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FRANKLIN CO. CLERK

2000 AUG 25 P 2:59

BEVERLY FINKE

IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON
IN AND FOR FRANKLIN COUNTY

STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY,

Plaintiff,

v.

CROWLEY MARITIME CORPORATION;
THE PORT OF PASCO; TIDEWATER
BARGELINES, INC.; PIUTE ENERGY AND
TRANSPORTATION COMPANY; DOYLE
BROTHERS, INC.; CONOCO, INC.; U.S
ARMY CORPS OF ENGINEERS;
BURLINGTON NORTHERN RAILROAD
COMPANY; McCALL OIL & CHEMICAL
CORPORATION; GREAT WESTERN
CHEMICAL COMPANY; and THOMAS
KIDWELL AND HENRY KIDWELL, AND
THEIR MARITAL COMMUNITIES.

Defendants.

NO. 00 2 50546 1

SUMMONS

TO: All Defendants;

AND TO: The Clerk of the above-entitled Court:

A lawsuit has been started against you in the above-entitled court by the State of Washington, Department of Ecology, Plaintiff. Plaintiff's claim is stated in the written complaint, a copy of which is served upon you with this Summons.

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SUMMONS


1

ATTORNEY GENERAL OF WASHINGTON
Ecology Division
PO Box 40117
Olympia, WA 98504-0117
FAX (360) 586-6760

1 The parties have agreed to resolve this matter by entry of a Consent Decree.
2 Accordingly, this Summons shall not require the filing of an answer.

3 Respectfully submitted this 15th day of August, 2000.

4 CHRISTINE O. GREGOIRE
5 Attorney General

6 
7 KEN LEDERMAN, WSBA #26515
8 Assistant Attorney General
9 Attorneys for Plaintiff
10 Department of Ecology
11 (360) 586-4607

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THEIR MARITAL COMMUNITIES.

Defendants.

NO. **00 2 50546 1**

COMPLAINT

I. JURISDICTION

1.1 This court has jurisdiction over the parties and over the subject matter under the Model Toxics Control Act, chapter 70.105D RCW.

II. PARTIES

2.1 Plaintiff State of Washington Department of Ecology (Ecology) is a state agency charged with the implementation of the Model Toxics Control Act.

2.2 Defendants have agreed to enter into a Consent Decree with Ecology under the Model Toxics Control Act to remedy the release of hazardous substances on property.

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III. FACTUAL ALLEGATIONS

3.1 The Site, referred to as the Pasco Bulk Fuel Terminals Site, is located in Section 31, Township 9 North, Range 30 East, Willamette Meridian, on the north bank of the Columbia River in Pasco, Washington. The Site is more particularly described in Exhibit A to the Consent Decree which has a detailed site diagram.

3.2 Ecology has determined that there has been a release or threatened release of hazardous substances at the Site. Ecology has further determined that this release or threatened release requires remedial action to protect human health, welfare, and the environment; and that Defendants are potentially liable persons with respect to this Site.

3.3 Ecology and Defendants have entered into a Consent Decree regarding remedial actions to be taken at the Site.

3.4 The Consent Decree has been the subject of public notice and comment under RCW 70.105D.040(4)(a). The Consent Decree is being submitted to the court along with this Complaint.

3.5 Ecology has determined that entry of the Consent Decree will lead to a more expeditious cleanup of the Site.

IV. CAUSE OF ACTION

4.1 Plaintiff realleges all preceding paragraphs.

4.2 Plaintiff alleges that Defendants are responsible for remedial action at the Site pursuant to the Model Toxics Control Act, chapter 70.105D RCW.

V. PRAYER FOR RELIEF

5.1 Ecology and Defendants request that the court sign and enter the Consent Decree in this matter.

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26

1 5.2 Ecology and Defendants further request that the court retain jurisdiction to enforce
2 the terms of the Consent Decree.

3 Respectfully submitted this 15th day of August, 2000.

4 CHRISTINE O. GREGOIRE
5 Attorney General

6 

7 KEN LEDERMAN, WSBA #26515
8 Assistant Attorney General
9 Attorneys for Plaintiff
10 State of Washington
11 Department of Ecology
12 (360) 586-4607

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THEIR MARITAL COMMUNITIES.

Defendants.

NO. **00 2 50546 1**

MOTION FOR ENTRY OF
CONSENT DECREE AND
MEMORANDUM IN SUPPORT OF
MOTION

I. INTRODUCTION

Plaintiff, Washington State Department of Ecology (Ecology), represented by Christine O. Gregoire, Attorney General, and Ken Lederman, Assistant Attorney General, brings this motion seeking entry of the attached Consent Decree. This motion is based upon the pleadings filed in this matter, including the Declaration of Ken Lederman.

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Defendants.

NO. 00 2 50546 1

DECLARATION OF KEN
LEDERMAN

I, Ken Lederman, declare under penalty of perjury under the laws of the State of Washington that the following is true and correct.

1. I am over twenty-one years of age and am competent to testify herein. The facts set forth in this Declaration are from my personal knowledge.

2. I am an Assistant Attorney General assigned to represent the Washington State Department of Ecology and the Attorney General's Office on legal matters relating to the Site in Pasco, Washington referred to as the Pasco Bulk Fuel Terminals Site.

DECLARATION OF KEN
LEDERMAN

1 3. On behalf of Ecology and the Attorney General's Office, I took part in the
2 negotiations that led to the Consent Decree that is being presented to the court.

3 4. The Consent Decree was the subject of public notice and public comment as
4 required by RCW 70.105D 040(4)(a).

5 5. Ecology has determined that the proposed remedial action will lead to a more
6 expeditious cleanup of hazardous substances in compliance with cleanup standards under RCW
7 70.105D.030(2)(e).

8 6. The U.S. Army Corps of Engineers (COE) is a listed Defendant in this matter. The
9 COE did not sign this Consent Decree. The COE is therefore not subject to the protections and
10 provisions of this Consent Decree. The COE may negotiate and enter into a separate Consent
11 Decree at a future time.

12 I declare under penalty of perjury of the laws of the state of Washington that the foregoing
13 is true and correct.

14 DATED this 15th day of August, 2000, in Olympia, Washington.

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16 
17 KEN LEDERMAN

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20 FA \PORT OF PASCO\KEN LEDERMAN DEC.DOC

AUG 25 2000

BEVERLY FINKE, CLERK

By _____ DEPUTY

IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON
IN AND FOR FRANKLIN COUNTY

STATE OF WASHINGTON,
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Defendants.

NO. 00 2 50546 1

ORDER ENTERING CONSENT
DECREE

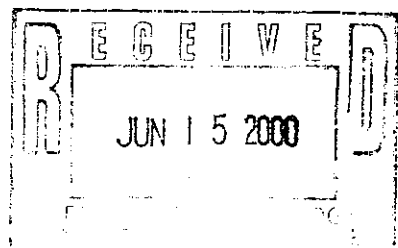
Having reviewed the Consent Decree signed by the parties to this matter, the Motion for Entry of the Consent Decree, the Declaration of Ken Lederman, and the file herein, it is hereby

ORDERED AND ADJUDGED that the Consent Decree in this matter is entered and that the Court shall retain jurisdiction over the Consent Decree to enforce its terms.

DATED this 24 day of August, 2000

JUDGE/COMMISSIONER
Franklin County Superior Court

ORDER ENTERING CONSENT
DECREE



IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON
FOR FRANKLIN COUNTY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY,

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Defendants.

No. **00 2 50546 1**
FRANKLIN COUNTY
OFFICE OF COUNTY CLERK AND
EX-OFFICIO CLERK OF SUPERIOR COURT
CONSENT DECREE

AUG 25 2000

BEVERLY FINKE, CLERK

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I. INTRODUCTION

A. In entering into this Consent Decree (Decree), the mutual objective of the Washington State Department of Ecology (Ecology), and the Potentially Liable Parties (PLPs or Defendants) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Decree requires the Defendants to undertake the remedial actions specified in Section 8.0 of the Final Cleanup Action Plan (CAP), as amended, attached to this Decree as Exhibits B and C. Ecology has determined that these actions are necessary to protect public health and the environment.

B. The Complaint in this action is being filed simultaneously with this Decree. An answer has not been filed, and there has not been a trial on any issue of fact or law in this case. However, the parties wish to resolve the issues raised by Ecology's complaint. In addition, the parties agree that settlement of these matters without litigation is reasonable and in the public interest and that entry of this Decree is the most appropriate means of resolving these matters.

C. In signing this Decree, Defendants agree to its entry and agree to be bound by its terms.

D. By entering into this Decree, the parties do not intend to discharge nonsettling parties from any liability they may have with respect to matters alleged in the complaint. The parties retain their respective rights to seek reimbursement, in whole or in part, from any liable persons for sums expended under this Decree or for matters alleged in the complaint.

E. This Decree shall not be construed either as proof of liability or responsibility for any releases of hazardous substances or cost for remedial action or as an admission of any facts; provided, however, that the Defendants shall not challenge the jurisdiction of Ecology in any proceeding to enforce this Decree.

F. The Court is fully advised of the reasons for entry of this Decree, and good cause having been shown: It is hereby ORDERED, ADJUDGED, AND DECREED as follows:

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II. JURISDICTION

A. This Court has jurisdiction over the subject matter and over the parties pursuant to Chapter 70.105D RCW, the Model Toxics Control Act (MTCA).

B. Authority is conferred upon the Washington State Attorney General by RCW 70.105D 040(4)(a) to agree to a settlement with any potentially liable person if, after public notice and hearing, Ecology finds the proposed settlement would lead to a more expeditious cleanup of hazardous substances. RCW 70.105D 040(4)(b) requires that such a settlement be entered as a consent decree issued by a court of competent jurisdiction.

C. Ecology has determined that a release or threatened release of hazardous substances has occurred at the Site which is the subject of this Decree.

D. Ecology has given notice to Defendants, as set forth in RCW 70.105D 020(16), of Ecology's determination that the Defendants are potentially liable persons for the Site and that there has been a release or threatened release of hazardous substances at the Site.

E. The actions to be taken pursuant to this Decree are necessary to protect public health, welfare, and the environment.

F. Defendants have agreed to undertake the actions specified in this Decree and consent to the entry of this Decree under the MTCA.

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III. PARTIES BOUND

This Decree shall apply to and be binding upon the signatories to this Decree (Parties), their successors and assigns. The undersigned representative of each party hereby certifies that he or she is fully authorized to enter into this Decree and to execute and legally bind such party to comply with the Decree. Defendants agree to undertake all actions required by the terms and conditions of this Decree and not to contest state jurisdiction regarding this Decree. No change in ownership or corporate status shall alter the responsibility of the Defendants under this Decree. Defendants shall provide a copy of this Decree to all agents, contractors and subcontractors.

1 retained to perform work required by this Decree and shall ensure that all work undertaken by
2 such contractors and subcontractors will be in compliance with this Decree.

3 IV. DEFINITIONS

4 Except as specified herein, all definitions in WAC 173-340-200 apply to the terms in this
5 Decree

6 A. Site: The Site, referred to as the Pasco Bulk Fuel Terminals Site, is located in
7 Section 31, Township 9 North, Range 30 East, Willamette Meridian, on the north bank of the
8 Columbia River in Pasco, Washington. The Site is more particularly described in Exhibit A to this
9 Decree which is a detailed site diagram.

10 B. Parties: Refers to the Washington State Department of Ecology and the
11 Defendants.

12 C. Defendants or PLPs: Refers to Crowley Maritime Corporation; the Port of Pasco, a
13 municipal corporation organized under the laws of the State of Washington; Tidewater Barge
14 Lines, Inc.; Puget Energy and Transportation Company; Doyle Brothers, Inc.; Conoco, Inc.; the
15 U.S. Army Corps of Engineers; Burlington Northern Railroad Company; McCall Oil & Chemical
16 Corporation; Great Western Chemical Company; and Thomas Kidwell and Henry Kidwell, and
17 their marital communities.

18 D. "Consent Decree" or "Decree": Refers to this Consent Decree and each of the
19 exhibits to the Decree. All exhibits are integral and enforceable parts of this Consent Decree.

20 V. STATEMENT OF FACTS

21 Ecology makes the following findings of fact without any express or implied admissions
22 by Defendant.

23 A. The Site is located in Section 31, Township 9 North, Range 30 East, Willamette
24 Meridian, on the north bank of the Columbia River in Pasco, Washington. The location of the Site
25 is depicted by the diagram that is Exhibit A to this Decree. The Site consists of the area that
26 extends laterally and vertically as far as the contamination in soil and ground water resulting from

1 releases at the Site. Based on the results of the Remedial Investigation (RI), the Site has been
2 determined to be approximately 90 acres in size and its boundaries, as shown in Exhibit A, are
3 approximately described as follows:

- 4 • Ainsworth Avenue on the north;
- 5 • The U.S. Army Corps of Engineers (COE) levee on the south;
- 6 • South 5th Avenue on the east; and
- 7 • A line extending from the intersection of South 9th Avenue and Ainsworth Avenue to
8 the intersection of the COE interceptor drain and the extension of South 12th Avenue
9 on the west.

10 The Site also includes a strip of land located west of South 12th Avenue that includes the COE
11 interceptor drain, the Port of Pasco oil/water separator, and the COE drainage ditch.

12 B. Much of the Site was used as a petroleum storage and distribution facility from the
13 1940s until 1992. The Site includes the main tank farm, other small tank farms, and other areas
14 which have been leased out to several operating tenants. The Port of Pasco has leased the main
15 tank farm to four different operators since 1941. In addition to petroleum products, agricultural
16 chemicals, including soil fumigants and fertilizers, and solvents were stored on areas within the
17 Site. In 1992, all operating storage tanks were emptied of petroleum products and agricultural
18 chemicals, and tanks not owned by the Port of Pasco were removed from the Site. Some buildings
19 and underground sumps associated with loading and distribution areas were also removed.

20 C. The Site lies behind dikes maintained by the COE. Other COE facilities on the
21 Site, which were all constructed prior to 1952, include two dewatering wells located within a
22 cutoff wall surrounding the Continental Grain facility and a 42-inch diameter interceptor drain
23 located on the southern portion of the Site for dewatering the area behind the dikes. The water in
24 the COE interceptor drain flows by gravity to an outlet located approximately 1,500 feet west of
25 the main tank farms, where an oil/water separator has been installed, and discharges to an open
26

1 ditch that empties into the COE collection pond. The COE periodically pumps water from the
2 pond into the Columbia River.

3 D. Oil films on water discharging from the interceptor drain to the collection pond
4 have been observed from time to time since the 1950s. In 1969, the COE investigated an oil film
5 floating on the water discharging from the interceptor drain and installed sheet piles to contain the
6 oil film. When oil was again reported on the COE collection pond in 1973, Ecology conducted a
7 study and determined that free-phase petroleum hydrocarbon product from underneath the tank
8 farms was infiltrating into the interceptor drain. Ecology and the COE conducted various studies
9 into the sources of the oil discharges over the years.

10 E. In 1986, Ecology detected volatile organic chemicals in samples collected at the
11 outlet of the interceptor drain. In 1986 and 1987, the Port and Crowley investigated soil and
12 ground water conditions at the Site. A total of 32 wells were installed and free product was found
13 in 19 wells. Free product was also detected in the two COE dewatering wells. In 1989, Ecology
14 conducted additional studies to characterize soil and ground water beneath the Site. In addition to
15 petroleum hydrocarbons, the study detected a fumigant constituent in soil and ground water. In
16 1990, the Port of Pasco replaced the sheet piles at the interceptor drain discharge with an oil/water
17 separator.

18 F. In 1990, Ecology conducted a Site Hazard Assessment of the Site to determine its
19 ranking relative to other contaminated sites in the state. The Site ranked a one on a scale of one to
20 five, one being the highest risk.

21 G. On October 15, 1992, Ecology issued Enforcement Order No. DE92IC-E106 (the
22 Order) requiring the PLPs to conduct the RI, Feasibility Study (FS), and Interim Actions under the
23 requirements of MTCA.

24 H. Site investigations for the RI started in 1993 and were completed in 1995. The
25 investigations determined the extent of free product plumes, petroleum and solvent contamination
26 in soils, ground water, and surface water. The nature and extent of contamination are summarized

1 in Section 3 0 of the CAP. The results of these investigations are presented in detail in the
2 following report: Associated Earth Sciences, Inc., Remedial Investigation Report, Pasco Bulk
3 Fuel Terminals Site, Pasco, Washington, January 8, 1996.

