AOC because the contaminants were not listed at the time of release and contamination of the environmental media remaining after the action is low level. Subtitle C requirements and the state of Washington minimum functional standards for landfills are also not relevant or appropriate to remedies at the facility because the requirements are not well suited to the site or site conditions. For example, no leachate has been identified and the site is located in a flood plain which is frequently inundated, depth to groundwater is less than 10 feet, etc.

- Protect the environment through removal of contaminated sediment in the lagoon and stormwater sewer to meet ambient water quality criteria (AWQC) and MTCA cleanup standards for surface water in Dillenbaugh Creek.

- Protect human health and the environment by removal of the floating product underneath the treatment works to meet Safe Drinking Water Act (SDWA) MCLs and MTCA clean up levels for groundwater at the facility boundary.

- Disposal of the most highly contaminated excavated material at an approved off-site hazardous waste landfill. A hazardous waste designation is relevant and appropriate for off-site transportation and disposal of soil and debris from the facility.

By cleaning up the facility and adjacent AOC soil the major source of contamination and, therefore, the risk to the general community will be reduced and eliminated, respectively. In addition, source control and reduction in volume of contamination will be achieved and state and federal criteria for the protection of human health and the environment will be met.

DESCRIPTION OF ALTERNATIVES

Alternative 1: No Action/Monitoring

Evaluation of a no action alternative is required in order to provide a basis for comparison of existing conditions and risks of potential conditions resulting from implementation of other remedial alternatives.

Major Components of the Remedial Alternative

Under the no action alternative, no additional remedial action would be taken to eliminate existing sources of contamination or to reduce the risks to humans or the effects on the environment. Annual groundwater and surface water sampling would be performed for thirty years to monitor the presence and migration of contamination in those media. A five-year review of this alternative would be performed to assess the threat due to contaminated soil and groundwater present.

Treatment Component

There is no treatment component for this alternative. Reduction in toxicity or volume would occur only through natural processes such as photodegradation or biodegradation. Toxicity, mobility and volume of the contaminated materials would remain at their present value for an indefinite period of time.

Containment Component

Containment is not a component of the no action alternative.

General Component

The no action alternative would be implemented simply by initiating and continuing long-term groundwater and surface water monitoring. Administratively, a contract for collection and analysis of the water samples would be established on a yearly basis or for periodic renewal.

Costs and Remediation Time Frame

The cost for this alternative includes groundwater monitoring, and is estimated at $250,000. This represents the collection and analysis of ten groundwater samples and four surface water samples per year over a thirty-year period. There are no capital costs for this alternative. It would take one-to-two months to implement.

Physical Effects on Environment Caused by Implementation

The no action alternative would not remove contaminated soil or sediment from the ACC facility or AOC. The risk from implementation of this alternative is minimal.

Alternative 2: Limited Action/Industrial Controls

Major Components of the Remedial Alternative

In this alternative the facility structures, treatment works, and above- and below-ground tanks and pipes would be removed. Floating product would be extracted from the groundwater. Soil from the Chehalis Avenue area would be excavated and consolidated on the facility. Institutional controls would be imposed and annual groundwater and surface water monitoring would be performed.

Treatment Component

This alternative does not have a treatment component.

Containment Component

This alternative does not have a containment component.

General Component

Structures and equipment in the treatment works area would be removed. Pipes, tanks, and metal debris would be cleaned using high-pressure water, and recycled or disposed of off-site. Carbon adsorption would treat the wastewater generated by this activity. The treated water would be discharged into the stormdrain system. Contaminated water found in tanks and pipes would be treated with carbon adsorption and discharged. Uncontaminated building debris would be recycled or disposed in a municipal landfill as appropriate.

Drums on the ACC facility containing solids and liquids would be recycled or disposed. Drums of soil cuttings would have their contents consolidated on the facility. Filter cake, from incineration of contaminated soil in 1988 and 1989, would be taken to a RCRA landfill for disposal. Ash from past on-site incineration deemed non-hazardous by the state would be consolidated on the facility. Liquid in drums would be sampled, recycled if possible, or sent to a treatment or disposal facility. All emptied drums would be cleaned with high pressure water and recycled. Nonhazardous material would be disposed at the municipal landfill.

The floating product below the treatment works would be extracted and recovered by an oil-water separator. Approximately 10,000 gallons of oily water would be pumped into a holding tank prior to oil-water separation. Treatment following oil-water separation would be required to achieve the substantive requirements of National Pollution Discharge Evaluation (NPDES) criteria before the water was discharged into the storm drain system. Oil recovered from the separator would be placed in drums and disposed at a hazardous waste treatment facility as per the remedial design.

Contaminated soil in the Chehalis Avenue area would be excavated from around homes, yards and the playfield. Approximately 14,300 cubic yards of soil would be removed. The soil would be transported to the facility for consolidation on the facility. Clean topsoil would be spread to the original grade in the Chehalis Avenue area to replace the excavated material and the area would be revegetated.

The entire ACC facility would be covered with 18-24 inches of clean fill, graded and contoured to a surface slope that promotes drainage. Hydroseed would be applied to the cover for protection.

Institutional controls would be implemented. Access to the facility and the storm water discharge lagoon would be restricted by erection of a chain link fence. The fence would be posted with warning signs to keep out potential intruders. Deed restrictions would be imposed to limit future use of the property.

Performance monitoring of groundwater and Dillenbaugh Creek water would be performed as per the Performance Monitoring Plan prepared in remedial design.

Costs and Remediation Time Frame

The limited action/institutional controls alternative would take 6 to 7 months to complete. The total estimated cost for this alternative is $3.8 million. Capital costs are $3.5 million, and would include excavation, demolition of the treatment works, enhancement of facility drainage, wastewater treatment, and security measure. Long term monitoring would be the same as Alternative 1 and would represent operation and maintenance costs of $250,000.

Physical Effects on Environment Caused by Implementation

The physical effects on the environment are minimal. Runoff of contaminated rainwater into the wetland could occur during soil consolidation on the facility and during facility demolition. Dikes, berms and oil absorbing booms would be used to control runoff. Work would be scheduled during dry summer months to minimize runoff.

Compliance with ARARS

This alternative may meet ARARS since contaminated soil and groundwater could be contained and institutional controls and performance monitoring are proposed. ARARS (MTCA Method B clean up goals) for soil would be met for the Chehalis Avenue Area and on the facility through containment.

Alternative 3: Off-Site Disposal

Major Components of the Remedial Alternative

In the off-site disposal alternative, contaminated soil and sediment at the facility and in the AOC, which exceed risk criteria, would be excavated. This material would be transported to an appropriate off-site facility for disposal. All structures on the facility would be demolished. The floating product layer below the treatment area would be removed.

Treatment Component

This alternative has no treatment component for soil, but does treat groundwater to some extent.

Containment Component

This alternative has no containment component.

General Components

Soil in the Chehalis Avenue area contaminated with PAHs, PCP and dioxin above cleanup criteria would be excavated and transported to a hazardous waste landfill. The soil would be excavated to a depth of approximately 8 inches involving approximately 14,300 cubic yards. Temporary relocation of residents and businesses may be required during soil excavation. Following excavation, the area would be backfilled with clean soil and revegetated with hydroseed or covered as appropriate.

Removal of the lagoon sediment would require a temporary diversion of the lagoon stormdrain to the north-south stormsewer that discharges to Dillenbaugh Creek. The stormdrain would be cleaned and relined.

The lagoon water and sediment would be removed by suction dredging. The sediment would be pumped to a staging basin and press for dewatering. The dewatered sediment would be transported via trucks for off-site disposal at an approved RCRA landfill.

Wastewater generated from the lagoon dewatering process would be treated in a transportable wastewater treatment system. The treatment system would be used to treat water generated by all cleanup activities on the site. Treated water would be discharged to the stormsewer system.

Structures, drums, tanks, and debris would be removed from the facility as described in Alternative 2. Construction debris would be recycled or used as backfill in excavations, depending on the character of the material. Soil would be excavated from the areas shown on Figure 2-9. Subsurface soil under the treatment works and around the surface impoundment would be excavated to a depth of approximately 10 feet, generating 25,600 cubic yards of soil.

Upon razing of the treatment works, the floating product layer would be removed as described in Alternative 2.

Subsurface soil to the south of the kilns would be excavated to a depth of 6 to 15 feet. Surface soil in the northwest corner of the mill would be excavated to a depth of 1 foot generating 1,800 cubic yards of soil for disposal. Similarly, 55,500 cubic yards of soil would be excavated from the landfill.