4 I. Interim actions at the Site began in 1993 and included the following:

- 5 • Installation of a trench and well system to recover free petroleum product from
6 ground water. As of May 1997, 4,388 gallons of free product were recovered.
7 Ten additional recovery trenches were installed in 1997 to recover more free
8 product.
- 9 • Evaluation and abatement of risks posed by the free product in utility manholes
10 and in a basement sump of a family residence within the Site. As a result of
11 this action, the sump in the basement of the family residence was sealed. The
12 Port of Pasco later purchased this property and demolished the residence. Also,
13 utility companies have been formally warned of the dangers of vapors in the
14 affected manholes.

15 J. Cleanup technologies were identified and evaluated with respect to MTCA
16 requirements in the FS. The Report is entitled: Associated Earth Science, Inc., Feasibility Study
17 Report, Pasco Bulk Fuel Terminals Site, Pasco, Washington, June 1997. This FS identified as the
18 preferred alternative a combination of treatment technologies which included: Free-phase product
19 recovery, ground water collection and treatment using an air stripper, in-situ and ex-situ soil
20 remediation, and ground water remediation via air sparging.

21 K. In 1998, an additional investigation was conducted to collect data for setting
22 cleanup levels based on Ecology's 1997 Interim Total Petroleum Hydrocarbons (TPH) Policy.
23 Results from this investigation are presented and analyzed in the report: Golder Associates Inc.,
24 Data Report on Interim TPH Investigation for the Pasco Bulk Fuel Terminals Site, Pasco,
25 Washington, October 1998.

1 L. Based upon the results of the RI, the FS, and the Interim IPH Investigations,
2 Ecology prepared a Draft Cleanup Action Plan (DCAP) in February 1999 that identified the Site
3 cleanup levels and the selected remedy for the Site. As required under MTCA, this DCAP was
4 made available for public review and comment and a Final Cleanup Action Plan (CAP), Exhibit B,
5 was issued in March 1999.

6 M. Two recent activities at the Site included: an In-situ Air Sparging/Soil Vapor
7 Extraction (IAS/SVE) pilot test conducted in April 1999; and the demolition of all remaining
8 tanks at the Site in July 1999. Findings based on these two activities have led to a modification to
9 the soil treatment described in the CAP (Exhibit B). The proposed amendment to the CAP to
10 incorporate the treatment modification is attached as Exhibit C.

11 N. Based upon the facts set forth herein, Ecology has determined that the release and
12 potential release of hazardous substances from the Site require remedial action to protect the
13 public health, welfare, and the environment

14 VI. WORK TO BE PERFORMED

15 This Decree contains a program designed to protect public health, welfare, and the
16 environment from the known release, or threatened release, of hazardous substances or
17 contaminants at, on, or from the Site.

18 A. This program implements the cleanup action selected in the final CAP as set forth
19 in the Scope of Work and Schedule (Exhibit D), which establishes the work to be performed and
20 the schedule to accomplish the required remedial actions at the Site for the duration of this Decree.

21 B. The cleanup action consists of the following: free product recovery; treatment of
22 groundwater and soils by In-Situ Air Sparging/Soil Vapor Extraction (IAS/SVE); treatment of
23 groundwater discharging to the ditch to meet cleanup levels; and biotreatment of soils (if
24 necessary) after IAS/SVE

25 Compliance monitoring will be performed to ensure that the cleanup standards are met. A
26 Restrictive Covenant (Exhibit F) will be recorded on all properties where residual concentrations

1 of hazardous substances, for which cleanup levels have been established in the CAP, exceed
2 residential cleanup levels.

3 C. Within ninety (90) days of entry of this Decree, the PLPs shall submit to Ecology
4 for approval the Engineering Design Report, Compliance Monitoring Plan, the Data Management
5 Plan, the Waste Management Plan, and an Institutional Control Plan. Within ninety (90) days of
6 entry of this Decree, the PLPs shall submit to Ecology for review a Health and Safety Plan. These
7 work plans shall become an integral and enforceable part of this Decree and shall be subject to the
8 terms specified herein.

9 D. The Construction Plan and Specifications and the Operation and Maintenance Plan
10 may be submitted in phases. The first submittal shall be within thirty (30) days after the
11 Engineering Design Report has completed public review and comment and is accepted by Ecology
12 as final. Construction under such plans shall begin not later than twelve (12) months after entry of
13 the Decree and shall be completed within six months as described in the Engineering Design
14 Report approved by Ecology.

15 E. Ecology will evaluate and determine the appropriateness of the Engineering Design
16 Report, Compliance Monitoring Plan, Data Management Plan, Institutional Controls Plan,
17 Construction Plans and Specifications, and Operation and Maintenance Plan. These plans shall
18 not be implemented, nor shall any other remedial activity take place at the Site, without Ecology's
19 approval. Once approved by Ecology, the plans and the schedule shall become integral and
20 enforceable elements of this decree.

21 F. A cleanup action report, summarizing all construction activities and changes or
22 modifications, shall be submitted to Ecology no later than ninety (90) days after completion of the
23 construction (Exhibit D, Tasks V and VI).

24 G. The work required by this Decree shall continue until all parties agree that all
25 environmental media at the Site meet the cleanup standards identified in the CAP (Exhibit B).

1 H. Defendants agree not to perform any remedial actions other than those required by
2 this Decree unless the parties agree to amend the Scope of Work to cover these actions. All work
3 conducted under this Decree shall be done in accordance with ch. 173-340 WAC unless otherwise
4 provided herein.

5 VII. DESIGNATED PROJECT COORDINATORS

6 The project coordinator for Ecology is:

7 Teresita Bala, Site Manager
8 Toxics Cleanup Program
9 Department of Ecology
10 Eastern Regional Office
4601 N. Monroe, Suite 202
Spokane, WA 99205-1295

11 The project coordinator for Defendants is:

12 Stephen Wilson, Technical Coordinator
13 Pasco Bulk Fuel Terminals Site Coordinating Group
2401 Fourth Avenue
Seattle, WA 98121

14 Each project coordinator shall be responsible for overseeing the implementation of this
15 Decree. The Ecology project coordinator will be Ecology's designated representative at the Site.
16 To the maximum extent possible, communications between Ecology and the Defendants and all
17 documents, including reports, approvals, and other correspondence concerning the activities
18 performed pursuant to the terms and conditions of this Decree, shall be directed through the
19 project coordinators. The project coordinators may designate, in writing, working level staff
20 contacts for all or portions of the implementation of the remedial work required by this Decree.
21 The project coordinators may agree to minor modifications to the work to be performed without
22 formal amendments to this Decree. Minor modifications will be documented in writing by
23 Ecology.

24 Any party may change its respective project coordinator. Written notification shall be
25 given to the other parties at least ten (10) calendar days prior to the change.
26

VIII. PERFORMANCE

All work performed pursuant to this Decree shall be under the direction and supervision, as necessary, of a professional engineer or hydrogeologist, or equivalent, with experience and expertise in hazardous waste site investigation and cleanup. Any construction work must be under the supervision of a professional engineer. Defendants shall notify Ecology in writing in advance of their involvement at the Site as to the identity of such engineer(s) or hydrogeologist(s), or others and of any contractors and subcontractors to be used in carrying out the terms of this Decree.

IX. ACCESS

The Defendants authorize Ecology or any Ecology authorized representatives to enter and freely move about all property at the Site that the Defendants either own, control or have access rights to at all reasonable times for the purposes of, inter alia: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Decree; reviewing the Defendants' progress in carrying out the terms of this Decree; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Decree; and verifying the data submitted to Ecology by the Defendants. The Defendants shall undertake all reasonable efforts to secure access to those properties within the Site not owned or controlled by the Defendants and needed for the work to be performed pursuant to this Decree. If the Defendants fail to secure access to those properties within the Site not owned or controlled by the Defendants, then Ecology shall make reasonable efforts to facilitate access to those properties pursuant to WAC 173-340-800(7) & (8). Pursuant to RCW 70.105D.030(1)(a), Ecology or any Ecology authorized representative shall give reasonable notice before entering any Site property unless an emergency prevents such notice. All Parties with access to the Site pursuant to this paragraph shall comply with approved health and safety plans.

1 **X. SAMPLING, DATA REPORTING, AND AVAILABILITY**

2 With respect to the implementation of this Decree, Defendants shall make available to
3 Ecology the results of all sampling, laboratory reports, and/or test results generated by them, or on
4 their behalf, and shall submit these results in accordance with Section XI of this Decree.

5 In accordance with WAC 173-340-840(5), ground water sampling data shall be submitted
6 in an electronic format agreeable to Ecology's site coordinator. These submittals shall be
7 provided to Ecology in accordance with Section XI of this Decree.

8 If requested by Ecology, Defendants shall allow Ecology and/or its authorized
9 representatives to take split or duplicate samples of any samples collected by Defendants pursuant
10 to the implementation of this Decree. Defendants shall notify Ecology seven (7) days in advance
11 of any sample collection or work activity at the Site. Ecology shall, upon request, allow
12 Defendants or their authorized representatives to take split or duplicate samples of any samples
13 collected by Ecology pursuant to the implementation of this Decree, provided it does not interfere
14 with the Department's sampling. Without limitation on Ecology's rights under Section IX,
15 Ecology shall notify Defendants seven (7) days prior to any sample collection activity unless an
16 emergency prevents such notice.

17 **XI. PROGRESS REPORTS**

18 Defendants shall submit to Ecology written monthly progress reports which describe the
19 actions taken during the previous month to implement the requirements of this Decree. The
20 progress reports shall include the following:

- 21 A. A list of on-site activities that have taken place during the month;
- 22 B. Detailed description of any deviations from required tasks not otherwise
23 documented in project plans or amendment requests;
- 24 C. Description of all deviations from the Schedule during the current month and any
25 planned deviations in the upcoming month;
- 26

1 D. For any deviations in Schedule, a plan for recovering lost time and maintaining
2 compliance with the Schedule;

3 E. All raw data (including laboratory analysis) received by the Defendant during the
4 past month and an identification of the source of the sample; and

5 F. A list of deliverables for the upcoming month if different from the Schedule.

6 After the effective date of this Decree, all progress reports shall be submitted by the tenth
7 day of the month in which they are due. Unless otherwise specified, progress reports and any
8 other documents submitted pursuant to this Decree shall be sent by certified mail, return receipt
9 requested, to Ecology's project coordinator.

10 Following receipt of notice from Ecology's project coordinator that construction is
11 complete (Exhibit D, Task V), Defendants may provide progress reports in accordance with the
12 schedule set in the Compliance Monitoring Plan (Exhibit D, Task II(1)).

13 XII. RETENTION OF RECORDS

14 During the pendency of this Decree and for ten (10) years from the date this Decree is no
15 longer in effect as provided in Section XXVI, Defendants shall preserve, all records, reports,
16 documents, and underlying data in its possession relevant to the implementation of this Decree and
17 shall insert in contracts with project contractors and subcontractors a similar record retention
18 requirement. Upon request of Ecology, Defendants shall make all non-archived records available
19 to Ecology and allow access for review. All archived records shall be made available to Ecology
20 within a reasonable period of time. This paragraph does not apply to documents that were
21 discarded by Defendants, their contractors or subcontractors in accordance with legitimate
22 document retention policies prior to the entry of this Decree or, for Defendants named in the 1992
23 Enforcement Order for the Site, prior to the entry of the 1992 Enforcement Order.

24 XIII. TRANSFER OF INTEREST IN PROPERTY

25 Prior to any voluntary conveyance or relinquishment of title, easement, leasehold, or other
26 interest in any portion of the Site, Defendants shall provide for continued operation and

1 maintenance of any containment system, treatment system, and monitoring system installed or
2 implemented pursuant to this Decree.

3 Prior to transfer of any legal or equitable interest in any portion of the Site owned or
4 controlled by Defendants during the effective period of this Decree, Defendants shall serve a copy
5 of this Decree upon any prospective purchaser, lessee, transferee, assignee, or other successor in
6 interest of the property; and, at least thirty (30) days prior to any transfer, Defendants shall notify
7 Ecology of said contemplated transfer.

8 **XIV. RESOLUTION OF DISPUTES**

9 A. In the event a dispute arises as to an approval, disapproval, proposed modification
10 or other decision or action by Ecology's project coordinator, the parties shall utilize the dispute
11 resolution procedure set forth below.

12 (1) Upon receipt of the Ecology project coordinator's decision, Defendants have
13 fourteen (14) days within which to notify Ecology's project coordinator of their objections to the
14 decision.

15 (2) The Parties' project coordinators shall then confer in an effort to resolve the
16 dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days,
17 Ecology's project coordinator shall issue a written decision.

18 (3) Defendants may then request Ecology management review of the decision. This
19 request shall be submitted in writing to the Toxics Cleanup Program Manager within seven (7)
20 days of receipt of Ecology's project coordinator's decision.

21 (4) Ecology's Program Manager shall conduct a review of the dispute and shall issue a
22 written decision regarding the dispute within thirty (30) days of the Defendants' request for
23 review. The Program Manager's decision shall be Ecology's final decision on the disputed matter.

24 B. If Ecology's final written decision is unacceptable to Defendants, Defendants have
25 the right to submit the dispute to the Court for resolution. The parties agree that one judge should
26 retain jurisdiction over this case and shall, as necessary, resolve any dispute arising under this

1 Decree. In the event Defendants present an issue to the Court for review, the Court shall review
2 the action or decision of Ecology on the basis of whether such action or decision was arbitrary and
3 capricious and render a decision based on such standard of review.

4 C. The Parties agree to utilize the dispute resolution process only in good faith and
5 agree to expedite, to the extent possible, the dispute resolution process whenever it is used. Where
6 any Party utilizes the dispute resolution process in bad faith or for purposes of delay, the other
7 Parties may seek sanctions.

8 Implementation of these dispute resolution procedures shall not provide a basis for delay of
9 any activities required in this Decree, unless Ecology agrees in writing to a schedule extension or
10 the Court so orders.

11 **XV. AMENDMENT OF CONSENT DECREE**

12 This Decree may be amended only by a written stipulation among the Parties that is
13 entered by the Court or by order of the Court. Such amendment shall become effective upon entry
14 by the Court. Agreement to amend shall not be unreasonably withheld by any party to the Decree.

15 Defendants shall submit any request for an amendment to Ecology for approval. Ecology
16 shall indicate its approval or disapproval in a timely manner after the request for amendment is
17 received. If the amendment to the Decree is substantial, Ecology will provide public notice and
18 opportunity for comment. Reasons for disapproval shall be stated in writing. If Ecology does not
19 agree to any proposed amendment, the disagreement may be addressed through the dispute
20 resolution procedures described in Section XIV of this Decree.

21 **XVI. EXTENSION OF SCHEDULE**

22 A. An extension of schedule shall be granted only when a request for an extension is
23 submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline
24 for which the extension is requested, and good cause exists for granting the extension. All
25 extensions shall be requested in writing. The request shall specify the reason(s) the extension is
26 needed.

1 An extension shall be granted only for such period of time as Ecology determines is
2 reasonable under the circumstances. A requested extension shall not be effective until approved
3 by Ecology or the Court. Ecology shall act upon any written request for extension in a timely
4 fashion. It shall not be necessary to formally amend this Decree pursuant to Section XV when a
5 schedule extension is granted.

6 B. The burden shall be on the Defendants to demonstrate to the satisfaction of Ecology
7 that the request for such extension has been submitted in a timely fashion and that good cause
8 exists for granting the extension. Good cause includes, but is not limited to, the following:

9 (1) Circumstances beyond the reasonable control and despite the due diligence of
10 Defendants including delays caused by unrelated third parties or Ecology, such as (but not limited
11 to) delays by Ecology in reviewing, approving, or modifying documents submitted by Defendants;
12 or

13 (2) Acts of God, such as (but not limited to) fire, flood, blizzard, extreme temperatures,
14 unusual storm, or other unavoidable casualty; or

15 (3) Endangerment as described in Section XVII.

16 However, neither increased costs of performance of the terms of the Decree nor changed
17 economic circumstances shall be considered circumstances beyond the reasonable control of
18 Defendants.

19 C. Ecology may extend the schedule for a period not to exceed ninety (90) days,
20 except Ecology may extend the schedule for a longer period when needed as a result of:

21 (1) Delays in the issuance of a necessary permit which was applied for in a timely
22 manner; or

23 (2) Other circumstances deemed exceptional or extraordinary by Ecology; or

24 (3) Endangerment as described in Section XVII.

25 Ecology shall give Defendants written notification in a timely fashion of any extensions
26 granted pursuant to this Decree.

XVII. ENDANGERMENT

In the event Ecology determines that activities implementing or in compliance with this Decree, or any other circumstances or activities, are creating or have the potential to create a danger to the health or welfare of the people on the Site or in the surrounding area or to the environment, Ecology may order Defendants to stop further implementation of this Decree for such period of time as needed to abate the danger or may petition the Court for an order as appropriate. During any stoppage of work under this section, the obligations of Defendants, with respect to the work under this Decree that is ordered to be stopped, shall be suspended and the time periods for performance of that work, as well as the time period for any other work dependent upon the work that is stopped, shall be extended pursuant to Section XVI of this Decree for such period of time as Ecology determines is reasonable under the circumstances.