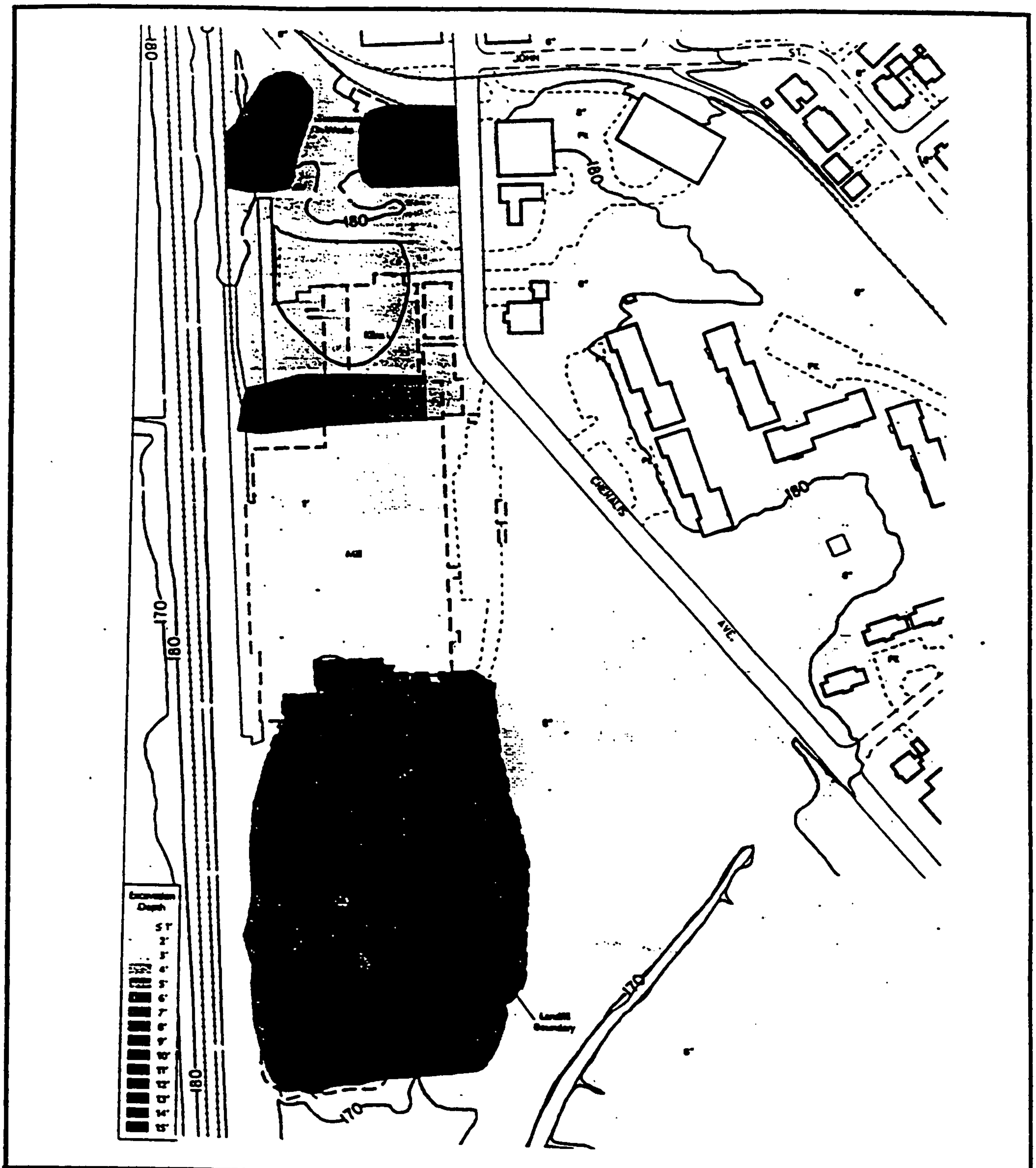
Runoff controls would be implemented during excavation. The facility would be contoured to promote runoff and covered with topsoil and seeded. Groundwater and surface water monitoring would be performed annually as described in Alternative 2.

Costs and Remediation Time Frame

The estimated time to complete this alternative is 1 year. The total estimated present worth cost for off-site disposal is $42.7 million. Total capital costs of $42.5 million include demolition and removal of all structures on the facility, wastewater treatment, drainage enhancement, and contaminated soil disposal. Operation and maintenance costs of $250,000 consist primarily of long-term monitoring.

Physical Effects on the Environment Caused By Implementation

Excavation and handling of contaminated media during implementation of Alternative 3 would pose some risk to the environment. Preventative measures would be taken to prevent migration of contaminated materials during remediation. During excavation on the facility, releases to the environment would be mitigated by the use of runon/runoff diversion techniques. Flood contingency plans would be enacted within 48 hours notice of an impending flood to prevent spread of contamination.



Scale in Feet

100 0 100

50

American Crossarm & Conduit
Offsite Disposal Excavation Plan

FIGURE

2-9

Dredging of the lagoon could damage surrounding foliage and release contaminated water and sediment into Dillenbaugh Creek. Measures would be taken to minimize the effects of this action by preventing lagoon flow to the creek during sediment removal.

Compliance With ARARs

MCLs—This alternative meets SDWA MCLs at the facility boundary through removal of non-aqueous phase liquid (NAPL) and contaminated soil which will reduce the potential for further contamination of the aquifer and groundwater monitoring at the facility boundary.

Water Quality Standards—Federal and State water standards for Dillenbaugh Creek would be met. Treatment of the facility soil to cleanup levels would result in contaminant levels protective of Dillenbaugh Creek based on AWQC.

MTCA—Achievement of risk-based cleanup levels for contaminated soil under the industrial (ACC facility area) and residential (Chehalis Avenue area) scenarios would also meet the risk-based cleanup levels under MTCA Method B. Restoration of the lagoon and creek water to ambient water quality criteria would meet MTCA Method A cleanup levels for surface water. MTCA Method A cleanup levels for groundwater would be met at the facility boundary.

Clean Water Act—Wastewater would be treated to meet the substantive requirements of the state NPDES permit prior to discharge to the surface water bodies within the area of contamination.

RCRA—Temporary storage of soil and wastewater within the area of contamination would conform to storage requirements (40 CFR 264 Subparts I, J, and L). Secondary containment, leak detection devices, and flood-proofing provided for the storage units would meet RCRA regulations.

The remedial activities at the facility and in the AOC would be conducted according to applicable sections of RCRA and Washington State Dangerous Waste regulations using procedures to prevent releases or damage during a 100-year flood. Off-site disposal would be performed with RCRA facilities which are in compliance with their permits and permitted to accept F032 wastes.

Alternative 4: Incineration

Major Components of the Remedial Alternative

This alternative, consists of removing soil contaminated with PCP, PAHs, and dioxin above cleanup levels, transferring the material to an incineration system located on the facility and treating it to levels at or below the goals. Groundwater under the treatment area would be remediated using biological degradation. The floating product layer in this same area would be removed.

Treatment Component

A transportable incinerator would be brought to the facility and set up in the AOC between Chehalis Avenue, the mill, and the landfill. The incinerator would be located on a raised earthen platform for flood protection. Contaminated areas in the location of the platform would be excavated prior to platform construction. A soil staging pad would be constructed for dewatering and staging the soil for the incinerator. A wastewater treatment system would be located on the platform. The incinerator would be used to incinerate surface soil from the mill, Chehalis Avenue area soil, subsurface soil from the kiln, lagoon sediment, surface and subsurface soil from the treatment area and landfill. After treatment is complete the incinerator would be removed.

A groundwater remediation system using biological degradation would be installed to remediate groundwater at the three localized ares under the treatment area. The groundwater treatment system would consist of one extraction well in approximately the same location as the floating product well and four injection wells. Groundwater would be extracted, supplemented with nutrients, and reinjected to enhance natural biodegradation of PCP and PAH. The process would continue until groundwater cleanup levels were met or the process proved ineffective.

Containment Component

This alternative has no containment component in as much as the treated soil would be placed back on the facility.

General Component

Site structures would be demolished and removed as described in Alternative 2. Drums of solid and liquid waste would be treated in the incinerator. Drums of filter cake from the previous incinerator efforts would be collected for disposal at a hazardous waste landfill.

Contaminated soil, approximately 1,800 cubic yards, from the mill area would be excavated and incinerated. Treated soil would be transported back to the facility for consolidation. Due to the probability that some soil may not meet cleanup requirements for lead, a solidification processing unit would be used to solidify the treated soil or containment as appropriate. The soil would be mixed with solidification agents and would be discharged on the facility. Soil that has lead below action levels would be off-loaded directly to the facility.

Chehalis Avenue area soil contaminated above risk goals, approximately 14,300 cubic yards, would be excavated and transported to the facility. Soil requiring treatment to achieve cleanup levels, approximately 4,400 cubic yards, would be processed through the incinerator. Treated soil would be off-loaded in the mill area. The remaining Chehalis Avenue soil would not require treatment and would be taken directly to the facility for consolidation.