In the event Defendants determine that activities undertaken in furtherance of this Decree or any other circumstances or activities are creating an endangerment to the people on the Site or in the surrounding area or to the environment, Defendants may stop implementation of this Decree for such period of time necessary for Ecology to evaluate the situation and determine whether Defendants should proceed with implementation of the Decree or whether the work stoppage should be continued until the danger is abated. Defendants shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after such stoppage of work, and thereafter provide Ecology with documentation of the basis for the work stoppage. If Ecology disagrees with the Defendants' determination, it may order Defendants to resume implementation of this Decree. If Ecology concurs with the work stoppage the Defendants' obligations shall be suspended and the time period for performance of that work, as well as the time period for any other work dependent upon the work which was stopped, shall be extended, pursuant to Section XVI of this Decree, for such period of time as Ecology determines is reasonable under the circumstances. Any disagreements pursuant to the clause shall be resolved through the dispute resolution procedures in Section XIV.

**XVIII. COVENANT NOT TO SUE,
REOPENERS AND CONTRIBUTION PROTECTION**

A. Covenant Not to Sue: In consideration of Defendants' compliance with the terms and conditions of this Decree, Ecology covenants not to institute legal or administrative actions against Defendants regarding the release of hazardous substances covered by this Decree.

This covenant is strictly limited in its application to the Site specifically identified in Exhibit A and to the hazardous substances that Ecology knows are located at the Site as of the entry of this Decree, including that which is known based on the information submitted by the PLPs to Ecology. This covenant is not applicable to any other hazardous substance or area and Ecology retains all of its authority relative to such substances and areas.

B. Reopeners: Ecology specifically reserves the right to institute legal or administrative action against Defendants seeking to require them to perform additional remedial actions at the Site, and to pursue appropriate cost recovery in accordance with provisions set out in RCW 70 105D.050, under the following circumstances:

(1) if Defendants fail to comply with the terms and conditions of this Decree, including all exhibits, and after written notice of noncompliance, fail to come into compliance;

(2) if Defendants fail to meet the requirements of this Decree, including, but not limited to, failure of the remedial action to meet the cleanup standards identified in the CAP;

(3) if Ecology determines that confirmational monitoring indicates that additional remedial actions are necessary to meet the cleanup standards identified in the CAP;

(4) if Ecology determines that action beyond the terms of this Decree is necessary to abate an imminent and substantial endangerment to public health, welfare, or the environment; and

(5) if new information becomes available regarding factors previously unknown to Ecology, including the nature or quantity of hazardous substances at the Site, and Ecology determines, in light of this information, that further remedial action is necessary at the Site to protect human health, welfare, or the environment, and Defendants, after notice, fail to take the necessary action within a reasonable time.

1 C. Applicability: The Covenant Not To Sue set forth above shall have no applicability
2 whatsoever to:

- 3 (1) Criminal liability;
4 (2) Liability for damages to natural resources; and
5 (3) Any Ecology action against potentially liable persons not a party to this Decree,
6 including cost recovery.

7 D. Prior to instituting legal or administrative action against Defendants seeking to
8 require them to perform additional remedial actions at the Site, Ecology shall provide Defendants
9 with fifteen (15) calendar days notice of such action.

10 E. Contribution Protection: With regard to claims for contribution against the
11 Defendants, the parties agree that each Defendant is entitled to contribution protection from all
12 claims brought pursuant to MTCA, RCW 70.105D.080 or any other state claim seeking, under
13 other theories, substantially similar relief, to the fullest extent allowed by MTCA, RCW
14 70.105D.040. The contribution protection conferred in this section shall not be frustrated by the
15 use of non-MTCA theories to seek relief in the nature of contribution or indemnification.

16 Nothing in this paragraph E in any way affects the rights or obligations of any Defendant
17 as to any separate agreement it may have with another Defendant.

18 XIX. LAND USE RESTRICTIONS

19 A. For those properties within the Site owned by the Defendants where residual
20 concentrations of hazardous substances for which cleanup levels have been established in the CAP
21 will exceed residential cleanup levels following completion of the cleanup action, Defendants
22 agree that the Restrictive Covenant (Exhibit F) shall be recorded with the office of the Franklin
23 County Auditor within twelve (12) months of the entry of this Decree. The Restrictive Covenant
24 shall restrict future users of the Site. Defendants will provide Ecology with a copy of the recorded
25 Restrictive Covenant within thirty (30) days of the recording date.

26 B. For those properties within the Site not owned by the Defendants where residual

1 concentrations of hazardous substances for which cleanup levels have been established in the CAP
2 will exceed residential cleanup levels following completion of the cleanup action, Defendants will
3 have eighteen (18) months from the date of entry of this Decree to gain access to these properties,
4 including the right to record the Restrictive Covenant.

5 C. After eighteen (18) months, if the Defendants have gained access to a property
6 within the Site and the right to record the Restrictive Covenant, then the Defendants will proceed
7 with the remediation of the property in accordance with the CAP in a reasonable restoration time-
8 frame to be determined pursuant to WAC 173-340-360(6) and, except as provided below, will
9 record the Restrictive Covenant (Exhibit F). The Restrictive Covenant (Exhibit F) shall be
10 recorded with the office of the Franklin County Auditor within twelve (12) months of obtaining
11 access. Defendants will provide Ecology with a copy of the recorded Restrictive Covenant within
12 thirty (30) days of the recording date. If the parties determine that the property already meets the
13 cleanup levels established in the CAP, then the Defendants will be required to record the
14 Restrictive Covenant (Exhibit F) according to Paragraph A. If the parties determine that the
15 property already meets residential cleanup levels or will meet residential cleanup levels at the
16 conclusion of the cleanup action, then the parties will jointly determine whether a Restrictive
17 Covenant is required.

18 D. After eighteen (18) months, if the Defendants have gained access to remediate a
19 property within the Site but have not gained the right to record a Restrictive Covenant for that
20 property, then the Defendants and Ecology will jointly determine whether the property can be
21 remediated to residential cleanup levels in a reasonable restoration time-frame in accordance with
22 WAC 173-340-360(6). If the parties determine that residential cleanup levels cannot be met in a
23 reasonable restoration time-frame, then the Defendants shall have an additional thirty (30) months
24 to either remediate the property in accordance with the CAP and obtain the right to record a
25 Restrictive Covenant, or to remediate the property to residential cleanup levels.

26 E. After eighteen (18) months, if the Defendants have failed to gain access to

1 remediate a property within the Site, the Defendants shall have an additional thirty (30) months to
2 gain access to remediate the property. Ecology will undertake all reasonable efforts to facilitate
3 access to remediate a property and/or to establish institutional controls on the property pursuant to
4 WAC 173-340-440, WAC 173-340-500 and WAC 173-340-800. Remediation of the property and
5 the recording of the Restrictive Covenant shall proceed according to paragraphs C and D.

6 **XX. INDEMNIFICATION**

7 Defendants agree to indemnify and save and hold the State of Washington, its employees,
8 and agents harmless from any and all claims or causes of action for death or injuries to persons or
9 for loss or damage to property arising from or on account of acts or omissions of Defendants, their
10 officers, employees, agents, or contractors in entering into and implementing this Decree.
11 However, the Defendants shall not indemnify the State of Washington nor save nor hold its
12 employees and agents harmless from any claims or causes of action arising out of the negligent
13 acts or omissions of the State of Washington, or the employees or agents of the State, in
14 implementing the activities pursuant to this Decree.

15 **XXI. COMPLIANCE WITH APPLICABLE LAWS**

16 A. All actions carried out by Defendants pursuant to this Decree shall be done in
17 accordance with all applicable federal, state, and local requirements including requirements to
18 obtain necessary permits, except as provided in paragraph B of this section.

19 (1) If, prior to the completion of the cleanup action pursuant to this Decree, Ecology
20 adopts revisions to the MTCA regulations or to its policies or guidance that affect the
21 determination of TPH cleanup levels, Defendants will review the regulatory changes and evaluate
22 whether or not such changes should modify the TPH cleanup levels that were approved by
23 Ecology for the Site. Defendants shall provide Ecology with the results of their evaluation and all
24 supporting information. Ecology will review such information and determine whether or not the
25 Defendants' conclusion is acceptable. If Ecology determines that its regulatory changes would
26 have such effect on the TPH cleanup levels, Ecology and the parties shall discuss whether

1 revisions to the CAP are necessary to achieve the modified TPH cleanup levels. If revisions to the
2 CAP are necessary in Ecology's assessment, Ecology shall initiate a process in accordance with its
3 then applicable regulations to revise the CAP, including the TPH cleanup levels, and, if required
4 to modify this Decree.

5 (2) If hazardous substances remain on-Site as part of the cleanup action, Ecology may
6 approve a conditional point of compliance for ground water which shall be as close as practicable
7 to the source of the hazardous substances, but not to exceed the property boundary. If Defendants
8 propose a conditional point of compliance, the Defendants shall demonstrate that all practicable
9 methods of treatment are being utilized in the Site cleanup. Ecology shall issue its decision
10 regarding this conditional point of compliance within 90 days of receipt of Defendants' written
11 demonstration.

12 B. Pursuant to RCW 70.105D.090(I), the substantive requirements of chapters 70.94,
13 70.95, 70.105, 75.20, 90.48, and 90.58 RCW and of any laws requiring or authorizing local
14 government permits or approvals for the remedial action under this Decree that are known to be
15 applicable at the time of entry of the Decree have been included in the CAP, and are binding and
16 enforceable requirements of the Decree. Defendants have a continuing obligation to determine
17 whether additional permits or approvals addressed in RCW 70.105D.090(I) would otherwise be
18 required for the remedial action under this Decree. In the event either Defendants or Ecology
19 determines that additional permits or approvals addressed in RCW 70.105D.090(I) would
20 otherwise be required for the remedial action under this Decree, it shall promptly notify the other
21 Parties of this determination. Ecology shall determine whether Ecology or Defendants shall be
22 responsible to contact the appropriate state and/or local agencies. If Ecology so requires,
23 Defendants shall promptly consult with the appropriate state and/or local agencies and provide
24 Ecology with written documentation from those agencies of the substantive requirements those
25 agencies believe are applicable to the remedial action. Ecology shall provide Defendants with an
26 opportunity to respond to Ecology prior to issuing its final determination regarding these

1 substantive requirements. Subsequently, Ecology shall make the final determination on the
2 additional substantive requirements that must be met by Defendants and on how Defendants must
3 meet those requirements. Ecology shall inform Defendants in writing of these requirements.
4 Once established by Ecology, the additional requirements shall be enforceable requirements of this
5 Decree. Defendants shall not begin or continue the remedial action potentially subject to the
6 additional requirements until Ecology makes its final determination.

7 Ecology shall ensure that notice and opportunity for comment is provided to the public and
8 appropriate agencies prior to establishing the substantive requirements under this section.

9 C. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the
10 exemption from complying with the procedural requirements of the laws referenced in RCW
11 70.105D.090(1) would result in the loss of approval from a federal agency which is necessary for
12 the State to administer any federal law, the exemption shall not apply and the Defendants shall
13 comply with both the procedural and substantive requirements of the laws referenced in RCW
14 70.105D.090(1), including any requirements to obtain permits.

15 **XXII. REMEDIAL AND INVESTIGATIVE COSTS**

16 The Defendants agree to pay all costs incurred by Ecology pursuant to this Decree. These
17 costs shall include work performed by Ecology or its contractors for, or on the Site under ch.
18 70.105D RCW, both prior to and subsequent to the issuance of this Decree for investigations,
19 remedial actions, and Decree preparation, negotiations, oversight and administration. Ecology
20 costs shall include costs of direct activities and support costs of direct activities as defined in
21 WAC 173-340-550(2). The Defendants agree to pay the required amount within ninety (90) days
22 of receiving from Ecology an itemized statement of costs that includes a summary of costs
23 incurred, an identification of involved staff, and the amount of time spent by involved staff
24 members on the project. A general statement of work performed will be provided upon request.
25 Itemized statements shall be prepared quarterly. Failure to pay Ecology's costs within ninety (90)
26

1 days of receipt of the itemized statement will result in interest charges at the rate of twelve percent
2 per annum.

3 **XXIII. IMPLEMENTATION OF REMEDIAL ACTION**

4 If Ecology determines that Defendants have failed without good cause to implement the
5 remedial action, Ecology may, after giving Defendants notice and an opportunity to correct or cure
6 the identified failure, perform any or all portions of the remedial action that remain incomplete. If
7 Ecology performs any or all portions of the remedial action that remain incomplete due to
8 Defendants' failure to implement the remedial action, Defendants shall reimburse Ecology for the
9 costs of doing such work in accordance with Section XXII, provided that Defendants are not
10 obligated under this section to reimburse Ecology for costs incurred for work inconsistent with or
11 beyond the scope of this Decree.

12 **XXIV. FIVE YEAR REVIEW**

13 As remedial action, including ground water monitoring, continues at the Site, the Parties
14 agree to review the progress of remedial action at the Site, and to review the data accumulated as a
15 result of site monitoring as often as is necessary and appropriate under the circumstances. At least
16 every five years, the Parties shall meet to discuss the status of the Site and the need, if any, of
17 further remedial action at the Site. Ecology reserves the right to require further remedial action at
18 the Site under appropriate circumstances. This provision will remain in effect for the duration of
19 the Decree.

20 **XXV. PUBLIC PARTICIPATION**

21 Ecology shall maintain the responsibility for public participation at the Site. However,
22 Defendants may cooperate with Ecology and, if agreed to by Ecology, shall:

23 A. Prepare drafts of public notices and fact sheets at important stages of the remedial
24 action, such as the submission of work plans, Remedial Investigation/Feasibility Study reports and
25 engineering design reports. Ecology will finalize (including editing if necessary) and distribute
26 such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings;

1 B. Notify Ecology's project coordinator prior to the preparation of all press releases
2 and fact sheets, and before major meetings with the interested public and local governments (other
3 than those who are a PLP). Likewise, Ecology shall notify Defendants prior to the issuance of all
4 press releases and fact sheets, and before major meetings with the interested public and local
5 governments;

6 C. Participate in public presentations on the progress of the remedial action at the Site.
7 Participation may be through attendance at public meetings to assist in answering questions, or as
8 a presenter;

9 D. In cooperation with Ecology, arrange and/or continue information repositories to be
10 located at the Mid-Columbia Library, Pasco Branch, 1321 West Hopkins St., Pasco, WA 99301-
11 5097 and Ecology's Eastern Regional Office at 4601 N. Monroe, Suite 202, Spokane, WA 99205-
12 1295. At a minimum, copies of all public notices, fact sheets, and press releases; all quality
13 assured ground water, surface water, soil sediment, and air monitoring data; remedial actions
14 plans, supplemental remedial planning documents, and all other similar documents relating to
15 performance of the remedial action required by this Decree shall be promptly placed in these
16 repositories.

17 **XXVI. DURATION OF DECREE**

18 This Decree shall remain in effect and the remedial program described in the Decree shall
19 be maintained and continued until the Defendants have received written notification from Ecology
20 that the requirements of this Decree have been satisfactorily completed.

21 **XXVII. CLAIMS AGAINST THE STATE**

22 Without in any way impairing the rights of the Port of Pasco or any other local government
23 who is a Defendant to utilize existing grants or loans and to obtain new grants or loans pursuant to
24 RCW 70 105D 070, Defendants hereby agree that it will not seek to recover any costs accrued in
25 implementing the remedial action required by this Decree from the State of Washington or any of
26 its agencies; and further, that the Defendants will make no claim against the State Toxics Control

1 Account or any Local Toxics Control Account for any costs incurred in implementing this Decree
2 Except as provided above, however, Defendants expressly reserve their right to seek to recover
3 any costs incurred in implementing this Decree from any other potentially liable person.

4 **XXVIII. EFFECTIVE DATE**

5 This Decree is effective upon the date it is entered by the Court.

6 **XXIX. PUBLIC NOTICE AND WITHDRAWAL OF CONSENT**

7 This Decree has been the subject of public notice and comment under RCW
8 70 105D.040(4)(a). As a result of this process, Ecology has found that this Decree will lead to a
9 more expeditious cleanup of hazardous substances at the Site.


10 If the Court withholds or withdraws its consent to this Decree, it shall be null and void at
11 the option of any party and the accompanying Complaint shall be dismissed without costs and
12 without prejudice. In such an event, no party shall be bound by the requirements of this Decree.

13 **XXX. NOTICE TO PARTIES**

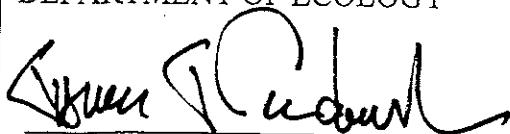
14 For all notices and other correspondence related to this Decree and exchanged between the
15 Project Coordinators, identified in Section VII, a copy of such notice or correspondence shall also
16 be provided to the Port of Pasco at the following address:

17 Jeffrey Bishop
18 Port of Pasco
19 904 E. Ainsworth Avenue
20 P. O. Box 769
21 Pasco, WA 99301-0769

22 So ordered this 24 day of August, 2000

23 
24 JUDGE
25 Franklin County Superior Court
26

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY




JIM PENDOWSKI
Program Manager
Toxics Cleanup Program

Date:

8/11/00

CROWLEY MARITIME CORPORATION

By: 
Title: CORPORATE SECRETARY

Date:

MAY 31, 2000

PORT OF PASCO

By: _____
Title: _____

Date: _____

CHRISTINE O. GREGOIRE
Attorney General



KENNETH LEDERMAN, WSBA # 26575
Assistant Attorney General
Attorneys for Plaintiff
Department of Ecology

Date:

8/15/00

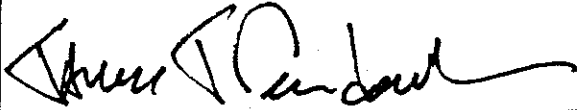
By: _____
WSBA #: _____
Attorney for Defendant
Crowley Maritime Corporation

Date: _____

By: _____
WSBA #: _____
Attorney for Defendant
Port of Pasco

Date: _____

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY



JIM PENDOWSKI
Program Manager
Toxics Cleanup Program

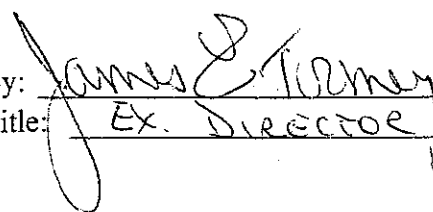
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Date: _____

PORT OF PASCO

By: 
Title: EX. DIRECTOR

Date: 4/27/00

CHRISTINE O. GREGOIRE
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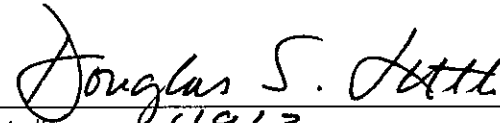


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Date: _____

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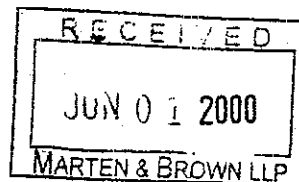
Attorney for Defendant

Conoco, Inc.

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26
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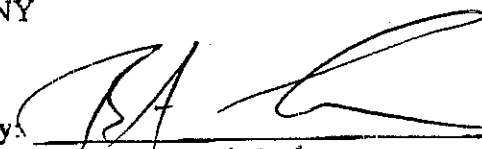
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CONSENT DECREE

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WSBA #: _____

Attorney for Defendant

Thomas Kidwell and Henry Kidwell,
and Their Marital Communities

7 Date: 5-31-2000

Date: _____

14
15 Kidwell
509-547-5509

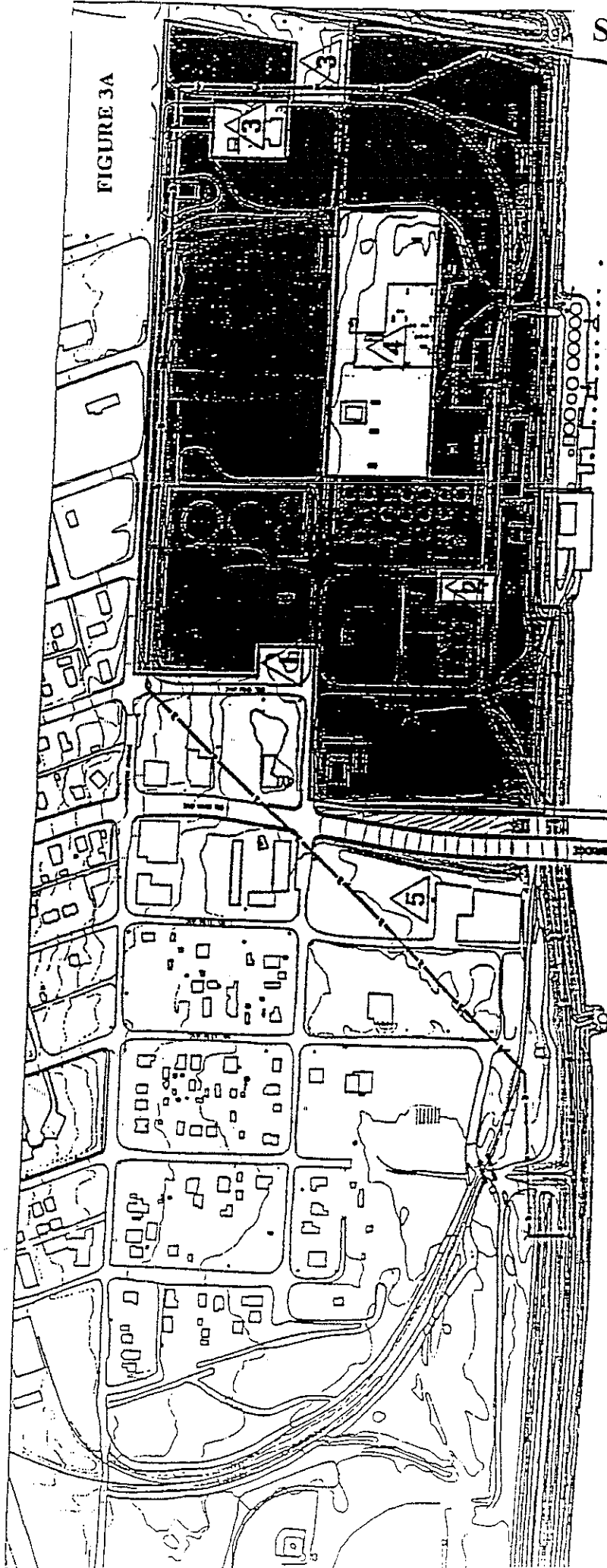
16 Martene Brown
17 Joshua Lipsky
18
19 206-292-6301
20
21
22
23
24
25
26

EXHIBIT A

SITE DIAGRAM

EXHIBIT A SITE DIAGRAM

FIGURE 3A



*Columbia River
(State Highway)*

CART BRIDGE

LEGEND

— APPROXIMATE SITE BOUNDARY

PORT OF PASCO PROPERTY

CITY OF PASCO PROPERTY

ROBINSON PROPERTY

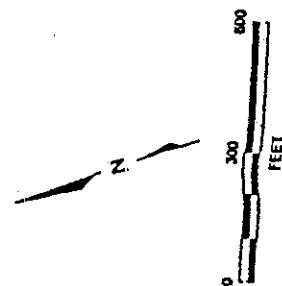
E. A. CURTIS PROPERTY

PACIFIC CORP. PROPERTY

JOHN MICHEL PROPERTY

NOTE: PROPERTY BOUNDARIES BASED ON UNDATED DRAWING C-1, "PROPERTY IDENTIFICATION PLAN, BULK FUEL TERMINAL SITE", BY MACTEC-MEIER ASSOCIATES.

C:\ARCHIVE\PROJECTS\BULK FUEL\BULK FUEL SITE\BULK FUEL SITE.dwg 10/15/93 11:15 AM



**PASCO SITE AND
PROPERTY OWNERSHIP**
CROWLEY/PASCO BULK FUEL

Golder Associates

EXHIBIT B

**FINAL CLEANUP ACTION PLAN
MARCH 1999**



FINAL CLEANUP ACTION PLAN

PORT OF PASCO SITE

[also referred to as the Pasco Bulk Fuel Terminals Site]

PASCO, WA

EASTERN REGIONAL OFFICE

TOXICS CLEANUP PROGRAM

MARCH 1999

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1.0 INTRODUCTION

1.1 THE CLEANUP PROCESS AND THE FINAL CLEANUP ACTION PLAN

The Final Cleanup Action Plan (FCAP) is one of a series of documents used by Ecology to monitor the progress of site investigation and cleanup. Figure 1 identifies the documents required under the Model Toxics Control Act (MTCA) Cleanup Regulation, Chapter 173-340 WAC.

The Remedial Investigation (RI) Report presents results of investigations into the nature and extent of contamination. The Feasibility Study (FS) Report assesses the risk posed by the contamination, and evaluates cleanup actions that eliminate, reduce or control these risks. Evaluations of cleanup actions in the FS are done in accordance with MTCA requirements. The RI and FS are conducted in accordance with work plans approved by Ecology. These Reports are made available for public review and comment.

The selection of a cleanup action by Ecology is presented in the Draft Cleanup Action Plan (DCAP). Upon completion of a public comment period on the DCAP, and after review and consideration of the comments received, a Final Cleanup Action Plan (FCAP) is issued.

The FCAP is incorporated into a Consent Decree or Agreed Order that provides the legal agreement for implementing the cleanup action. The remaining documents implement the selected cleanup action.

1.2 PURPOSE AND OBJECTIVES

Having completed the public comment period for the DCAP, and after review and consideration of the comments received, Ecology is issuing this FCAP. This decision document presents Ecology's final selected cleanup action for the Port of Pasco Site (the Site), also referred to as the Pasco Bulk Fuel Terminals Site. This Site is located on the north bank of the Columbia River in the southeastern portion of the City of Pasco, Washington (as shown in Figure 2). The selected cleanup action is primarily based upon the following documents:

- Remedial Investigation Report, Pasco Bulk Fuel Terminals Site, Associated Earth Sciences, Inc., January 8, 1996;
- Feasibility Study Report, Pasco Bulk Fuel Terminals Site, Associated Earth Sciences, Inc., June 12, 1997;

- The Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC.

Portions of the FCAP and DCAP text, and most of the figures are taken directly from these documents.

This FCAP includes the following:

- Brief description of the Site;
- The nature and extent of contamination at the Site;
- The cleanup standards for the Site;
- A description of the proposed remedial alternatives or actions presented and evaluated in the FS Report;
- Ecology's selected cleanup action.

1.3 DECLARATION

Ecology's selected remedy is protective of human health and the environment. Furthermore, the selected remedy is consistent with the preference of the State of Washington as stated in RCW 70.105D 030(1)(b) for permanent solutions.

1.4 APPLICABILITY

This FCAP is applicable only to the Port of Pasco Site. Cleanup standards and cleanup actions have been developed as an overall remediation process being conducted under Ecology oversight using MTCA authority, and should not be considered as setting precedents for other sites.

1.5 ADMINISTRATIVE RECORD

The documents used to make the decisions discussed in this cleanup action plan are constituents of the administrative record for the site. These documents are listed in the Reference Section

The entire administrative record for the site is available for public review by appointment at Ecology's Eastern Regional Office, 4601 N Monroe, Spokane, WA 99205-1295. Documents that were made available for public comment and review are also available at the Mid-Columbia Library, Pasco Branch, 1320 W Hopkins Street, Pasco, WA 99301-5097.

2.0 SITE BACKGROUND

2.1 SITE BOUNDARY

The Site, as defined in MTCA, means "any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located."

Based on the results of the Remedial Investigation (RI), the Site has been determined to be approximately 90 acres in size and its boundaries are shown in Figure 3 and described as follows:

- Ainsworth Avenue on the north.
- The U.S. Army Corps of Engineers (COE) levee on the south.
- A line extending from the intersection of South 9th Avenue and Ainsworth Avenue to the intersection of the COE interceptor drain and the extension of South 12th Avenue on the west.
- South 5th Avenue on the east.
- The Site also includes a strip of land located west of South 12th Avenue that includes:
 - The COE interceptor drain.
 - The Port of Pasco oil/water separator
 - The COE line drainage ditch.

Most of the Site is owned by the Port of Pasco as shown in Figure 3A.

2.2 SITE HISTORY

This Site has been used primarily as a petroleum storage and distribution facility since the early 1940s. Other industrial and commercial uses have also occurred at the Site over the years. Facilities currently at the Site include the now unused main aboveground tank yard contained in a diked area, a barge loading dock, former aboveground tank yards from which the tanks have been removed, an operating grain elevator and distribution center, an electrical substation, a wastewater pump station owned and operated by the City of Pasco, a cement distributor, a truck repair facility, an agricultural testing laboratory, other former tank farms,

light manufacturing and commercial businesses, and a truck wash facility. Figure 3 shows the Site layout and facility locations.

The Site once included three tank farms that, during peak operating periods, consisted of approximately 50 aboveground tanks (see Figure 3). The Port of Pasco had leased the main tank farm to four different operators since 1941. Other smaller tank farms also were operated at the Site. In addition to petroleum products, agricultural chemicals including soil fumigants, fertilizers, and solvents were stored. The Site also contained rail car and truck loading racks, railroad spurs, and underground and aboveground pipelines. In 1992, all operating storage tanks were emptied of petroleum products and agricultural chemicals, and tanks not owned by the Port of Pasco were removed from the Site. Some buildings and underground sumps associated with loading and distribution areas were also removed.

The Site lies behind dikes maintained by the COE. The COE facilities on the Site include: an embankment levee and cutoff wall that parallel the Columbia River, two dewatering wells located within a cutoff wall surrounding the Continental Grain facility, and a 42-inch-diameter interceptor drain located beneath the southern portion of the Site. (See Figure 3). All these facilities were constructed prior to 1952. The COE interceptor drain was constructed to dewater the area behind the dikes. Water in the COE interceptor drain flows by gravity to an outlet located approximately 1,500 feet west of the main tank farm. Following discharge through an oil/water separator, the water flows through an open channel and discharges into the COE collection pond. The COE periodically pumps the water from the pond into the Columbia River. The two dewatering wells constructed inside the Continental Grain cutoff wall used to discharge to the interceptor drain. In 1995, the COE installed another oil/water separator for the water pumped from these two wells which then discharges directly to the Columbia River.

2.3 SITE INVESTIGATIONS

Oil films on the water discharging from the interceptor drain to the collection pond have been observed since the 1950s. In 1969, the COE investigated an oil film floating on the water discharging from the COE interceptor drain; sheet piles were installed to contain the oil film. When oil was again reported on the COE collection pond in 1973, Ecology conducted a study and determined that free-phase petroleum hydrocarbon product was infiltrating into the COE drain. In 1990, the Port of Pasco replaced the sheet piles at the COE interceptor drain discharge with an oil/water separator.

The 1969 COE investigation of oil in the collection pond and interception trench suggested that petroleum contamination could be migrating from the bulk fuel terminal to the interceptor drain. Ecology's 1973 study determined that free-phase petroleum hydrocarbon product was infiltrating into the COE interceptor drain. In 1986, Ecology detected chlorinated solvents and one constituent of a fumigant in samples collected at the outlet of the interceptor drain.

In late 1986 and 1987, GeoEngineers as a consultant to the Port of Pasco installed 20 monitoring wells and detected free product in nine of these wells. Ten additional wells were installed by GeoEngineers in 1987; free-phase product was detected in 19 of the 32 wells, including the two COE dewatering wells.

In 1989, Ecology conducted additional studies to characterize soil and ground water beneath the Site. In addition to petroleum hydrocarbons, the study detected a fumigant constituent in soil and ground water.

In 1990, Ecology conducted a Site Hazard Assessment of the Site to determine its ranking relative to other contaminated sites in the State. The Site ranked a 1 on a scale of 1 to 5, 1 being the highest risk.

On October 15, 1992, Ecology issued Enforcement Order No. DE92TC-E106 (the Order) requiring the potentially liable persons (PLPs) to conduct a Remedial Investigation (RI), Feasibility Study (FS), and Interim Actions under the requirements of MTCA. Collectively referred to as the PLPs in the Order are: The Port of Pasco; Crowley Maritime Corporation; Tidewater Barge Lines, Inc.; Doyle Brothers, Inc.; U.S. Army Corps of Engineers; Puget Energy and Transportation Company; and, Conoco, Inc. This Enforcement Order was amended in 1993 to add Burlington Northern Railroad Company to the list of PLPs to whom the Order was issued.

Site investigations for the RI started in 1993 and were completed in 1995. The results are presented in detail in The Remedial Investigation Report dated January 1996. The RI work consisted of the following: COE Drain Investigation, Soil Investigations, Ground Water Investigations, Surface Water and Sediment Investigation; Air Investigation; Continental Grain Investigation, and Data Validation.