Contaminated subsurface soil behind the kilns would be excavated as described in Alternative 3 and treated in the incinerator. Treated soil would be placed back on the facility.

Lagoon sediment would be dredged, dewatered and processed through the incinerator. Treated sediment would be consolidated on the facility.

Subsurface soil under the treatment area (surface impoundment and treatment works), approximately 12,700 cubic yards, would be excavated and processed through the incinerator. Treated soil would be used for backfill in the same excavated area. Approximately 5,900 cubic yards of surface soil in the treatment area would be excavated to a depth of 2 feet and incinerated.

Soil in the landfill, approximately 55,500 cubic yards, would be excavated and screened prior to incineration. Approximately 47,000 cubic yards would be incinerated and 8,500 cubic yards of debris would be taken to an off-site RCRA landfill. Treated soil would be placed back into the landfill.

The ACC facility would be contoured to enhance runoff. Clean fill from the incinerator platform would be spread to a depth of 6 inches over the facility and revegetated.

The groundwater remediation system described previously would be used to remediate the groundwater under the treatment works. An extraction system similar to that described in Alternative 2 would be installed to remove floating product beneath the treatment works. Removal of floating product would occur prior to excavation in the treatment area.

Runoff controls would be installed as well as groundwater and surface water monitoring, as described in Alternative 3.

Costs and Remediation Time Frame

This alternative would take 28 months to implement. Groundwater remediation would continue indefinitely. The total present worth cost for this alternative is estimated at $103 million. Capital costs, $102 million, include incineration and consolidation of the soil, construction of the treatment platform and dewatering pad, building demolition, and wastewater treatment. Operation and maintenance costs, $862,000, include monitoring costs and groundwater treatment.

Physical Effects on the Environment Caused by Implementation

Although short-term risks for either releases to the environment or exposure to humans would be escalated during excavation, storage, and treatment activities, precautions would be taken to prevent exposure and mitigate migration of contaminated materials. Those risks would be similar to Alternative 3. The transportable incinerator would be operated according to treatment performance requirements to prevent unacceptable risk to the environment. A risk assessment would be performed prior to implementation of this technology to insure that the environment would not be adversely affected.

Compliance with ARARs

MCLs—*In situ* biological treatment of the contaminated aquifer would be designed using SDWA MCLs cleanup levels. Although groundwater treatment systems would not be applied to other areas, source removals may be sufficient in addition to natural degradation to meet MCLs at the facility boundary.

MTCA—MTCA cleanup standards (goals) would be achieved under this alternative.

Clean Water Act—Discharges of wastewater to surface-water bodies within the area of contamination would be treated to meet the substantive requirements of the state NPDES permit.

RCRA—Temporary storage of soil and wastewater within the area of contamination and flood contingency plans would be performed in compliance with applicable RCRA requirements.

RCRA treatment and performance requirements for fixed-base incinerators (40 CFR 264 Subpart O) would be anticipated to be relevant and appropriate to the activities described for this alternative. The transportable incinerator would be designed to meet these requirements, and monitored to ensure compliance.

Alternative 5: Containment

Major Components of the Remedial Alternative

Remedial action taken in this alternative consists of consolidating all contaminated soil and sediment from the AOC on the ACC facility. The area would be capped to prevent contact with the contaminated soil and to prevent rainwater infiltration. The alternative also includes deed and access restrictions and groundwater and surface water monitoring.

Treatment Component

This alternative has no treatment component.

Contaminant Component

Contaminated soil and sediment would be consolidated on the facility and covered with an impermeable layer to prevent people from coming into contact with the contamination and to prevent rainwater infiltration. Following soil consolidation, a 6-inch bedding layer would be graded and rolled over the soil. An impermeable membrane would be placed over this layer. Drainage pipe circumscribing the capped area would discharge collected surface water to a ditch. The final layer of the cap would consist of topsoil and vegetation. The cap would be vented to release any gases generated.

General Components

In preparation for capping all facility structures would be razed and disposed as described in Alternatives 2 and 3. Drums of waste material, debris, ash, and above and below ground tanks would be handled as described in Alternative 2.

Approximately 14,300 cubic yards of contaminated soil from the Chehalis Avenue area would be excavated and placed on the facility. Similarly, dewatered sediment and soil from the lagoon would be consolidated with the Chehalis Avenue soil. Contaminated lagoon water would be removed from the sediment, treated, and discharged to Dillenbaugh Creek. The storm drain would be cleaned and relined.

Because contamination would remain on the facility, deed and access restrictions would be imposed as outlined in Alternative 2. Groundwater and Dillenbaugh Creek would be monitored annually as described in Alternative 1.

Costs and Remediation Time Frame

Containment and associated remedial actions would take 1 year to complete. The estimated present worth cost for this alternative is $7.1 million. Capital costs which include excavation, consolidation and capping are $6.8 million. Operation and maintenance costs are approximately $265,000 and include monitoring, inspection and fence/cap repair.

Physical Effects on Environment Caused by Implementation

The risks to the environment from this alternative are similar to those in Alternative 3 and similar measures would be taken to minimize the impact. Flood contingency plans would be imposed for this alternative in the short term for removal of highly contaminated containerized materials upon notification of an impending flood. Long-term flood contingency is not needed because the flooding is passive and not expected to effect the performance of the cap. Additional risks are associated with leaving the contaminated soil in place without treatment although transport from infiltration and exposure would be reduced by the cap.

Compliance with ARARS

MCLs—This alternative does not include activities to remediate the aquifer or remove the subsurface contamination. Therefore, this alternative is not expected to meet MCL at the facility boundary.

Water Quality Standards—Federal and state water quality standards would be met for Dillenbaugh Creek and the lagoon upon removal of contaminated lagoon water and sediment. No effluent discharges would be made to the creek. Containment of the facility soil would mitigate the contaminant source for the lagoon and creek through stormwater runoff.

MTCA—This alternative would meet the risk-based cleanup levels under MTCA Method B through containment. The pathway for exposure by inhalation, ingestion, and dermal contact would be eliminated, reducing the overall risk. MTCA Method cleanup levels for groundwater would not be met at the facility boundary indefinitely, although natural attenuation would work to reduce contaminant concentrations. Restoration of the lagoon and creek water to AWQC would meet MTCA cleanup levels for surface water.

RCRA—This alternative would not meet relevant and appropriate RCRA (40 CFR 264) siting requirements for hazardous waste landfills, since portions of the facility landfill are below the seasonally high water table and are located within the 100-year floodplain without washout protection. Although minimum technical requirements (MTRs) would not be used, the 4- to 20-foot low-permeability layer underlying most of the facility area is expected to prevent the migration of residual contamination into the aquifer.

Off-Site Treatment and Disposal

Major Components of the Remedial Alternative

This remedial action consists of excavating the contaminated soil from the ACC facility and AOC, as described in Alternative 3. This material would be sent to an off-site incinerator for treatment. Incinerator ash would be disposed in a RCRA hazardous waste landfill. Structures and soil would be removed from the facility. The areas would be backfilled with clean soil and reseeded.

Currently there are no commercial hazardous waste incinerators permitted to treat the wood treating waste found at the facility (F032 wastes). This alternative would be implemented in the event that a permitted facility becomes available and includes the assumption that the incinerator facility would also be responsible for final deposition of the treatment residuals.

Treatment Component

Treatment would be similar to processes described in Alternative 4 but the incinerator would be located at an off-site commercial facility.

Containment Component

This alternative has no on-site containment component.

General Components

This alternative has the same general components as Alternative 3 except the excavated materials would be treated in an off-site incinerator prior to disposal in a landfill.

Excavated soil and sediment would be dewatered on the facility and shipped to the incinerator facility in covered transport trucks. Landfill material would require screening to remove metal and other debris prior to shipment. Material removed from the screening process would be taken to an off-site RCRA landfill for disposal.

After all structures and soil are removed from the facility, these areas would be backfilled with clean soil and reseeded.

Costs and Remediation Time Frame

Approximately 3 years is estimated for implementation of this alternative. Off-site treatment and disposal is the most expensive alternative with an estimated present worth cost of $292.6 million. Capital costs include excavation and off-site incineration and are $292.3 million. Operation and maintenance costs are $250,000, similar to all previous alternatives.

Physical Effects on Environment Caused by Implementation

The physical impact on the environment of this alternative would be equivalent to Alternative 3. Environmental risks would be minimized by providing secondary containment for storage tanks and other storage areas and by implementing runoff controls during remedial action.

Compliance with ARARs

MCLs—Similar to that discussed in Alternative 3, this alternative only includes removal of the floating product and would only achieve MCLs at the facility boundary.

Water Quality Standards—Similar to Alternative 3, federal and state water quality standards are anticipated to be met in this alternative.