The FS Report, which was completed in 1997, describes the applicable cleanup requirements for the Site, proposes cleanup standards, identifies and evaluates remedial action alternatives for the Site, and recommends remedial alternatives for the Site.

2.4 INTERIM ACTIONS

Interim actions at the Site started in 1993. They included the following:

- The installation of a trench and a well with skimmer pumps to recover free petroleum product from ground water.

As of May 1997, 4,388 gallons of free product have been recovered from ground water. Ten additional recovery trenches have been installed as supplemental interim action in order to recover more free product from the ground water. Free-phase product recovery is continuing under the Interim Action.

- The evaluation and abatement of risks posed by the free product in utility manholes and in a basement sump of a family residence in the Site.

The sump in the basement of the family residence was sealed. The Port of Pasco has since purchased this property and this residence has been demolished. A building still exists in the vicinity, which has been vacated. Also, utility companies have been warned of the dangers of vapors in the affected manholes.

2.5 PHYSICAL SITE CHARACTERISTICS

2.5.1 Site Geology

Site soils are divided into four primary stratigraphic units, consisting of from top to bottom of: Fill, Alluvium, the Pasco Gravel, and the Ringold Formation. Fill material including sandy silt, silty sand, sand, sand with gravel, and gravel are present in the upper few feet over most of the Site, with a maximum thickness of approximately 7 feet. Alluvium at the Site consists of silt and fine sand with less extensive deposits of clayey silt and clay. In general, this alluvium is present in a wedge that thickened toward the southern portion of the Site near the banks of the Columbia River. The Pasco Gravel consists primarily of sandy gravel with cobbles and ranges from 13 to 34 feet in thickness. The Ringold Formation encountered beneath the Pasco Gravel is about 40 feet below ground surface (bgs). It consists of indurated to cemented, hard silt and clayey silt interbedded with fine sand.

2.5.2 Ground Water Hydrology

The ground water flow system consists of a shallow, unconfined aquifer within the alluvium and the underlying Pasco Gravels. Depth to ground waters across the Site ranges from roughly 4 to 10 feet bgs. The base of the unconfined aquifer system is the upper surface of the Ringold Formation.

Ground water flow within the unconfined aquifer is generally from east to west, but it turns south in the immediate vicinity of the COE interceptor drain. The COE interceptor drain acts as a line sink that locally lowers the ground water table and is the discharge point for COE dewatering wells. Ground water levels are generally lowest during the month of October and highest during May and June. Annual ground level fluctuations across the Site average about one foot.

The Columbia River is located immediately south of the Site. Hydraulic interconnection between the Site and the River is minimized by the COE levee that is keyed into the Ringold Formation.

3.0 NATURE AND EXTENT OF CONTAMINATION

3.1 FREE-PHASE PRODUCT

Free-phase product is present at the Site as shown in Figure 4. It is generally at a depth of 4 to 6 feet. The free-product consists of gasoline and diesel, the amounts of each varying from one plume to another. The apparent free-phase product thickness increases during periods of low ground water table elevation. Free product discharges to the COE drain and is collected in the oil/water separator.

3.2 SOILS

3.2.1 Total Petroleum Hydrocarbons (TPH) and Related Compounds

Areas of significant TPH surface concentrations are limited only to the tank farm area as shown in Figure 5. Figure 6 shows the areas where significant TPH concentrations occur at the 2-4 feet depth. A much broader portion of Site soils shown in Figure 7 has significant TPH concentrations at the 4-6.5 feet depth, generally associated with the water table.

Detections of polynuclear aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene, and xylenes (BTEX) in soils are generally located within the areas delineated by TPH. Figure 7A shows the maximum benzene concentrations in subsurface soil samples.

3.2.2 Arsenic and Lead

Arsenic levels in soil are all within background levels. Lead levels in soils are below the most stringent value considered protective of human health.

3.2.3 Chlorinated Volatile Organic Compounds (VOCs)

Perchloroethylene (PCE) is detected at former PCE tank locations. Trichloroethylene (TCE) occurs only in association with PCE and is not detected above the most stringent cleanup level. The chemical 1,2-dichloropropane (1,2-DCP), a soil fumigant, is detected in only one soil boring.

3.3 GROUND WATER

3.3.1 TPH and Related Compounds

Dissolved gasoline and diesel in ground water are the major contaminants on Site. Concentrations measured during the RI are as high as 170,000 µg/L TPH-gasoline and 15,000

$\mu\text{g/L}$ TPH-diesel. The area exceeding the 1000 $\mu\text{g/L}$ TPH concentration in ground water is shown in Figure 8.

The occurrences of lead, PAHs, and BTEX essentially lie within the TPH plume, consistent with the presence of these compounds in petroleum products.

3.3.2 Arsenic

Arsenic concentrations elevated above the background concentration have the same general distribution as the TPH plume. Figure 9 shows total arsenic concentrations in ground water. A correlation was also noted between low dissolved oxygen (DO) and elevated arsenic levels in ground water. The DO contour plot in Figure 10 shows a broad DO low that corresponds to the greatest arsenic concentrations. The low dissolved oxygen in ground water may lead to reducing conditions in soil, which may in turn contribute to increased mobility of arsenic that, in a higher oxidation state, is normally present as oxides in soils.

3.3.3 Chlorinated VOCs

Areas of significant PCE, TCE and dichloroethene (DCE) detections overlap, although relative percentages of these compounds varies from well to well. The areas for TCE and PCE concentrations in ground water are shown in Figures 11 and 12 respectively.

The greatest concentration of 1,2-DCP measured at the Site occurs near the former west tank farm. The dissolved-phase 1,2-DCP plume extends downgradient (southwest) to the COE drain as shown in Figure 13. The southward extent is limited by the COE drain except for a consistent occurrence south of the drain at one monitoring well, MW-35.

3.4 COE INTERCEPTOR DRAIN

The occurrence of dissolved phase contaminants in the water in this drain is consistent with the nature and extent of dissolved phase contaminants identified in ground water in monitoring wells adjacent to the drain. Most of the contaminant entry has been identified to occur between MH-2 through MH-5. There is also visual evidence of free-phase product having historically entered the drain between MH-2 through MH-5.

3.5 SURFACE WATER AND SEDIMENT

TPH, lead, and VOCs are detected in the ditch surface water. Concentrations of PCE and lead are higher in the collection pond than at the point where the ditch water enters the pond. This suggests that there are other sources of contaminants to the pond that are not related to the Site. For this reason, the Site includes the ditch but not the COE Collection Pond.

TPH, lead, and a few VOCs are detected in the ditch sediments. Benzene, PCE, TCE, and 1,2-DCP are not detected in sediment samples. Concentrations of detected chemicals are higher at the sediments found at the head of the ditch immediately downstream of the oil/water separator.

3.6 CONTAMINANT TRANSPORT

Piezometric maps for the Site indicate that mobile free-phase product migrates to the southwest into the COE interceptor drain. The occurrence and migration of free-phase product appear to be constrained by subtle stratigraphic changes within the alluvium and changes in ground water levels. Free-phase product intercepted by the drain is removed by an oil/water separator at the outlet of the drain.

Dissolved-phase TPH constituents, chlorinated VOCs and arsenic in the ground water flow into the COE interceptor drain. These dissolved-phased constituents are transported via the COE interceptor drain to the oil/water separator at the end of the drain. Oil/water separator effluent is discharged to the east ditch, which in turn flows into the COE collection pond. The COE collection pond is pumped into the Columbia River.

3.7 RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

The Site is primarily used for industrial purposes with some residential and commercial properties located adjacent to the Site. Both humans and aquatic biota may currently be exposed to contamination at this Site. Humans may contact contaminated soils on Site via ingestion, dermal contact, or inhalation. There are currently no water supply wells at the Site although there are no restrictions to the use of this ground water, which is a potential future source of drinking water.

Off-site exposure pathways include contaminant volatilization along preferential pathways, contact with ground water, and migration via ground water to surface water and sediments in the COE Collection Pond. Ingestion of ground water and inhalation of vaporized chemical from ground water is possible if a well were placed on or downgradient from the Site in the future. Also ground water discharged to the COE Pond is pumped to the Columbia River which serves as a drinking water source for the City of Pasco.

4.0 CLEANUP STANDARDS

The two primary components of cleanup standards are (1) cleanup levels and (2) points of compliance. Both must be established for each site. Cleanup levels determine at what concentration a particular hazardous substance does not threaten human health or the environment. The goal is to address all material above those concentrations with some remedy that prevents exposure to those materials. Points of compliance designate the locations on the site where the cleanup levels must be met.

4.1 CLEANUP LEVELS

Developing cleanup levels involves several steps: determining which method to use; determining the reasonable maximum exposure scenario; developing cleanup levels for individual substances in individual media, taking into account potential cross-media contamination; determining what substances contribute to overall risks at the site (indicator hazardous substances); evaluating levels for single substances in single media for indicators; and, adjusting individual levels downward to meet site risk and hazard limits specified in MTCA.

There are three methods used to determine cleanup levels under MTCA: Methods A, B, and C. Method A is used for routine sites or sites that involve relatively few hazardous substances which have available numerical levels. Method B is the standard method for determining cleanup levels and is applicable to all sites. Method C is a conditional method used when a cleanup level under Method A or B is technically impossible to achieve or may cause greater environmental harm. Method C may also be applied to qualifying industrial properties. Cleanup level methods are established for ground water, surface water, soil, and air.

WAC 173-340-708 states that "when defining cleanup requirements at a site that is contaminated with a large number of hazardous substances, the department may eliminate from consideration those hazardous substances that contribute a small percentage of the overall threat to human and the environment. The remaining hazardous substances shall serve as indicator hazardous substances for purposes of defining site cleanup requirements."

The factors to be considered in determining whether or not a substance should be retained for an analysis of overall site risk or hazard are:

1. The frequency of detection of the substance. It may be appropriate to eliminate compounds, which are detected with a frequency of 5 % or less.
2. The concentration of the substance. Substances with concentrations marginally above their cleanup standards may not be important in considerations of overall hazard and risk.

3. The toxicity of the substance. It may be suitable to delete substances of low toxicity.
4. Environmental fate. Substances, which readily degrade in the environment, may not be of importance to overall hazard or risk. Conversely, those with highly toxic degradation products should be included in an analysis of overall hazard and risk.
5. The natural background levels of the substance. MTCA regulates risks due to substances found at contaminated waste sites. The risks caused by substances at background concentrations are not addressed by MTCA.
6. The mobility and potential for exposure to the substance. Substances may be eliminated if the values for these factors are low.

Limitations of analytical chemistry are also considered. The practical quantitation limit (PQL) for detection of a substance may be greater than its risk-based cleanup level. The risk-based cleanup level is used in the analysis of the over-all site hazard and risk in such cases, but the regulatory limit for that substance will be the PQL. Improvements in analytical technology will result in readjustment of the regulatory limit to match the new, lower PQL during any subsequent evaluation of the Site.

Once a list of substances to be assessed for cumulative risks and hazards has been developed, total site risk is calculated based upon the established cleanup levels. The total site risk for a site must not exceed 1×10^{-5} and the hazard index, calculated for chemicals with similar non-carcinogenic toxicity endpoints, must not exceed 1. MTCA does not define how to apportion risk and hazard index among substances, as long as individual standards for each substance are not violated.

4.2 SITE CLEANUP LEVELS

Site cleanup levels are developed for each media as illustrated in Tables 1 to 16. Ground water cleanup levels were developed first, as soil cleanup levels are calculated at levels that will not result in violation of ground water levels. Similarly, surface water cleanup levels were developed before determining the sediment cleanup levels.

4.2.1 Ground Water Cleanup Levels

Ecology has determined that the highest beneficial use of ground water at this Site is drinking water. Exposure to hazardous substances via ingestion of drinking water and other domestic uses represents the reasonable maximum exposure and standards developed to protect these uses will be protective of all other uses. Method B is the appropriate method for developing cleanup levels for ground water. Ground water from the Site discharges to an unlined ditch that goes to a collection pond, which is periodically pumped to the Columbia River.

Therefore, ground water must not violate surface water cleanup levels. The Columbia River is classified as a Class A fresh surface water of the state under Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington. Characteristic uses for Class A water bodies include: domestic, industrial, agricultural water supply; stock watering; fish and shellfish; wildlife habitat; recreation, and commerce and navigation.

Method B ground water cleanup levels are developed from:

1. Drinking water criteria that include:
 - Applicable or Relevant and Appropriate Requirements (ARARs) including Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs). An ARAR value can be used as a cleanup level if it is sufficiently protective of human health and environment (i.e., the cancer risk is less than 1×10^{-5} or if the hazard quotient is less than 1).
 - Formula values based on human health under WAC 173-340-720(3)(ii) for those substances for which sufficiently protective, health-based criteria have not been established under ARARs.
2. Levels to protect surface water that include (based on WAC 173-340-730):
 - all water quality criteria published under Chapter 173-201A WAC, Water Quality Standards for Surface Water of the State of Washington;
 - the EPA Ambient Water Criteria (AWQC) which are based on the protection of aquatic organisms (acute and chronic criteria) and human health published pursuant to section 304 of the Clean Water Act. These human health criteria are promulgated in the National Toxics Rule (NTR);
 - formula values under WAC 173-340-730(3)(iii) for hazardous substances which sufficiently protective, health-based criteria or standards have not been established under ARARs;
 - for surface waters which represent a source or potential future source of drinking water, concentrations which are anticipated to result in no adverse impacts to human health as established in accordance with WAC 173-340-720(3), the Method B drinking water levels. These are the same criteria listed under #1.

Method A cleanup levels may be used for substances that do not have Method B levels. Levels based on natural or area background of the hazardous substances are also considered.

The Practical Quantitation Limits (PQL) for a substance may be greater than the health-based number. In such cases, the cleanup level becomes the PQL. If the PQL is lowered during cleanup of the site or during periodic review, the regulatory limit will be adjusted downward. However, total site risk will be calculated using actual health based levels.

Table 1 shows the applicable cleanup criteria for chemicals detected in site ground water (excluding the PQLs). The human-health based criteria for surface water in the NTR include levels for fish and water consumption, and for fish consumption only. The criteria listed in Table 1 are for fish consumption only since ingestion of water is taken into consideration under the drinking water criteria. The most stringent of these criteria is the selected Method B cleanup level for each individual substance. The cleanup levels for Total Petroleum Hydrocarbons (TPH), arsenic, and lead are the Method A levels. The Method A level for arsenic of 5 µg/L is based on the natural background number. Method A levels will not be included in the overall site risk calculations.

Table 2 shows the chemicals detected in ground water along with the maximum concentrations and frequencies of detection. Maximum concentrations and frequencies of detection for TPH, total metals, light Polynuclear Aromatic Hydrocarbons (LPAHs), heavy Polynuclear Aromatic Hydrocarbons (HPAHs), and VOCs related to petroleum (Benzene, Toluene, Ethylbenzene, and Xylenes or BTEX) were determined from Phase I and II ground water data for wells without free product. Samples of ground water taken from wells with free product may not be representative of the ground water since contaminants may be transferred into the ground water as the sampling equipment is lowered through the product. For VOCs not necessarily related to petroleum, the maximum concentrations and frequencies were determined from all Phase I and II ground water data including wells with free product. Contaminants with concentrations less than the individual cleanup level or those with 5% or less detection frequencies are eliminated for consideration as indicator substances.

Cleanup levels will not be established for the following contaminants which exceed the 5% frequency of detection: acenaphthylene and phenanthrene (LPAHs); benzo(ghi)perylene (HPAH); and, methylene chloride and chloroethane (VOCs). No reference dose or cancer potency factor has been adopted by EPA's Integrated Risk Information System (IRIS) or by the Health Effects Assessment Summary Tables (HEAST) for toxicity of any of these contaminants, nor can a reference dose be developed utilizing the methods described in Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part A. Therefore Method B formula health based levels cannot be calculated. There are also no ARARs or Method A levels for these contaminants. However, it is expected that concentrations of these contaminants will be reduced during remediation of the Site since these substances will be undergoing treatment together with other contaminants within their respective groups.

Table 3 shows the proposed individual Method B ground water cleanup levels, the individual cancer risk and hazard quotients for the indicators. Risks for cleanup levels which are based on the PQLs are calculated based on the actual Method B cleanup level. The indicator HPAHs are

all carcinogenic PAHs (cPAHs) The Method B cleanup level of 0.012 $\mu\text{g/L}$ for each of the indicator cPAH is lower than the PQL. The Method A cleanup level for total cPAHs is based on Method B concentrations but modified based on analytical considerations. The Method A cleanup level is therefore used for total cPAHs. The total cancer risk in the ground water for these proposed cleanup levels is 2.1×10^{-5} . The total hazard quotient for each toxic end effect is shown to vary from 1.653 to 0.625.

These individual cleanup levels for the ground water in Table 3 are adjusted downwards such that the total site cancer risk is 1×10^{-5} and the hazard quotient for each toxic effect is 1 or less. Table 4 shows adjusted concentrations that add to a total cancer risk of 1.0×10^{-5} and a hazard quotient of 1 or less for each toxic end effect.

4.2.2 Soil Cleanup Levels

The Site does not qualify as an industrial site under WAC 173-340-745. However, the Site does qualify as commercial property under the provisions of WAC 173-340-740(1)(c) because: the Site is zoned light industrial, it is currently used for and has historically been used for industrial or commercial purposes, and there is a buffer zone of non-contaminated land that separates the Site from the residentially zoned area while other adjacent areas are zoned for industrial/commercial purposes. Method C Commercial cleanup levels are used for Site soils.

Ecology has recently established an interim TPH policy that provides for using a "surrogate" approach in determining risk-based cleanup levels for TPH under Methods B and C. This is published under Ecology's "Interim Interpretative and Policy Statement - Cleanup of Total Petroleum Hydrocarbons (TPH)". This Interim Policy provides guidance on only two pathways: (1) direct human health contact, and (2) soil-to-groundwater. The surrogate approach requires quantification of ranges of aromatic and aliphatic hydrocarbons using the volatile petroleum hydrocarbons (VPH) analysis and the extractable petroleum hydrocarbons (EPH) analysis. The results are entered into a spreadsheet prepared by Ecology to determine whether the concentrations are protective of human health direct contact and protective of ground water.

This Interim TPH Policy is used to evaluate cleanup levels for soils at this Site. Additional data collected to implement this policy is presented in the "Data Report on Interim TPH Investigation for the Pasco Bulk Fuel Terminals Site, Pasco Washington", October 1, 1998. Table 5 shows the spreadsheet for the maximum concentration of the petroleum fractions measured from soil samples at the Site. The hazard quotients for both residential and commercial soils exceed the 1.0. In addition, the TPH level in ground water exceeds 1 mg/L, and concentrations for benzene and ethylbenzene in ground water exceed the ground water cleanup level developed in Table 4. These concentrations will have to be adjusted downwards to meet the required MTCA thresholds. Table 6 shows adjusted concentrations to meet the criteria for Method C Commercial Soils. The resulting ground water concentrations for benzene and toluene are approximately the same ground water concentrations shown in Table

4. For comparison, concentrations adjusted to meet the criteria for Method B (Residential) soils are shown in Table 7.

Table 8 shows the applicable soil cleanup criteria for the Site. Method B and Method C Commercial values for soil ingestion were considered. Levels that are protective of ground water obtained from Tables 6 for TPH related contaminants or 100 times the adjusted ground water concentration from Table 4, are included for substances that have been identified as ground water indicators for the site. The cleanup level is the most stringent of the levels cited in this table.

The screening for indicator substances for Site soils is shown in Table 9. The indicators are substances that exceed the cleanup levels at a frequency of more than 5%. In general, soil cleanup levels for substances that are in ground water are driven by protection of ground water.

Table 10 shows the risk and hazard quotient calculation for Site soil cleanup levels. Hazard quotients for soil are primarily driven by the Interim TPH calculation which does not specify toxicity endpoints. Therefore the hazard quotient based on TPH has been assigned to all toxicity endpoints. The soils cancer risk does not exceed 1×10^{-5} and the hazard quotients do not exceed 1.

4.2.3 Surface Water Cleanup Levels

The surface water in the Site is the water in the ditch that receives effluent from the existing COE oil/water separator. The discharge from the oil/water separator is the point at which contamination from Site ground water is released to surface water. The cleanup criteria for surface water are the same levels shown in Table 1. These levels are consistent with WAC 173-340-730(3). Method B drinking water standards are considered because the surface water is pumped to the Columbia River, which is a Class A surface water body that represents a current source of drinking water.

Surface water and sediment samples were collected downstream from the oil/water separator (including the COE collection pond) and the Columbia River. A review of the distribution of exceedances of the indicators show that benzene, 1,2-Dichloropropane (1,2-DCP), and perchloroethylene (PCE) or tetrachloroethylene exceeded the cleanup level at the upstream end of the ditch immediately downstream of the oil/water separator. Lead, 1,2-DCP and PCE exceeded the cleanup level at the pond but not at the downstream end of the ditch leading to the pond. The results show possible contributions from off-site sources for lead, 1,2-DCP and TCE in the pond. No exceedances of cleanup levels were found in the Columbia River. The Collection Pond and the Columbia River are therefore not considered part of the Site and cleanup levels are set only for the ditch. The indicator substance screening for indicators are thus based on results of samples taken from locations in the ditch only.

Table 11 identifies the indicators for the surface water in the ditch. Exceedances of cleanup levels for these indicators occur only at the head of the ditch, which is immediately downstream of the outlet point for the ground water coming out of the interceptor drain.

Ground water discharging from the drain will meet cleanup levels that are protective of surface water. Remediation of surface water in the ditch is not necessary.

4.2.4 Sediment Cleanup Levels

Table 12 shows the screening for indicators in the sediments based on results of samples from the two locations in the ditch. Since there are no cleanup levels established for sediments, cleanup levels for sediments in the ditch will be based on soil cleanup levels. However, concentrations will also be compared to the Freshwater Sediment Quality Values (FSQV) published in Ecology's publication No 97-323a, "Creation and Analysis of Freshwater Sediment Quality Values in Washington State", July 1997. Cross media contamination of the sediments to surface water will be considered equivalent to soils concentration for protection of ground water. TPH is not an indicator in the surface water. Therefore the cleanup level for TPH does not have to be based on protection of water. The ITPH level for residential soils shown in Table 7 is used as screening criteria.

There are no indicator chemicals for sediments in the ditch. Remediation of sediments is not necessary.

4.2.5 Total Site Cancer Risk/Hazard Quotients and Summary of Site Cleanup Levels

Cleanup levels have been set for the indicator chemicals for ground water (Table 4) and soils (Table 10). The total site cancer risk and hazard quotient for each toxic end point for these proposed cleanup levels are calculated in Table 13. The site cancer risk meets the MTCA threshold of 1×10^{-5} . The site cancer risk is attributed to contaminants in the ground water. The hazard quotients for four of the seven toxic end points exceed the MTCA criterion of 1.0.

Ground water cleanup levels were readjusted further as shown in Table 14. The resulting total site cancer risk and hazard quotients meet the MTCA criteria as shown in Table 15.

Table 16 shows the final Site cleanup levels for the Site.

4.3 POINTS OF COMPLIANCE

The Point of Compliance is defined in MTCA as the points or points where cleanup levels established in accordance with WAC 173-340-720 through WAC 173-340-760 shall be attained (WAC 173-340-200). Once those cleanup levels have been attained at that point, the site is no longer considered a threat to human health and the environment.

4.3.1 Soil

For soil cleanup levels based on protection of ground water, the point of compliance shall be established in the soils throughout the site under WAC 173-340-740(6).

For soil cleanup levels based on human exposure via direct contact, the point of compliance shall be established in the soils throughout the site from the ground surface to fifteen feet below the ground surface. This represents a reasonable estimate of the depth of the soil that could be excavated and distributed at the soil surface as a result of site development activities.

Actual soil concentrations based on protection of ground water will be determined from ground water monitoring data according to the Compliance Monitoring Plan and will over-ride the theoretical numbers specified in this DCAP. Soil cleanup levels based on protection of ground water will be met if ground water cleanup levels have been achieved as determined using the statistical requirements under MTCA for meeting cleanup levels. Should soil levels result in continued contamination of ground water, further remedial action will be necessary.

4.3.2 Ground Water

For ground water, WAC 173-340-720(6) governs the definition of the point of compliance. The point of compliance in ground water is established throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth, which could potentially be affected by the site. If hazardous substances remain contained on site, the department may approve a conditional point of compliance as close as practicable to the source of hazardous substances, not to exceed the property boundary.

4.3.3 Surface Water

WAC 173-340-730(6) requires that for surface water, the point of compliance shall be the point or points at which hazardous substances are released to surface waters of the state unless the department has authorized a dilution zone in accordance with WAC 173-201-035. Where hazardous substances are released to the surface as a result of ground water flow, no dilution zone shall be allowed to demonstrate compliance with surface water cleanup levels.

At this Site, ground water is released to surface water at the outlet of the COE interceptor drain. The point of compliance for ground water discharging to surface water is at the discharge point from the COE drain into the ditch.

5.0 PROPOSED CLEANUP ACTIONS

5.1 REMEDIAL ACTION GOALS

The remedial action goals are intended to protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. They are developed considering the characteristics of the contaminated medium, the characteristics of the hazardous substances present, migration and exposure pathways, and potential receptor points.

There are two media of concern at this Site: soil and ground water. Remediation of ground water discharging via the COE drain will address the contamination in the surface water that is contaminated at the head of the ditch. TPH, constituents of petroleum that are mainly PAHs and VOCs, and chlorinated solvents are the chemical groups threatening human health and the environment in these media. Contamination in ground water and soils at the Site is migrating to the COE drain as a result of ground water transport or as a result of erosion of soil and surface water runoff processes. Contamination can also be transported into the air both on- and off site via volatilization or particulate transport. Potential exposure to contaminated media could occur through dermal contact, ingestion and inhalation. Construction workers and trespassers on-site, city workers in utility corridors, residents in adjacent properties, and recreationalists in the COE collection pond are possible receptors for the contamination.

Based upon these anticipated pathways, the following remedial action goals are reasonable for site:

- Remove free-phase petroleum product;
- Prevent leaching of contaminants from soil into the ground water that would result in exceedance of ground water cleanup levels;
- Prevent direct contact and ingestion of soils in excess of cleanup levels by humans;
- Prevent direct contact and ingestion of contaminated ground water beneath the Site by humans;
- Prevent direct contact and ingestion of contaminated ground water leaving the COE interceptor drain through the oil/water separator by humans and biota in surface water;

5.2 SUMMARY OF FEASIBILITY STUDY CLEANUP ALTERNATIVES

Alternatives for reaching remedial action goals in soils and ground water were evaluated in the Feasibility Study (FS) Report, Associated Earth Sciences, 1996. To be consistent with this FS report, the area east of 10th Street is referred to as "on-property"; the area west of 10th Street is the "off-property".

The technologies analyzed for soil were:

- No Action
- Institutional Controls
- Containment
- Stabilization
- Removal and Disposal
- Treatment
 - Bioremediation
 - Low Temperature Thermal Desorption
 - In-Situ Soil Flushing
 - Soil Washing
 - Soil Vapor Extraction

The ground water technologies were:

- No Action
- Institutional Controls
- Containment
- Treatment
 - Bioreactors
 - In-Situ Bioremediation
 - Air Stripping
 - Carbon Adsorption
 - Air Sparging

Following this individual analysis of technologies, six alternatives, combining different technologies were presented. Of the six alternatives presented, one is the "Free Phase Product Removal Only" alternative, presented as a baseline for comparison with active site remediation. Free-phase product recovery is already occurring at the Site under an Interim Action and will continue to be removed from the ground water table through these recovery trenches.

5.3 CLEANUP ACTION ALTERNATIVES

5.3.1 Alternative 1: Free Phase Product Removal Only (Figure 14)

The alternative is carried forward as the baseline alternative for comparison purposes. Free-phase product will continue to be removed from the ground water table through recovery trenches. The removal may include ground water depression to enhance free-phase product recovery.

5.3.2 Alternative 2: Free-phase Product Recovery; Ground Water Collection and Treatment; Soil Capping (Figure 15)

Removal of free-phase product will continue. Ground water will continue to be collected in the COE drain and treated in the existing oil/water separator. Air stripping will treat the effluent from the oil/water separator. A new storm drain line will be constructed to collect surface runoff and bypass the COE interceptor drain, oil/water separator, and air stripper. All contaminated surface soils will be capped with clean soil or pavement. On-property areas of the Site with surface contamination may be fenced instead of capped if the land use of the area will allow. Institutional controls will be required for soil and ground water both off-property and on-property. Ground water monitoring will be required.

5.3.3 Alternative 3: Free-phase Product Recovery; Ground Water Collection and Treatment; Limited Soil Remediation (Figure 16)

Removal of free-phase product will continue. Ground water will continue to be collected in the COE interceptor drain and treated in the existing oil/water separator. A new interceptor drain located east of and parallel to South 10th Avenue will be installed and connected to the existing COE drain to increase and enhance ground water collection. The effluent from the oil/water separator will be treated using air strippers. All Site surface water will be collected in a new storm water line constructed adjacent to the existing COE interceptor drain and treated in oil/water separators. All on-property contaminated surface soils will be excavated to a depth of 2 feet and treated by bioremediation and capped with clean soils or pavement. Institutional controls will be required for soils and ground water. Ground water monitoring will be required.

5.3.4 Alternative 4: Free-phase Product Recovery; Ground Water Collection and Treatment; Remediation of all Off-property Soil; Limited Remediation of On-property Soil (Figure 17)

This alternative is alternative 3 plus remediation of all off-property contaminated soils by excavation and ex-situ bioremediation treatment. Institutional controls will be required for on-property soils and ground water. Ground water monitoring will be required.

5.3.5 Alternative 5: Free-phase Product Recovery; Ground Water Collection and Treatment via the Interceptor Drain; In-situ Remediation of Off-property Soil; In-situ and Ex-situ Remediation of On-property Soil; On- and Off-property In-situ Ground Water Remediation (Figure 18)

Free-phase product removal will continue. Product recovery and long-term monitoring will be implemented at the Continental Grain facility. Contaminated ground water base flow in the COE interceptor drain will be collected and treated by oil/water separator and air stripping. On- and off-property contaminated ground water would be treated in-situ by ground water aeration. Contaminated soils in the main tank area will be excavated to the water table and treated ex-situ by bioremediation. In the main tank farm excavation footprint, free-phase product will be skimmed off during excavation and ground water will be pumped out and treated ex-situ by air stripping or air sparging. Off-property contaminated soils will be treated with the ground water using a combination of free-phase product recovery/Soil Vapor Extraction (SVE) and ground water aeration trenches. Contingent upon results of an SVE pilot test, on-property contaminated soils will be treated using SVE piping installed in the IA and ground water aeration trenches. Institutional Controls will be required on-property during remedial activities. Ground water monitoring will be required.

5.3.6 Alternative 6: Free-phase Product Recovery; Ground Water Collection and Treatment; Remediation of All On- and Off Property Soil; On-Property In-Situ Ground Water Treatment (Figure 19).

Free-phase product recovery will continue. Ground water will continue to be collected in the COE interceptor drain and treated in the existing oil/water separator. A new interceptor drain located east of and parallel to South 10th Avenue will be installed and connected to the existing COE drain to increase and enhance ground water collection. The effluent from the oil/water separator will be treated using air strippers. Ground water on the site will be remedied by air sparging in the product recovery trenches. All Site surface water would be collected in a new storm water line constructed adjacent to the existing COE interceptor drain and treated in oil/water separators. All contaminated on- and off-property soil would be excavated to the mean seasonal water table, and treated by low temperature thermal desorption (LTTD). LTTD is a treatment technology that effectively removes volatile organic compounds from soil through heat transfer without bringing the soil matrix to combustion temperatures. The thermal processor typically consists of a soil feed system, desorber drum, and an air pollution control equipment. This process transfers the contaminants from the soils to the air but does not destroy the contaminants. An appropriate air treatment system is needed to meet air quality standards.

6.0 CLEANUP ACTION CRITERIA

The Model Toxics Control Act Cleanup Regulation describes the requirements for selecting cleanup action (WAC 173-340-360). It specifies the criteria for approving cleanup actions, the order of preference for cleanup technologies, policies for permanent solutions, the application of these criteria to particular situations, and the process for making these decisions.

6.1 THRESHOLD REQUIREMENTS [WAC 173-340-360(2)]

All cleanup actions shall:

1. Protect human health and the environment.
2. Comply with cleanup standards.
3. Comply with applicable state and federal laws.
4. Provide for compliance monitoring.

6.2 OTHER REQUIREMENTS [WAC 173-340-360(3)]

The selected cleanup action must also:

1. Use permanent solutions to the maximum extent practicable.
2. Provide for a reasonable restoration time frame.
3. Consider public concerns raised during public comment on the draft cleanup action plan.

6.3 CLEANUP TECHNOLOGY HEIRARCHY [WAC 173-340-360(4)]

Cleanup of hazardous waste sites shall utilize technologies that minimize the amount of untreated hazardous substances remaining at a site. The following technologies shall be considered in order of descending preference:

1. Reuse or recycling;
2. Destruction or detoxification;
3. Separation or volume reduction followed by reuse, recycling, destruction, or detoxification of the residual hazardous substances;
4. Immobilization of hazardous substances;

5. On-site or off-site disposal at an engineering facility designed to minimize the future release of hazardous substances and in accordance with applicable state and federal laws;
6. Isolation or containment with attendant engineering controls;
7. Institutional controls and monitoring.