MTCA—Achievement of risk-based cleanup levels for contaminated soil under the industrial (ACC facility area) and residential (Chehalis Avenue area) scenarios would meet the risk-based cleanup levels under MTCA Method B. MTCA Method groundwater cleanup levels would be met by this alternative at the facility boundary. Restoration of the lagoon and creek water to AWQC would meet MTCA Method cleanup levels for surface water.

Clean Water Act—Wastewater discharged to surface-water bodies within the area of contamination would be treated to meet the substantive requirements of the state NPDES permit and would comply with Clean Water Act requirements.

RCRA—Temporary storage of soil and wastewater within the area of contamination, and flood contingency plans would meet RCRA storage requirements as outlined in 40 CFR 264 Subparts I, J, and L. This alternative is not plausible without an available permitted hazardous waste incinerator. 40 CFR 264 Subpart O requires that 99.9999% destruction removal efficiency (DRE) be achieved for dioxin-containing wastes. This performance standard is expected to apply. Currently, no commercial hazardous waste incinerator is permitted to burn dioxin-containing waste.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The following section discusses the comparison of alternatives with respect to the nine statutory CERCLA requirements.

Protectiveness of Human Health and the Environment

All cleanup alternatives except No Action provide protection to human health and the environment. Alternatives 2 and 5, which allow the most highly contaminated low-level material to remain on the facility, are less protective.

Institutional controls are relied upon in Alternative 2 to maintain protection of human health. Some risk to the environment would still exist in Alternative 2 as a result of contaminated lagoon sediment remaining in place and releasing toxics to Dillenbaugh Creek.

Compliance with Applicable or Relevant and Appropriate Requirements

Alternatives 2, 3, 4, 5, and 6 which remove surface soil in the Chehalis Avenue area would meet the Washington State Model Toxics Control Act (MTCA) Standards.

None of the alternatives would meet all MTCA cleanup standards for unrestricted use for soil and groundwater on the facility. Several facts have been considered in proposing a remedy that complies with MTCA. These include the following:

- It is not possible to reuse or recycle the contaminated soil, nor is it practicable to treat all the contaminated soil and the groundwater. However, if treatment can be done to significantly lower the risks posed by the site, it should be done;
- The most highly contaminated materials should be removed; and
- Contaminants remaining on the facility should be contained. When contamination remains, MTCA requires institutional controls to restrict future access and use.

In the short term, Federal Drinking Water Standards for contaminated groundwater will likely be met at the facility boundary under all of the alternatives. However, under Alternatives 2, 3, 4, and 6, the most significant sources of groundwater contamination would be removed increasing the compliance term.

All alternatives involving removal and treatment or off-site disposal of contaminated soil would meet Federal and State Resource Conservation and Recovery

Act (RCRA) standards for proper disposal of this material. These standards chiefly apply to Alternatives 3, 4, and 6.

Long-Term Effectiveness and Permanence

Alternative 4, involving on-site treatment, along with Alternative 6, involving off-site incineration, permanently destroy PAH and other organic compounds. Alternative 3 involves solidification as the treatment process prior to disposal in an off-site landfill to permanently limit the mobility of the contaminants in that material. Alternatives 2 and 5, involving institutional controls and containment, do not permanently remove or destroy the contaminants.

Alternatives 1, 2, and 5, which allow contaminated soil to remain on-site, risk the potential for a flood to cause off-site migration.

Reduction of Toxicity, Mobility, and Volume

Alternative 4 and Alternative 6 provide the highest reduction of toxicity, mobility, and volume by permanently destroying the contaminants. Solidification, employed in Alternative 3, will limit the mobility of the contaminants in the solidified material as it will be disposed in a controlled landfill. Alternative 5 provides reduction in mobility and volume through enhanced biodegradation and capping. Alternatives 1 and 2 do not provide any reduction through treatment.

Short-Term Effectiveness

Alternatives 2 and 5, which involve capping, provide the greatest short-term effectiveness because they can be implemented most quickly and result in the least risk to workers and the community. All alternatives other than the no action alternative involve the removal of contaminated soil and could have negative short-term impacts such as dust generation, particularly in areas with heavy contamination. Alternatives 3, 4 and 6 also involve excavation and treatment or disposal of much larger volumes of soil. Those alternatives would present greater short-term risks and would require the most extensive measures to mitigate short-term risks.

Implementability

All of the alternatives can be implemented with existing technologies, although with varying degrees of difficulty. Alternatives 1, 2 and 5 involve less excavation, making the logistical work involved with their implementation relatively easy. Alternative 4 would require extensive staging of material prior to and immediately after treatment, and is considered the most complex to implement. This alternative is also complicated to implement due to the location of the facility in an active flood plain. Alternative 6 involves the excavation and off-site treatment of contaminated soil. It may be difficult to locate a commercial off-site incinerator that could handle the soil in Alternative 6.

Cost

Alternative 1 has the lowest cost due to the minor remedial work performed. Alternative 2 has the next lowest cost because it relies on institutional controls which are inexpensive to implement. Alternative 5 is third lowest because it does not treat soil but contains it on-site. Alternatives 3, 4 and 6 have the highest costs because they dispose of the soil off-site or treat the soil using incineration, all of which have significant costs.

THE SELECTED REMEDY

Based upon consideration of CERCLA requirements, the detailed analysis of alternatives against the nine criteria, and comments from the public, the EPA and State of Washington have determined that a combination of Alternative 3 (off-site disposal) and Alternative 5 (containment) is the most appropriate remedy for the facility and AOC in Chehalis, Washington. The selected remedy is appropriate because it meets all the RAOs (see p 2-31), has good long-term effectiveness and permanence, reduces the volume and mobility of contamination, is highly effective in the short term, is quickly implementable, and has a relatively low cost.

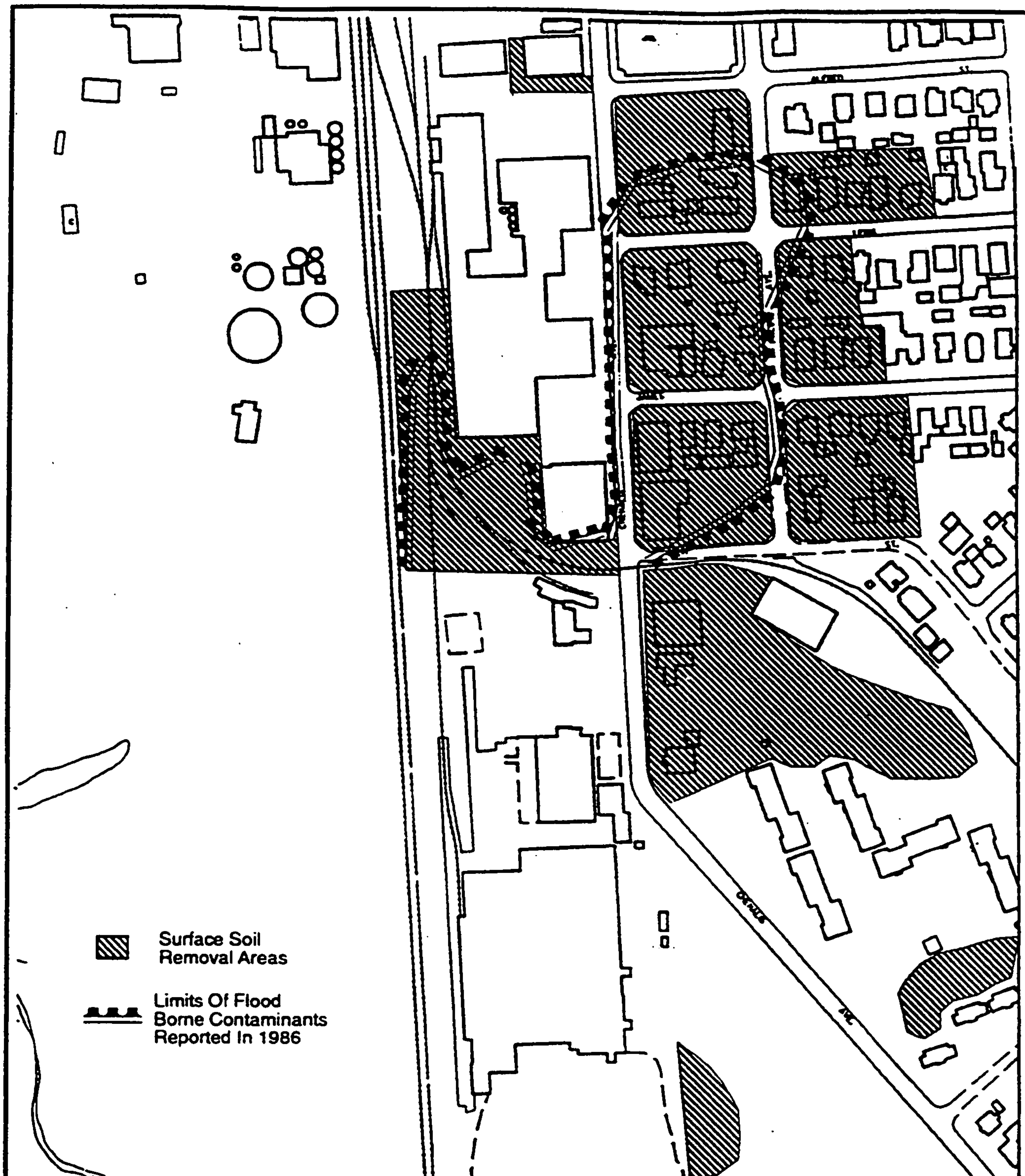
Major Components of the Selected Remedy

AOC

Soil in the Chehalis Avenue area contaminated with PAHs, PCPs, and dioxins will be excavated and consolidated on the facility. Approximately 8 inches of soil will be excavated from the areas outlined in Figure 2-10. This will include the playfield adjacent to the facility. A total volume of approximately 14,300 cubic yards will be excavated and the areas will be back filled with clean soil and seeded.

Discussions with affected home owners will be held to inform them of the plans for excavation. Permission to excavate soil on private property will be obtained prior to work in that area.

The design will incorporate requirements to minimize disturbance of residents. Excavation of soil in the Chehalis Avenue area will be performed in such a manner that disruption is minimized. Areas such as single blocks will be done at



Scale in Feet

200 0 200

100

Chehalis Avenue Area Excavation Plan

FIGURE

2-10

a time to minimize residential impact. Working hours will be set and noise abatement employed as necessary to be compatible with a residential setting.

The design will incorporate appropriate safety and health protection. Air monitors will be set up at work area boundaries to assure ambient dust levels and contaminant concentrations do not adversely affect surrounding residents. Decontamination will occur on heavy equipment prior to entering uncontrolled public roadways to control contamination migration. Dust control measures will also be employed.

The design will contain a confirmatory performance monitoring plan so that after soil excavation is complete and prior to backfilling, confirmatory sampling will be performed to verify the remaining soil does not exceed cleanup levels. Details of the sampling scheme will be determined during remedial design.

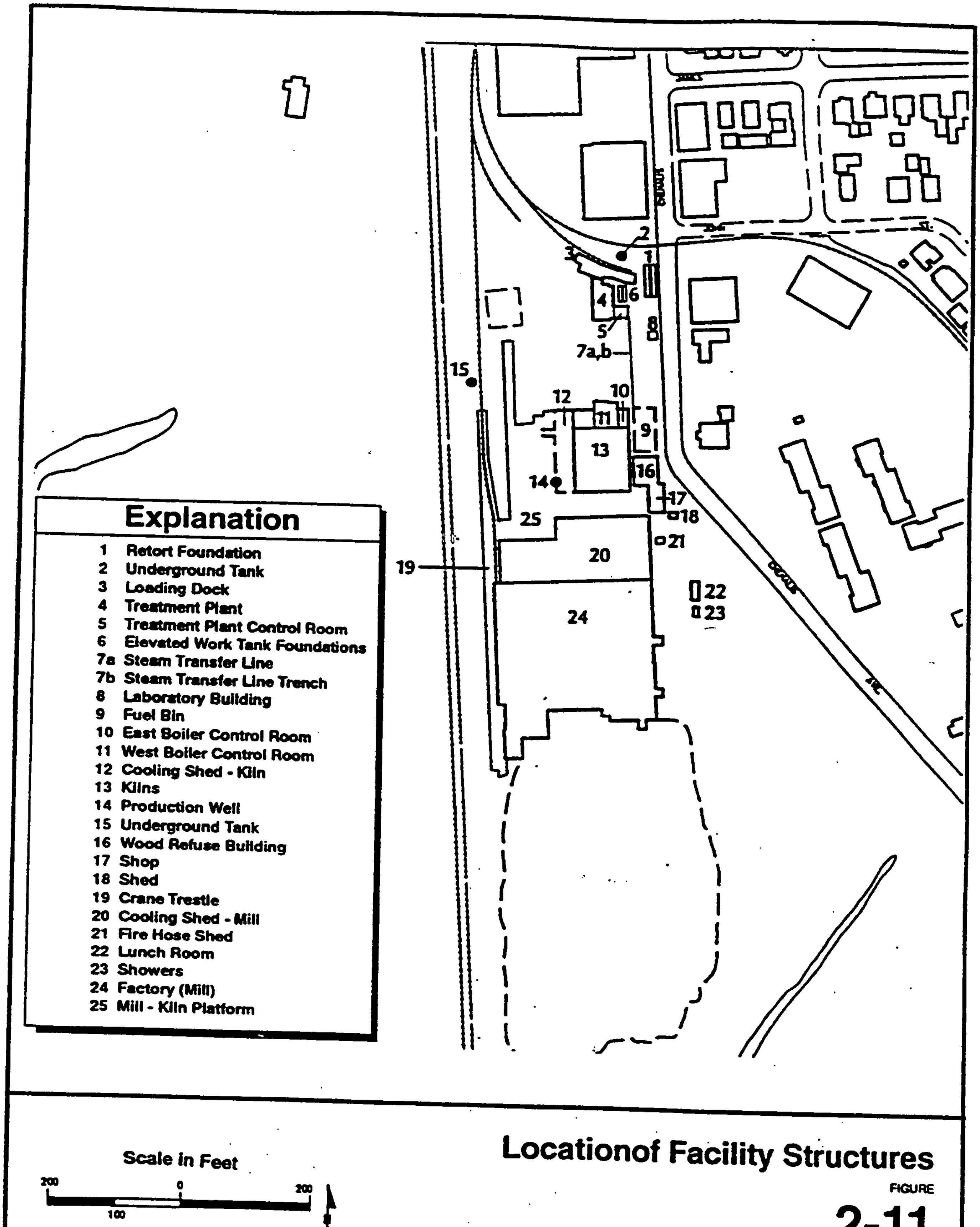
Contaminated sediment in the storm water discharge lagoon will be removed by dredging and/or excavating. Contaminated sediment from the stormsewer drain will be removed and the storm drain cleaned. The sediment will be dewatered and transported to an approved RCRA hazardous waste disposal facility. The sewer will be relined in such a manner that results in no reduction of flow capacity and the lagoon contoured to provide containment capacity for the city of Chehalis stormwater discharges. Removal of the stormwater discharge lagoon sediment and cleaning and relining the storm drain will be performed such that no discharge of contaminated water or sediment is released to Dillenbaugh Creek.

ACC Facility

All facilities and structures will be demolished. Figure 2-11 outlines the structures and equipment which will be removed. These include:

- below-ground tanks
- treatment works
- steam transfer lines
- laboratory building
- boiler control room
- 8 kilns
- sheds
- shop
- crane trestle
- mill
- fuel bin

Demolition debris will be cleaned and recycled when feasible. Otherwise, it will be disposed in a permitted landfill as appropriate.



Locationof Facility Structures

FIGURE

2-11

The facility production well and unnecessary resource protection wells will be abandoned in accordance with WAC 173-160.

The most highly contaminated surface and subsurface soil on the facility would be excavated as outlined in Figure 2-12. Excavation would include approximately 2 feet of surface soil in the treatment area, 10 feet of subsurface soil under the treatment works and the surface impoundment, and 6 feet of subsurface soil to the south of the kiln. Approximately 20,000 cubic yards will be excavated from the area and will be transported to a RCRA approved off-site hazardous waste disposal facility. Treatment studies will be performed to evaluate the benefits of stabilization prior to disposal. If treatment shows a reduction in leachability to below TCLP requirements for lead and PCP, consideration will given to solidifying the soil at the off-site landfill prior to disposal.