6.4 CRITERIA FOR PERMANENT SOLUTIONS [WAC 173-340-360(5)]

When selecting a cleanup action, preference shall be given to permanent solutions to the maximum extent practicable. The following criteria are used to determine whether a cleanup action is permanent to the maximum extent practicable:

- Overall protection of human health and the environment including the degree to which existing risks are reduced, time required to reduce the risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, the degree the cleanup action may perform to a higher level than specified cleanup standards, and improvement of the overall environmental quality.
- Long term effectiveness including degree of certainty that the alternative will be successful, long-term reliability, magnitude of residual risk, and effectiveness of controls required to manage treatment residues and wastes.
- Short-term effectiveness including protection of human health and the environment during construction and implementation of the alternative, and the degree of risk to human health and the environment prior to attainment of cleanup standards.
- Permanent reduction of toxicity, mobility and volume of hazardous substances including adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substances releases and sources of releases, degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.
- Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction, operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.
- Cleanup costs A cleanup action shall not be considered practicable if the incremental cost of the cleanup action is substantial and disproportionate to the incremental degree of protection it would achieve over a lower preference cleanup action. When selecting from among two or more cleanup action alternatives, which have an equivalent level of preference, preference may be given to the least cost alternative.

- The degree to which community concerns is addressed.

7.0 EVALUATION OF PROPOSED REMEDIAL ALTERNATIVES

Table 17 shows a summary of the evaluations done for the six alternatives in relation to the threshold criteria and other requirements. Applicable State and Federal Laws and Regulations to the six proposed alternatives have been identified in the FS Report. The cost estimates for the alternatives are shown in Table 18

7.1 THRESHOLD CRITERIA

7.1.1 Alternative 1

Of the six alternative proposed, only alternative 1 does not meet the threshold criteria. Cleanup standards will not be met, as there is no treatment proposed for soils and ground water. This alternative does not provide for compliance monitoring and fails to be protective of human health and the environment.

7.1.2 Alternative 2

This alternative addresses contaminated soil by eliminating exposure areas where the asphalt, concrete, and soil caps are constructed. Ground water discharging to surface water at the end of the COE drain will be treated by the oil/water separator and air stripper. However, ground water leaching and transport of petroleum constituents in areas under soil covers and fenced areas will not be reduced. Contaminated soils will continue to leach constituents into ground water as contaminated soils become saturated due to fluctuating ground water levels. Institutional controls preventing the use of ground water and preventing access, together with compliance monitoring will satisfy the containment requirements of WAC 173-340-700(2).

7.1.3 Alternative 3

This alternative will provide protection to human health and the environment by treating much of the contaminated surface soils, by enhancing ground water collection in drains, and by treating ground water discharge using the oil/water separator and air stripper. Areas paved with asphalt or concrete will also limit infiltration of surface water thereby reducing potential contaminant mobilization from contaminated soil to ground water. Ground water contamination from soils will continue due to contaminated soils becoming saturated with fluctuating ground water levels. Contaminated ground water will continue to migrate across the Site. Institutional controls limiting exposure through land use restrictions will be required. Compliance monitoring will be performed.

7.1.4 Alternative 4

As with Alternative 3, this alternative will protect human health and the environment with the addition of treatment of all off-property contaminated soils. Ground water remediation under this alternative will provide the same level of protection as alternative 3. As with Alternative 3, this alternative will require institutional controls and provide for compliance monitoring.

7.1.5 Alternative 5

Protection of human health and the environment will be increased under this alternative as treatment for on-property and off-property soils and ground water will be undertaken in air sparging/SVE trenches. Most, if not all, of the contaminated ground water and soils are expected to be remedied by this alternative. Institutional controls during remediation will be required as part of this alternative to limit the use of on-site ground water and control excavation to prevent contact with soil and ground water that is not affected by the air sparging/SVE system. A long-term ground water monitoring program will be developed and implemented to verify the effectiveness of air sparging/SVE systems and the ground water collection activity.

7.1.6 Alternative 6

Alternative 6 is also protective of human health and the environment. Under this alternative, all of the contaminated soils above the water table will be excavated and treated by LTDD and ground water that is collected in the interceptor drain systems will be treated by the oil/water separator and an air stripper. In addition, highly contaminated ground water in the vicinity of the free product plume areas will be treated by air sparging. With the removal and treatment of all contaminated soils, ground water cleanup levels are also expected to be achieved.

7.2 OTHER REQUIREMENTS

7.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

When selecting a cleanup action, preference is given to permanent solutions to the maximum extent practicable. A permanent solution is one in which cleanup standards can be met without further action required at the site. The criteria for evaluating whether a solution is permanent to the extent practicable are discussed individually below and a comparison of the alternative with the criteria is also shown in Table 17.

7.2.1.1 Overall Protection of Human Health and the Environment

Alternative 1 ranks the lowest since contaminated soils, subsurface soils, and ground water will not be remedied. Alternative 2 does not actively address on-property and off-property soil contamination, but ground water collected in the COE interceptor drain and the existing

oil/water separator will be treated using air stripping. Alternative 3 includes limited surface soil remediation but does not address subsurface soil contamination and subsequent ground water contamination. Collection of ground water will be enhanced through the installation of a new interceptor drain to be tied in to the existing drain and oil/water separator. Effluent of the air/water separator will be treating using air stripping. Alternative 4 is alternative 3 plus treatment of all off-property contaminated soil by excavation and treatment using bioremediation. Overall protection is increased in Alternatives 5 and 6 since both on- and off-property soils and ground water treatment are proposed.

7.2.1.2 Long Term Effectiveness

Alternatives 2, 3, 4, 5, and 6 will permanently reduce the amount of risk to off-site ground water receptors by collecting and treating all ground water. Alternatives 3, 4, 5, and 6 will additionally reduce the risk to off-property ground water receptors by collecting and treating contaminated ground water before it migrates off-property. Alternatives 4, 5, and 6 will permanently reduce the risk to off-property soil receptors by treating contaminated soils. Alternatives 5 and 6 rank the highest because it will be possible to treat all soils and contaminated ground water.

7.2.1.3 Short Term Effectiveness

Except for Alternative 1, all alternatives may cause a short-term risk to workers during excavation and construction activities from exposure to: contaminated dust; direct contact with contaminated soils and ground water; and organic vapors. Short-term risks to the public may be due to the dust released during excavation and construction and due to the organic vapors released during air stripping, SVE, and LTDD processes. Alternative 6 ranks the lowest because of significant excavation of soils.

7.2.1.4 Permanent Reduction in Toxicity, Mobility, and Volume of Hazardous Substances

All alternatives will remove free-phase product and reduce the mobility of ground water contamination by collecting ground water in the interceptor drain and treating the ground water before discharging to surface water. Alternatives 3, 4, 5, and 6 further reduce the mobility of contaminated ground water off site by additional collection and/or treatment of the ground water crossing the property boundary by South 10th Avenue. Alternative 2 reduces the mobility of contamination by capping portions of the contaminated surface soils but does not address volume or toxicity. Alternatives 3, 4, and 5 and 6 will reduce the toxicity, mobility, and volume of contaminated soil surface by treatment. Alternatives 4, 5, and 6 add treatment of off-property contaminated soils. Alternatives 5 and 6 will reduce the toxicity, mobility, and volume of all contaminated soils and ground water by treatment.

7.2.1.5 Implementability

All alternatives are implementable and have been used to remediate similar contamination at other sites.

7.2.1.6 Cleanup Costs

Table 18 shows the capital costs, operations and maintenance costs, and total costs for the different alternatives.

7.2.2 Provide for a Reasonable Restoration Time Frame

Criteria for establishing a reasonable restoration time frame are outlined in WAC 173-340-360(6). Restoration time frame is the longest for Alternatives 1 and 2 since no additional soils and ground water treatment will be undertaken. Restoration time frame is shortest for Alternative 6.

7.2.3 Consider Public Concerns Raised During Public Comment on the Draft Cleanup Action Plan

Ecology will provide the public for an opportunity to review and comment on the draft cleanup action during a 30-day public comment period.

7.3 CLEANUP TECHNOLOGY PREFERENCE

Alternative 2 ranks low as it relies mainly on containment of soils and institutional controls and monitoring. Alternative 3 ranks somewhat higher since it includes some surface soil treatment and ground water collection and treatment will be enhanced. Alternative 4 is preferred over Alternative 3 since all off-property contaminated soils will be removed and treated. Alternatives 5 and 6 have a higher preference because soils and ground water will be undergoing active treatment and thus are roughly equivalent.

8.0 SITE CLEANUP ACTION

Of the alternatives presented, Alternatives 5 and 6 meet the remedial action goals discussed in Section 5.1. However, the relative difference in environmental protection and in the level of remediation achieved by these two alternatives is small. The primary differences are the rate at which cleanup of the site would be achieved and the relative costs of the alternatives. Although restoration of the site is much faster for Alternative 6, Alternative 5 provides equivalent treatment technologies and an equivalent reduction of risk at a significantly lower cost.

Ecology's selected cleanup action is Alternative 5 (see Figure 18) of the Feasibility Study, as modified in this Section. The air stripper to treat the oil/water separator effluent that is proposed in Alternative 5 may be replaced by any combination of ex-situ and in-situ treatment so long as ground water discharging from the oil/water separator into the ditch meets the applicable cleanup levels. A detailed description of the cleanup action follows.

8.1 FREE-PHASE PRODUCT

- Free-phase product recovery currently being conducted as an interim action will continue until the free-phase product recovery system has reduced the apparent free-phase product thickness to 0.1 foot or less. All free-phase product recovered will be recycled. After the recovery system is suspended, the free product thickness shall be monitored quarterly to ensure that significant accumulations of product do not return to the trenches. Any exceedance of 0.1 foot of apparent hydrocarbon thickness will require restarting the recovery system. The recovery shall be considered complete when there is no exceedance of the apparent hydrocarbon thickness of 0.1 foot for a period of 2 years or upon Ecology's concurrence.
- A monitoring well will be designed and installed to effectively monitor possible accumulations of free-phase product in the area beneath the Continental Grain facility. If recoverable thicknesses of free-phase product are detected in the monitoring well, then a passive skimming system will be implemented.

8.2 SOILS

- Contaminated soils in the main tank farm will be excavated as close as practicable to the seasonal low water table. The excavated soils will be treated by ex-situ bioremediation (land treatment) in a suitable area of the Site to be determined during remedial design. Free-phase product encountered during the excavation will be skimmed from the ground water and transported off-site for treatment/recycling.

- Small on-property areas of contaminated soil outside of the main tank farm would also be excavated to the water table where practical and treated by ex-situ bioremediation.
- Upon successful completion of a SVE pilot test, the contaminated on- and off-property soils remaining after the excavation will be remediated via implementation of SVE in all or a subset of the trenches equipped with SVE piping. This in-situ treatment will include soils from the Main Tank Farm that are not excavated. Effluent from the SVE system will be treated as necessary to meet applicable air emissions limits. In the event the SVE pilot test is not successful a contingency plan for treatment of the soils will be submitted to Ecology for review and approval within (60) days upon completion of the SVE pilot test.
- In-situ remediation of soils will continue until ground water levels are met and cleanup levels for ingestion/direct contact have been met. The PLPs may request and get approval from Ecology to stop active remediation once treatment is no longer practical. Compliance with cleanup levels will be done in accordance with statistical requirements of MTCA.

8.3 GROUND WATER

- Ground water base flow will continue to be collected in the COE interceptor drain and treated in the existing oil/water separator. Ground water discharging to the ditch will be treated to meet ground water cleanup levels which are protective of surface water. The treatment may be applied to the effluent of the oil/water separator or may be moved closer to the source of contamination along the COE drain or in ground water. Air discharges from the treatment systems will meet applicable air emissions limits.
- Ground water will be treated in-situ through aeration trenches as shown in Figure 18 or as modified, if necessary, in the engineering design plans. Effluent from the aeration trenches will be removed through the SVE piping and treated as necessary to meet applicable air emission limits. Active treatment of ground water will continue until cleanup levels are met throughout the Site. Practicability of active treatment may be reviewed in accordance with MTCA.
- Ground water pumped for water depression in product recovery or for dewatering excavations will be required to meet discharge requirements. Prior to discharging to the COE drain, the water will be treated to meet discharge requirements until a treatment system is in place to treat the dissolved contaminants in the drain. Water to be discharged to the City of Pasco sanitary sewer shall meet discharge requirements.

8.4 SURFACE WATER

- Ground water discharging to the ditch from the COE drain-oil/water separator system will be treated to meet ground water cleanup levels which are protective of surface water. No remediation of surface water in the ditch is required.

8.5 MONITORING

A compliance monitoring plan, prepared in accordance with the requirements of WAC 173-340-410 shall be prepared to address the following objectives:

1. Protection monitoring. Monitoring will be conducted to confirm that human health and the environment are being protected during construction and operation of the cleanup action. Soils, air, and ground water will be monitored.
2. Performance monitoring. Monitoring will be conducted to confirm that the cleanup action has attained cleanup standards and other performance standards. Ground water, soils, and air shall be monitored to evaluate the performance of cleanup technologies and demonstrate compliance with substantive requirements of applicable state and federal laws.
3. Confirmational monitoring. The long-term effectiveness of the cleanup action once cleanup standards and other performance standards have been attained will be confirmed through continued monitoring of ground water and soils.

8.6 INSTITUTIONAL CONTROLS

Institutional controls are required when residual concentrations of hazardous substances which exceed Method A or Method B cleanup levels are to remain on Site (WAC 173-340-440) or when industrial or commercial exposure assumptions are used (WAC 173-340-706(1)(a)). For this Site, Method C Commercial exposure is used for the soils. Therefore, institutional controls including restrictive covenants will be placed on areas that exceed Method B (residential) cleanup levels.

The PLPs will be required to obtain an agreement with owners to execute deed restrictions for all impacted areas. If the PLPs cannot execute such deed restrictions, soils must meet Method B (Residential) cleanup levels.

WAC 173-340-440(8) states that:

If the residual hazardous substances remaining at the site are subsequently reduced in concentration such that Method B cleanup levels are met without a conditional point of compliance, then the owner may request that the restrictive covenant or other restrictions be eliminated. The restrictive covenant or other restrictions shall be removed, if the department, after public notice and opportunity for comment, concurs

8.7 PERMIT REQUIREMENTS

RCW 70.105D.090 exempts remedial actions at a facility conducted under a consent decree, order, or agreed order from the procedural requirements of chapters 70.94, 70.95, 70.105, 75.20, 90.48 and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals. However, the Department shall ensure compliance with the substantive provisions of such permits or approvals.

Ground water discharges to the city sanitary sewer shall meet substantive requirements of a State Waste Discharge Permit, which include obtaining approval from the City of Pasco and meeting local limits.

The proposed actions use air to treat ground water and soils. Substantive requirements for applicable air permits must also be satisfied.

Substantive requirements of applicable local permits must also be complied with.

9.0 EVALUATION OF THE CLEANUP ACTION WITH RESPECT TO MTCA CRITERIA

9.1 EVALUATION WITH RESPECT TO THRESHOLD CRITERIA

9.1.1 Protection of Human Health and the Environment

Exposure routes at this site include ingestion or contact with contaminated soils, ground water, and surface water. Treating on-property and off-property contaminated soils will eliminate soil contact and ingestion. Treating both surface and subsurface soils will eliminate potential leaching of contamination from the soils to the ground water. Ingestion and direct contact of ground water and surface water will be addressed through treatment of ground water leaving the site and underneath the site.

9.1.2 Compliance with Cleanup Standards

The selected remedy will comply with cleanup standards. This selected alternative combines in-situ and ex-situ treatment of both soils and ground water.

9.1.3 Compliance with Applicable State and Federal Laws

The selected remedy will comply with applicable state and federal laws, identified in Table 19. Local laws, which may be more stringent than specified state and federal law, will govern where applicable.

9.1.4 Provide for Compliance Monitoring

The selected remedy will provide for compliance monitoring. A compliance monitoring plan will be prepared in accordance with the requirements in WAC 173-340-410.

9.2 EVALUATION WITH RESPECT TO OTHER REQUIREMENTS

9.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

Free-phase product recovery with subsequent recycling is a permanent solution. Removal and treatment of contaminated soils as well as the treatment of subsurface soils using aeration/SVE are also considered permanent solutions. The treatment of ground water collected in the COE drain by the oil/water separator and the in-situ treatment of ground water beneath the site are permanent solutions as well.