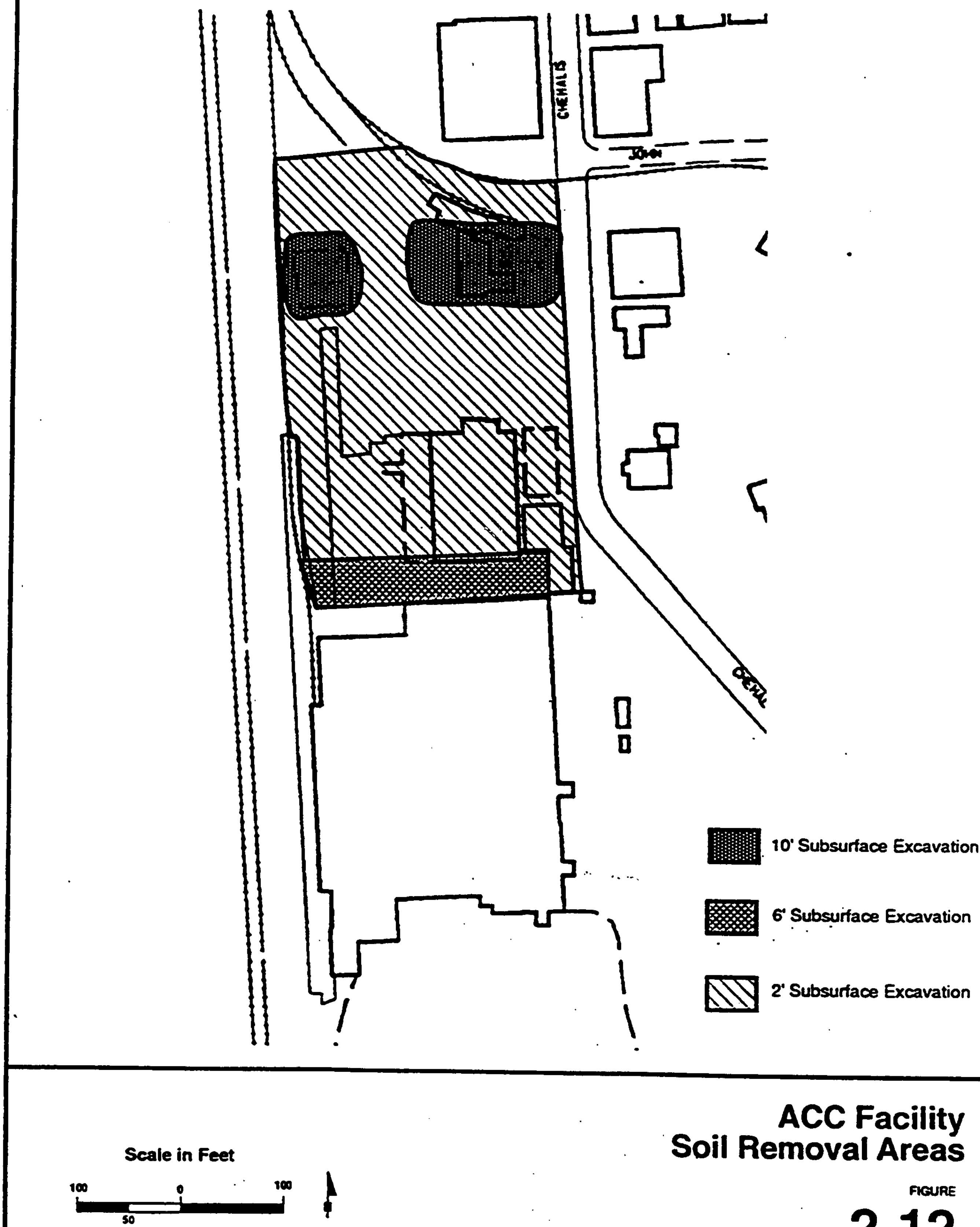
During excavation of the treatment works and surface impoundment, physical processes will be used to remove the floating product on the groundwater. Oil absorbent materials, water removal pumps and an oil water separation or other equivalent processes will be used to achieve removal of the major mass of floating product. The oil removed will be disposed at an off-site hazardous waste treatment facility.

Wastewater generated from site activities will be treated to substantive requirements of the state of Washington National Pollution Discharge Elimination (NPDES) standards prior to on-site discharge or be taken off-site for disposal.

Incinerator ash from incineration of contaminated soil in 1988 and 1989 will be consolidated with the Chehalis Avenue residential soil consistent with Ecology's determination of the non-hazardous nature of the ash. The consolidated soil and ash will be used to backfill excavation under the treatment works and surface impoundment. Clean backfill will be used to fill the excavation to surrounding grade.

During remedial design, a computer model will be used to compute the backwater curve so that no or negligible net increase in floodwater elevation will result from the remedy. The entire facility (see facility boundary Figure 2-2 will be covered with clean topsoil, properly sloped and contoured and revegetated with grass.

Runon/runoff controls will be implemented to prevent contaminated water from entering the wetland or Dillenbaugh Creek. Work will be scheduled to coincide with the dry part of the year to minimize potential flood damage and runoff. The wetland and creek will be left to recover naturally.



ACC Facility
Soil Removal Areas

FIGURE
2-12

A Performance monitoring program will be developed as a part of the remedial design. The monitoring program will be designed to monitor remedial action performance and to assess the risks to human health and the environment from the remedial action. This program will include annual monitoring of groundwater, Dillenbaugh Creek, the lagoon and other areas, as deemed necessary during design. The plan will also contain a provision for post-flood monitoring, as deemed necessary, to assess remedy performance.

In addition to the performance monitoring, post-flood monitoring and O&M activities described above, Five-Year Reviews are also an important component of the selected remedy. These periodic reviews, which are required no less often than each five years after initiation of the remedial action, will evaluate whether the response action remains protective of human health and the environment. At this site, the focus of these reviews should include: whether the cover over the facility remains effective, whether the land use controls remain in place, whether the water main under the landfill or other utility lines have become a potential migration route, whether the groundwater contamination remains confined to the facility, and the frequency and cost of O&M repairs and how these relate to protectiveness. If any of these items indicate remedy failure or a higher than acceptable potential for remedy failure, EPA, in consultation with the State, will consider whether or what further actions should be taken.

Institutional controls will be implemented. Access to the facility will be restricted by erection of a chain link fence around the entire facility. Deed notices and restrictions will be imposed to limit future use of the property, ensure that the cover and contamination below are not disturbed, and that current and future city utility maintenance, upgrades and or abandonment are consistent with the remedy objectives. Periodic site inspection and maintenance (cover, fence, signs) will be completed to review performance of the remedial action and determine needed maintenance. Five year reviews will be performed to determine the performance and protectiveness of the remedial action.

Cleanup Levels

The cleanup objectives for the facility and AOC are based on performance requirements which are consistent with the numerical cleanup criteria of the

Washington State Model Toxics Control Act (MTCA) regulations, Chapter 173-340 WAC. The cleanup standards (Method B, residential) are:

Compound	Maximum Groundwater Concentration	Cleanup Level—Groundwater	Maximum Soil Concentration	Cleanup Level—Soil
CPAH	600 ug/L	0.012 ug/L[a] 0.3 ug/L[b]	258,000 ug/kg	172 ug/kg[a]
PCP	91,400 ug/L	0.729 ug/L[a]	250,000 ug/kg	8,330 ug/kg[a]
TCDD	ND	0.00058 ng/L[a] 0.025 ng/L[b]	143,000 ng/kg	0.0066 ng/kg[a]

Notes:
a MTCA Method B (Carcinogenic)
b Practical Quantitation Limit
ND Not detected

Ecology concurs with the selected remedy. The selected remedy meets the cleanup levels in the AOC by removal and through containment on the facility [WAC 173-340-740(6)(d)]. Containment is an acceptable approach due to the fact that low levels of contaminants exceeding cleanup standards are present at all depths throughout the facility, resulting in large volumes of contaminated soil, and because the remedy includes compliance monitoring (WAC-173-340-410), institutional controls (WAC 173-340-440) other conditions of WAC 173-340-360(8).

The cleanup objectives are provided at specific areas within the facility which will be excavated to a given depth. Those objectives were developed through an alternative optimization evaluation performed in the feasibility study. Based on this evaluation, it was determined that 70% of the total contamination could be removed by excavating 25% of the soil as specified in the selected remedy. This approach optimizes the balance between contamination removal, treatment and cost, consistent with WAC 173-340-360(5)(d).

Protection of the Environment During Remedial Action

During implementation of the remedial action, measures will be used to mitigate impact on the environment.

During excavation in the Chehalis Avenue area, soil will be loaded into covered trucks. Trucks will be decontaminated to prevent spreading of contaminated material through the streets. Equipment will be cleaned prior to leaving the areas of excavation. Stormwater diversion techniques and runoff/runon control measures will be employed if necessary.

Precautions will be taken to prevent release to the environment and mitigate migration of contaminated material during demolition and excavation activities at the facility. Stormwater diversion techniques (runoff/runon control measures) such as covering areas under excavation, construction of diversion ditches, and the use of dikes and berms will be employed. In addition, excavation in low-lying areas will be conducted during the dry season to minimize runoff. Wastewater generated during the remedial action will be treated to protective levels (e.g., NPDES) prior to discharge to Dillenbaugh Creek.

Flood contingency plans will be enacted within 48 hours notice of an impending flood. These plans include immediate cessation of excavation activities and securing contaminated material to prevent dispersion.

Cost and Remediation Time Frame

Remediation is estimated to take 8 to 12 months to complete. Costs for the selected remedy are itemized in Table 2-5. Capital costs are $9.5 million and include excavation of soil, surface structure demolition, off-site disposal of the highly contaminated soil, and contour and grading of the ACC facility. Operation and maintenance costs are $250,000 and include water monitoring, cover maintenance and site inspection. Total present worth value is $9.7 million.

STATUTORY DETERMINATIONS

EPA's primary responsibility under its CERCLA authorities is to ensure that remedial actions at Superfund sites are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, final remedial actions must comply with applicable or relevant and appropriate environmental standards unless a statutory waiver is justified. The selected remedy must also be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element.

The selected remedy for the ACC facility, Chehalis, Lewis County, Washington meets all of the statutory requirements of Section 121 of CERCLA. The evaluation of the CERCLA criteria are discussed below.

Table 2-5—Cost Analysis—Selected Remedy

Description	Quantity	Unit	Unit Cost	Cost
Capital Costs				
1. Mobilization/Demobilization (Utility Hookup)		LS		$11,925
2. Site Preparation				
Decommission Utilities		LS		$1,500
Perform Site Survey	3	Day	$910.00	$2,730
Install Temporary Construction Fencing	3,000	LF	$5.65	$16,950
Remove & Replace Existing Monitoring Wells	11	Well	$3,500.00	$38,500
3. Structural Demolition and Disposal				
Mill Building		LS		$195,314
Kiln Building and Concrete Slab		LS		$86,865
Platform		LS		$42,130
Treatment Works		LS		$45,121
Tramway		LS		$33,650
Other Buildings & Misc. Items		LS		$5,535
Dispose of Drums w/Contaminated Materials	374	Drum	$136.00	$50,864
Recycle misc. items (tires, auto tanks, pipes, etc)	25	Ton	$75.00	$1,875
4. Storage Tank Removal & Reclamation	8	Tank	$6,750.00	$54,000
5. Water Control				
Construct Dewatering Pad	2,500	SY	$45.17	$112,925
Install Diversion Ditches & Berms	1,650	LF	$3.64	$6,006
6. Consolidation of Solids				
Temporarily Relocate Residents	160	PERS	$410.00	$65,600
Excavation of Chehalis Ave Soil	14,300	CY	$15.12	$216,216
Excavation of Contaminated Soil	19,400	CY	$2.30	$44,620
Hydraulic Dredging of Lagoon Sediment	3,300	CY	$3.00	$9,900
Dewater w/Plate-Frame Filter Press	3,300	CY	$38.75	$127,875
Hauling	14,300	CY	$2.25	$32,175
Backfill Excavations w/Clean Fill	19,400	CY	$4.69	$90,986
Clean Topsoil for Chehalis Ave. Area & Hydro-seed	14,300	CY	$16.00	$228,800

Table 2-5—Cost Analysis—Selected Remedy *(continued)*

Description	Quantity	Unit	Unit Cost	Cost
7. Soil Disposal (Off-Site Landfill)	19,400	CY	$250.00	4,850,000
8. Safety Monitoring and Sampling				
Soil Sampling and Analysis (1 sample/yard)	80	1 yard	$850.00	$68,000
Health & Safety Expend. (30 pers @ $60/pers/day)	90	Day	$1,800.00	$162,000
9. Wastewater Treatment	350,000	Gallon	$0.45	$157,500
NAPL Disposal	10,000	Gallon	$4.00	$40,000
10. Facility Cover				
Place 2-foot Topsoil Layer	33,700	CY	$16.00	$539,200
Recontour/Shape & Grade ACC Facility	50,550	SY	$0.53	$26,792
Hydroseed	450,000	SF	$0.06	$27,000
11. Clean & Reline Storm Drain	830	LF	$225.00	$186,750
Subtotal				**$7,579,304**
Engineering Expenses (10%)				$757,930
Contingency Allowances (15%)				$1,136,895
Total Capital Costs				**$9,474,129**
Operation and Maintenance Costs (present worth)				
1. Water Monitoring				
Sampling	30	Year	$7,470.00	$70,419
Laboratory Analysis	30	Year	$11,240.00	$105,959
2. Site Inspections/Cover Maintenance	30	Year	$400.00	$3,771
Subtotal				**$180,148**
Administrative Costs (15%)				$27,022
Contingency Allowances (25%)				$45,037
Total O&M Costs				**$252,208**
Total Present Worth Value				**$9,726,337**

Note: The costs are present worth estimates (+=50%, -30%), with a 10%discount rate for 1 year.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment by removal of contaminated soil in the Chehalis Avenue area and its consolidation on the ACC facility where human access and exposure will be restricted by capping/covering, fencing, and deed restrictions. Thorough removal of the Chehalis Avenue area soil and subsequent sampling to assure cleanup levels are met will reduce the cancer risk to residents to within the 1×10^{-6} criteria.

Human health and the environment will be protected by demolition and removal of the facility structures. Excavation, removal and disposal of highly contaminated soil on the facility and capping will also protect human health and the environment such that the residual cancer risk will not exceed 1×10^{-5}.

Protection of the environment is provided by removing lagoon sediment that presents a potential risk to terrestrial and aquatic wildlife. Although no treatment of Dillenbaugh Creek is provided, the creek water contamination will be reduced by removing the source of contamination. Removing the majority of contaminated soil, covering the area with clean soil and revegetating will significantly reduce contaminated surface runoff which will reduce the PCP, PAH and dioxin loading to the creek.

Extraction of the floating product layer below the treatment works will remove one continuing source of contamination to groundwater. Groundwater contamination above MCLs is only present within the facility boundaries, is not anticipated to migrate off site due to tight hydrogeologic setting, and would not be used as a source of drinking water due to very low permeability, expected well yield and deed restrictions. therefore, the current and potential beneficial uses of groundwater beneath the site do not include drinking the water. Additionally, groundwater contaminants are not expected to migrate vertically downward into deeper aquifers. Removing most of the sources of contamination (soils and floating product) will eventually lead to groundwater restoration within the site boundary through natural physical and microbial degradation processes or natural attenuation.

Covering the entire facility with clean soil and revegetating will protect human health by eliminating soil ingestion, dermal contact and dust inhalation pathways. In addition it will eliminate the migration of contaminated runoff from the area. Deed and access restriction will assure that the potential threats of the area are known and that the inadvertent excavation of contaminated soil is avoided.

Monitoring of groundwater, and creek water will protect humans by providing early indications of an increase in contaminant concentrations so that additional engineering or institutional controls can be implemented.

Compliance with Applicable or Relevant and Appropriate Requirements

Chemical Specific ARARs

Federal Safe Drinking Water Act—The selected remedy does not include groundwater actions other than removal of the floating product and therefore will only meet SDWA MCLs at the facility boundary. The facility boundary (see Figure 2-2) is the point of compliance for groundwater.

Federal Water Quality Criteria/State Water Quality Standards—Although contaminated sediment will not be removed from Dillenbaugh Creek, water quality standards should be met over time through natural attenuation and removal of the source of contamination, lagoon water and sediment and storm runoff. The deleterious effects of remedial actions in the wetlands or creek outweigh the potential environmental benefits.

Model Toxics Control Act (MTCA) (WAC 173-340)—MTCA cleanup levels for groundwater will be met at the facility boundary. MTCA B soil cleanup levels will be met for the Chehalis Avenue area. MTCA B soil cleanup levels, will be met on the facility through containment and monitoring.

Action Specific ARARs

RCRA/Washington State Dangerous Waste Regulation—RCRA Subtitle C for treatment storage and disposal of hazardous waste will be met for off-site disposal actions. Storage of soil and wastewater within the area of contamination will conform to the RCRA storage requirements for containers, tanks, and waste piles (40 CFR 264 Subpart I, J, and L). Secondary containment, leak detection devices, and flood-proofing provided for storage units will meet RCRA regulations.

Clean Water Act (CWA), 33 U.S.C. Section 1251 et seq; National Pollutant Discharge Elimination System (NPDES); Washington State Water Pollution Control Act, RCW 90-48; NPDES Permit Program requirements, WAC 173-220—Wastewater will be treated to meet the substantive requirements of the state NPDES permit prior to discharge to surface water bodies beyond the area of contamination.

Location Specific ARARs

Executive Order on Protection of Wetlands and Floodplains—The selected remedy is not expected to adversely impact the floodplain or lagoon; therefore, the standards of this executive order will be met.

Shoreline management Act (RCW 90.58 1971 Act) may be ARAR and would be met through the design permitting plan.

Short-Term Cleanup or Subsequent Compliance Actions

Other construction specific ARARs include:

RCW 70.95 Solid Waste recovery and Management Act
RCW 18.104 Water Well Construction
WAC 173-162 Licensed Well Drillers
WAC 446-50 Transportation of Hazardous Materials
WAC 206-155 Safety for Construction Workers
WAC 296-62, Part P, WISHA Hazardous Waste Operations

Cost-Effectiveness

The selected remedy is cost-effective because it is protective of human health and the environment and achieves an appropriate balance of long-term effectiveness and permanence, reduction of toxicity, mobility or volume, and short-term effectiveness. The selected remedy provides an overall effectiveness proportionate to its cost, $9.7 million.

Utilization of Permanent Solutions and Resource Recovery Technologies to the Maximum Extent Practicable

EPA and Ecology have determined that the selected remedy represents the maximum extent to which permanent solutions can be utilized in a cost-effective manner for the facility and AOC. The selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume, short-term effectiveness, implementability and cost. The remedial action also considers state and community acceptance.

Removal of Chehalis Avenue area soil, covering the area with clean soil, and revegetating will provide a permanent solution in reducing risks to remediation objectives. Contaminant mobility is reduced due to removal of the soil from an uncontrolled environment and consolidation in a controlled environment. Toxicity and volume are not reduced by this portion of the remedial action.

Risk on the ACC facility will be permanently reduced by off-site disposal of the highly contaminated soil and demolition and removal of above and below ground structures. After implementation, risk from surface soil is insignificant due to placement of a layer of clean topsoil over the area and revegetation. The potential for recontaminating the Chehalis Avenue area will also be permanently reduced by this part of the remedial action. The volume of contaminated soil and other material is reduced by this part of the remedial action as demolition debris and highly contaminated soil are removed. Mobility of the contaminated soil remaining on the facility is reduced by covering with topsoil and seeding.

Removal of the floating product in the groundwater will assist in expediting the natural attenuation of the contaminants and meet compliance with MTCA or MCL requirements at the facility boundary. Removal of the floating product results in reduction in volume of contaminants.

Fencing and deed restrictions will provide a high level of reliability and control in reducing exposure to potential trespassers. Periodic inspection and repair of the fence, and cover maintenance will be required to maintain its integrity.

Preference for Treatment as a Principal Element

Preference for treatment as a principle element was met for the principle threat in the emergency source removal action which involved incineration. The selected remedy does not meet the statutory preference for treatment as a principal element for the remaining low-level threat.

INTRODUCTION

This summary responds to comments received during the public comment period held by the U.S. Environmental protection Agency (EPA) from October 1, 1992, through October 31, 1992, regarding EPA's Proposed Cleanup Plan for the American Crossarm & Conduit (ACC) facility in Chehalis, Washington. The Proposed Plan was developed from information in the Remedial Investigation/ Feasibility Study (RI/FS) report prepared for this site and discussions with Ecology. The RI/FS report and Proposed Plan are available for review at the Chehalis-Timberland Public Library and at EPA's office in Seattle, Washington. Copies of the Proposed Plan were also sent to local citizens on EPA's mailing list developed as part of the community relations effort for this site.

On October 21, 1992, EPA held a public Meeting at the Lewis County PUD auditorium to present the results of the RI/FS and to discuss EPA's Proposed Plan. EPA encouraged participants to submit verbal comments during the meeting and/or submit written comments.

BACKGROUND ON COMMUNITY INVOLVEMENT

In September of 1989, EPA initiated a community involvement effort to keep the public informed and address community concerns regarding the Remedial Investigation at ACC. EPA developed a revised Community Relations Plan for the site based on interviews with citizens and community leaders. The revised Community Relations Plan built on activities begun during EPA's emergency response efforts at the site (1986 to 1989). EPA published fact sheets during the investigation to apprise the community of developments.

The following is a summary of activities conducted by EPA to support community involvement for remedial activities at the ACC Superfund site:

- November 1989—EPA conducted community interviews, which included meetings with local citizens and business owners, County Commissioners and the County Assessor's Office, the Lewis County Health District, City of Chehalis officials, and the Lewis County Economic Development Council and Chamber of Commerce. In addition, EPA held an open house for other interested members of the community. The purpose of the interviews was for EPA to learn about community concerns related to the ACC site.

- March 1990—EPA published a fact sheet describing site investigation plans.
- April 1990—EPA revised its Community Relations Plan to reflect new community concerns and to identify public involvement activities and future site investigation and cleanup activities.
- April 1990—EPA meet with the Lewis County Health Department to discuss residential yard sampling.
- September 1990—EPA met with Ecology, County Health, and City of Chehalis officials from the department of public works, city manager's office and fire department to update them on site investigation developments and plans.
- September 1990—EPA published fact sheet on the preliminary Phase 1 sampling activities.
- February 1991-EPA published a fact sheet summarizing sample results to date and announcing the second phase of sampling.
- October 1991—EPA presented an update on site activities to the Twin Cities Chamber of Commerce.
- April 1992—EPA published a fact sheet updating activities and describing some interim cleanup actions.
- September 1992—EPA published the Remedial Investigation and Feasibility Study (RI/FS) report and Proposed Plan for cleanup for public comment.
- October 1992—EPA held a 30-day public comment period from October 1st through 31st. During the comment period EPA held a public meeting on October 21, 1992.

SUMMARY OF PUBLIC COMMENTS AND EPA RESPONSES

Both oral and written comments were received during the public comment period. Oral comments consisted of one anonymous telephone message to EPA in Seattle, one oral comment from Ecology, and three comments presented during the public meeting. Three written comments were received. Numerous questions were raised in the public meeting which were addressed at the meeting and are documented in the meeting transcript. Those questions are not addressed in this responsiveness summary. This section contains a summary of the comments and EPA's responses. The comments are organized by subject matter and similar comments have been grouped together as appropriate. Copies of the written comments as well as a copy of a transcript of the public meeting are available at EPA's record center in Seattle and at the Chehalis-Timberland Public Library.

Public Comments and EPA Responses by Subject Matter

On-site soil consolidation

- Comment: One commenter expressed concern about the proposal for on-site consolidation of soil removed from the residential yards because the commenter felt that it would be perceived as a temporary solution.

  Response: On-site consolidation of soil removed from the residential yards is the preferred solution because the soil cannot be recycled, treatment is not practicable due to site limitations, and off-site disposal in a landfill is very expensive. The soil will be contained, and institutional controls and long-term monitoring will restrict exposure and add to the protectiveness of the remedial action.

- Comment: Ecology commented in a telephone conversation with EPA, that the state favors on-site containment of the ash from past incineration of contaminated material from the removal action. The state said that the ash is cleaner than other materials on site, there is no additional risk reduction by disposing of it in an off-site landfill, and on-site containment would have a substantial cost savings.

  Response: EPA concurs with Ecology's recommendation and has incorporated this recommendation into its final cleanup plan (Record of Decision). Analytical data sheets illustrating the chemical characteristics of the ash are available in EPA's Administrative Record file for the ACC site.

Cost

- Comment: Two commenters felt that there are more beneficial uses of the money EPA proposes to spend to cleanup the ACC site. One of the commenters further stated that the money should have a strong, positive impact on the economy of this local area and the state of Washington for many years.

  Response: EPA is proposing to cleanup the ACC site under its Superfund authorities. The Comprehensive Environmental, Response, Compensation, and Liability Act, as amended (commonly called Superfund) provides EPA with the authority to use special "Fund" money to protect human health and the environment from risks caused or threatened by uncontrolled hazardous substances. EPA is not authorized to use this money for activities other than cleanup of hazardous substances.

Monitoring

- Comment: Some commenters asked for clarification on EPA's proposed post cleanup monitoring described in the Proposed Plan.

  Response: The cleanup design will include a plan for post cleanup monitoring to ensure protection of human health and the environment, and the adequacy of the remedial action over time. Details of the plan will be prepared during the remedial design.

Flood Concerns

- Comment: Several commenters wanted to be sure that EPA's cleanup actions would not result in an incremental increase in the height of flood water.

  Response: The design will account for the estimated volume of clean material that would be brought to the site and used as cover, and other changes in site conditions. The design will insure that no (or an acceptable) increase in the height of floodwater. Available computer programs, which are used to predict the height of floodwater, will be used during the design to assure that the flooding conditions are not worsened as a result of the cleanup.

Scope of and Justification for Cleanup

- Comment: One commenter wanted EPA to include a junkyard property located at the Northeast corner of the intersection of Chehalis Avenue and John Street as a part of the residential cleanup area.

  Response: EPA does propose to remove surface soil from the junkyard property that the commenter refers to, which occupies the southern half of the block on the Northeast corner of Chehalis Avenue and John.

- Comment: Some commenters felt that the health risks were small from exposure to surface soil in the community and that EPA is being overly conservative by proposing to remove the residential soil. The commenters also wondered what control property owners have over soil removal on their properties.

Response: EPA agrees that the proposed plan is protective. The extent of the soil removal activities are largely due to EPA's concern for public health and desire to limit potential exposure to contaminants in the residential area. EPA will work with individual homeowners to address specific concerns about cleanup of their yards.

Additional Washington Department of Ecology Comments

- Comment: Ecology commented that the proposed plan should be modified to incorporate: 1) studies of treatment technologies during design of the cleanup to evaluate whether they are practical and/or would significantly reduce risk; 2) conformational sampling in the residential yards and play field; and 3) institutional controls.

  Response: EPA has modified its Proposed Plan to reflect Ecology's comments in the Record of Decision.