9.2.1.1 Long-term Effectiveness

Long-term effectiveness will be achieved by destruction of the contaminants through treatment in soils and ground water.

9.2.1.2 Short-term Effectiveness

Risks associated with the cleanup action include potential exposure of workers to dust, soil, ground water, and surface water during construction activities, and exposure to organic vapors as a result of treatment. Mitigation measures will be part of the remedial design, and on-site monitoring will be conducted.

9.2.1.3 Permanent Reduction of Toxicity, Mobility, and Volume

Free-phase product removal, treatment by bioremediation of soils, in-situ treatment of soils aeration/SVE, treatment of collected ground water by the oil/water separator and air stripper, in-situ treatment of ground water by air sparging all will permanently reduce the toxicity, mobility and volume of hazardous substances.

9.2.1.4 Implementability

All treatment technologies in this selected remedy are easily implemented.

9.2.1.5 Cost

The cost for this selected remedy is significantly less than the cost for Alternative 6 which provides almost the same level of protection and risk reduction.

9.2.2 Provide for a Reasonable Restoration Time Frame

Restoration time frame for this alternative is estimated to be from 10-13 years. Ecology believes that this is a reasonable restoration time frame based on the criteria under WAC 173-340-360(6).

9.2.3 Consider Public Concerns

Ecology will provide opportunity for the public to review and comment the Draft Cleanup Action Plan. Public comments and concerns will be evaluated in developing the final Cleanup Action Plan.

10.0 IMPLEMENTATION SCHEDULE

Submittal of the following documents for Ecology's review and approval will be required within ninety (90) days of the date of signing the Consent Decree or other instrument implementing this cleanup action plan:

- Institutional Control Plan
- Compliance Monitoring Plan (including medium specific Sampling and Analysis Plan, and Quality Assurance Procedures Plan)
- Engineering Design Report
- Health and Safety Plan
- Data Management Plan
- Investigative Waste Management Plan.

Public notice and opportunity to comment will be provided on these plans.

The Construction Plans and Specifications, and the Operation and Maintenance Plan will be submitted following finalization of the Engineering Design Report. These plans will be required to provide for a six month construction period to start not later than twelve (12) months after the effective date of the Consent Decree. A cleanup action report will be submitted no later than 3 months after completion of the cleanup action construction.

11.0 REFERENCES CITED

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TABLES

TABLE 1. APPLICABLE GROUND WATER/SURFACE WATER CLEANUP CRITERIA

CONTAMINANT	GROUND WATER					SURFACE WATER						
	ARAR			Hazard Quotient	MTCA Method A, ug/L	Basis	MTCA Method B, ug/L	Basis	MTCA Method B ug/L	Chapter 173-201A, AWQC, or NTR Freshwater, ug/L		
	MCL, ug/L	Cancer Risk								Acute	Chronic	Fish Consumption
TPH												
TPH					1000	aesthetics						
Total Metals												
arsenic	50	8.57E-04	10.4		5	background	0.0583	CAR	0.0982	360	190	
lead					5	ARAR, blood				82	3.2	
LPAHs												
acenaphthene												
acenaphthylene												
anthracene												
fluorene							960	NCAR	643	1700	520	
naphthalene							4800	NCAR	25900			110000
phenanthrene							640	NCAR	3460			14000
							320	NCAR	9880	2300	620	
HPAHs												
benzo(a)anthracene												
benzo(a)pyrene	0.2	1.67E-05					0.012	CAR	0.0296			0.031
benzo(b)fluoranthene							0.012	CAR	0.0296			0.031
benzo(ghi)perylene							0.012	CAR	0.0296			0.031
benzo(k)fluoranthene												
chrysene							0.012	CAR	0.0296			0.031
dibenzo(ah)anthracene							0.012	CAR	0.0296			0.031
fluoranthene							0.012	CAR	0.0296			0.031
indeno(123-cd)pyrene							640	NCAR	90.2	3980		370
pyrene							0.012	CAR	0.0296			0.031
							480	NCAR	2590			11000
VOCs												
benzene	5	3.31E-06			5	ARAR	1.51	CAR	43	5300		
ethylbenzene	700		0.875		30	ARAR, aesthetics	800	NCAR	6910	32000		71
toluene	1000		0.625		40	ARAR, aesthetics	1600	NCAR	48500	17500		29000
xylene, total	10000		0.625		20	ARAR, aesthetics	16000	NCAR				200000
1,2-dichloropropane	5	7.76E-06					0.643	CAR	23.2	23000	5700	
1,2-dichlorobenzene	600		0.833				720	NCAR	4200	1120	763	17000

CAR - Carcinogen
NCAR - Noncarcinogen

TABLE 1. APPLICABLE GROUND WATER/SURFACE WATER CLEANUP CRITERIA

CONTAMINANT	GROUND WATER					SURFACE WATER					
	ARAR		Hazard Quotient	MTCA Method A, ug/L	Basis	MTCA Method B, ug/L	Basis	MTCA Method B ug/L	Chapter 173-201A, AWQC, or NTR Freshwater, ug/L		
	MCL, ug/L	Cancer Risk							Acute	Chronic	Fish Consumption
1,3-dichlorobenzene	75	4.11E-05				1.82	CAR	4.86	1120	763	2600
1,4-dichlorobenzene						5.54	CAR	219	1120	763	2600
bromoform						4800	NCAR				360
2-butanone											
2-hexanone											
4-methyl-2-pentanone											
acetone											
carbon disulfide						800	NCAR				
chlorobenzene	100		0.625			800	NCAR				
chloroform						160	NCAR				
chloromethane						7.17	CAR	5030			21000
trans-1,2-dichloropropene						3.37	CAR	283	28900	1240	470
methylene chloride								133			
trichlorofluoromethane											
1,1,1-trichloroethane	200		0.0278			2400	NCAR				
1,1,2-trichloroethane	5	6.51E-06	0.156	200	ARAR	7200	NCAR	417000			
1,1,2,2-tetrachloroethane						0.768	CAR	25.3		9400	42
1,1-dichloroethane						0.219	CAR	6.48		2400	11
1,1-dichloroethene	7	9.65E-05	0.0972			800	NCAR				
1,2-dichloroethane	5	1.04E-05		5	ARAR	0.0729	CAR	1.93	11600		3.2
chloroethane						0.481	CAR	5.94	118000	20,000	99
tetrachloroethene	5	5.83E-06	0.0625	5		0.858	CAR	4.15	5280	840	8.85
trichloroethene	5	1.23E-06		5	ARAR	3.98	CAR	55.6	45,000	21,900	81
vinyl chloride	2	8.69E-05		0.2		0.023	CAR	2.92			525
cis-1,2-dichloroethene	70		0.875			80	NCAR				
trans-1,2-dichloroethene	100		0.625			160	NCAR	32800			

CAR - Carcinogen
NCAR - Noncarcinogen

TABLE 2. INDICATOR SUBSTANCE SCREENING - GROUND WATER

CONTAMINANT	Frequency of Detection	Maximum Concentration, ug/L	MTCA Cleanup Level, ug/L (Table A.1)	BASIS	Screening Results
TPH*					
TPH-D	0.66	110,000			
TPH-G	0.55	86,000			
TPH-O	0.5	828			
TPH		196,828	1000	A, aesthetics	Indicator
Total Metals*					
arsenic	0.98	146	5	A, Background	Indicator
lead	0.82	148	3.2	AWQC	Indicator
LPAH*					
acenaphthene	0.16	62	520	AWQC	< cleanup level
acenaphthylene	0.1	110			No toxicity data
anthracene	0.3	39			< cleanup level
fluorene	0.45	88	4800	BNCAR	< cleanup level
naphthalene	0.34	770	640	BNCAR	< cleanup level
phenanthrene	0.43	200	320	BNCAR	Indicator
HPAH*					No toxicity data
benzo(a)anthracene	0.13				
benzo(a)pyrene	0.14	91	0.012	BCAR	Indicator
benzo(b)fluoranthene	0.1	0.8	0.012	BCAR	Indicator
benzo(ghi)perylene	0.08	0.6	0.012	BCAR	Indicator
benzo(k)fluoranthene	0.18	1.5			No toxicity data
chrysene	0.19	0.63	0.012	BCAR	Indicator
dibenzo(a,h)anthracene	0.03	1.2	0.012	BCAR	Indicator
fluoranthene	0.18	1.8	0.012	BCAR	<= 5% detection frequency
indeno(123-cd)pyrene	0.14	200	370	NTR	< cleanup level
pyrene	0.14	0.29	0.012	BCAR	Indicator
VOC*					< cleanup level
benzene					
ethylbenzene	0.5	11,000			
toluene	0.48	2500	5	MCL	Indicator
xylylene, total	0.38	11,000	700	MCL	Indicator
	0.52	21,400	1000	MCL	Indicator
			10,000	MCL	Indicator

AWQC - Ambient Water Quality Criteria
 BCAR - B, carcinogen
 BNCAR - B, noncarcinogen
 MCL - Maximum Contaminant Level

* Excluding wells w/ free product
 ** Including wells w/ free product

TABLE 2. INDICATOR SUBSTANCE SCREENING - GROUND WATER

CONTAMINANT	Frequency of Detection	Maximum Concentration, ug/L	MTCA Cleanup Level, ug/L (Table A.1)	BASIS	Screening Results
VOC**					
1,2-dichloropropane	0.25	170	5	MCL	Indicator
1,2-dichlorobenzene	0.08	0.2	600	MCL	< cleanup level
1,3-dichlorobenzene	0.005	5			<= 5% detection frequency
1,4-dichlorobenzene	0.03	0.6	1.82	BCAR	<= 5% detection frequency
bromoform	0.08	0.2	5.54	BCAR	< cleanup level
2-butanone	0.07	5100			Marginally above 5% detection frequency and cleanup level
2-hexanone	0.005	8	4800	BNCAR	<= 5% detection frequency
4-methyl-2-pentanone	0.02	89			<= 5% detection frequency
acetone	0.17	790	800	BNCAR	< cleanup level
carbon disulfide	0.05	0.8	800	BNCAR	<= 5% detection frequency
chlorobenzene	0.07	1.6	100	BNCAR	< cleanup level
chloroform	0.21	66	7.17	MCL	< cleanup level
chloromethane				BNCAR	Indicator
trans-1,2-dichloropropene	0.05	2			<= 5% detection frequency
methylene chloride	0.05	20	3.37	BCAR	< cleanup level
	0.09	120			<= 5% detection frequency
trichlorofluoromethane	0.02	0.4			No toxicity data
			2400	BNCAR	<= 5% detection frequency
1,1,1-trichloroethane	0.02	0.5			<= 5% detection frequency
1,1,2-trichloroethane	0.13	5.6	200	MCL	< cleanup level
1,1,2,2-tetrachloroethane	0.01	1.5	5	MCL	Marginally above cleanup level
			0.219	BCAR	<= 5% detection frequency
1,1-dichloroethane	0.05	0.6	800		<= 5% detection frequency
1,1-dichloroethene	0.12	2.7	0.0729	BNCAR	< cleanup level
1,2-dichloroethane	0.09	110	0.481	BCAR	Indicator
chloroethane	0.11	0.5		BCAR	Indicator
tetrachloroethene	0.47	8300			No toxicity data
trichloroethene	0.27	1100	5	MCL	Indicator
vinyl chloride	0.05	1.5	5	MCL	Indicator
cis-1,2-dichloroethene	0.32	1800	0.023	BCAR	<= 5% detection frequency
trans-1,2-dichloroethene	0.14	250	70	MCL	Indicator
			100	MCI	Indicator

* Excluding wells w/ free product

** Including wells w/ free product

AWQC - Ambient Water Quality Criteria
 BCAR - B, carcinogen
 BNCAR - B, noncarcinogen
 MCL - Maximum Contaminant Level

TABLE 3. RISK/HAZARD QUOTIENT CALCULATIONS - GROUND WATER INDICATORS

INDICATOR SUBSTANCE	METHOD B CLEANUP LEVEL, ug/L	PQL, ug/L	PROPOSED CLEANUP LEVEL, ug/L	BASIS	CANCER RISK **	HAZARD QUOTIENT				
						H E M O T O X I C I T Y	H E P A T O T O X I C I T Y	N E P H R O T O X I C I T Y	N E U R O T O X I C I T Y	W E I G H T
TPH - D										
TPH - G										
TPH - O										
TPH, total	1000									
			1000	A						
Total Metals										
Arsenic	5	10	10	PQL						
Lead	3.2	10	10	PQL						
LPAH										
naphthalene	320	0.4	320	BNCAR						
HPAH										
CPAHs	0.1	0.1	0.1	A						1
VOC										
benzene	5	0.1	5	MCL	3.31E-06					
ethylbenzene	700	0.1	700	MCL						
toluene	1000	0.1	1000	MCL			0.875	0.875		
xylene	10000	5	10000	MCL			0.625	0.625		
1,2-dichloropropane	5	0.1	5	MCL	7.78E-06					0.625
chloroform	7.17	0.2	7.17	BCAR	1.00E-06					
1,1-dichloroethene	0.0729	0.02	0.0729	BCAR	1.00E-06		0.090			
							0.001			

PQL - Practical Quantitation Limit
 BCAR - B, carcinogen
 BNCAR - B, noncarcinogen
 MCL - Maximum Contaminant Level

** at Method B levels

TABLE 4. GROUND WATER CLEANUP LEVELS ADJUSTMENT/CANCER RISK AND HAZARD QUOTIENTS CALCULATIONS

INDICATOR SUBSTANCE	METHOD B CLEANUP LEVEL, ug/l (From Table 3)	BASIS	ADJUSTED METHOD B CLEANUP LEVEL, ug/L	PQL, ug/L	PROPOSED CLEANUP LEVEL, ug/L	CANCER RISK **	HAZARD QUOTIENT				
							HEMOTOXICITY	HEPATOTOXICITY	NEPHROTOXICITY	NEUROTOXICITY	W E I G H T
TPH											
TPH - D											
TPH - G											
TPH - O											
TPH total	1000	A	1000		1000						
Total Metals							not calculated, Method A number				
Arsenic	5	A	5	10	10						
lead	3.2	AWQC	3.2	10	10						
LPAH							not calculated, Method A, background				
naphthalene	320	BNCAR	197	0.4	197						
HPAH											
cPAHs	0.1	A	0.1		0.1					0.616	
VOC							not calculated, Method A number				
benzene	5	MCL	5	0.1	5	3.31E-06					
ethylbenzene	700	MCL	600	0.1	600						
toluene	1000	MCL	320	0.1	320			0.75	0.75		
xylene	10000	MCL	6153	5	6153			0.2	0.2	0.2	
1,2-dichloropropane	5	MCL	2	0.1	2						
chloroform	7.17	BCAR	1	1	1	3.11E-06				0.385	0.385
1,1-dichloroethene	0.0729	BCAR	0.027	0.02	0.027	1.39E-07					
1,2-dichloroethane	0.481	BCAR	0.3	0.02	0.3	3.70E-07					
tetrachloroethane	5	MCL	1.75	0.01	1.75	6.24E-07					
trichloroethene	5	MCL	2	0.01	2	2.04E-06					
						5.03E-07					

** at adjusted cleanup level

TABLE 5. RISK CALCULATION FOR SOILS - TPH INTERIM POLICY
MAXIMUM CONCENTRATIONS DETECTED

[illegible]

TABLE 6. TPH INTERIM POLICY CALCULATIONS - METHOD C COMMERCIAL SOIL CLEANUP LEVELS

Worksheet: Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*														
1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column. 2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well." 3. Hazard quotients for individual substances or fractions cannot exceed 1.0 4. The hazard index (sum of the hazard quotients) cannot exceed 1.0 5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial. 6. The risk for the total cannot exceed 1x10E-05 for any land use. 7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH. 8. If any exceedance occurs in 3-7 above, then the cleanup level for TPH has not been met.														
1	2	3	4	7	8	7	8	3	4	11	6	12	8	13
Compound	Soil Conc. (mg/kg)	RfD (mg/kg-day)	OC PF (kg-day/mg)	Commercial Factor	Commercial Multiplier	Commercial HQ	Commercial Risk	MW (g/mol)	Moles (mmol/kg)	Mol. Frac. (percent)	Solubility (mg/l)	Effect. Sol. (mg/l)	DF	Conc. @ well (mg/l)
Aliphatics														
EC 5-6	1							81.0000	0.0123	0.0004	28.0000	0.0116	1.0000	0.0116
EC >6-8	5							100.0000	0.0500	0.0017	4.2000	0.0070	1.0000	0.0070
EC >8-10	760							130.0000	5.8462	0.1955	0.3300	0.0645	1.0000	0.0645
EC >10-12	810							160.0000	5.0625	0.1693	0.0260	0.0044	1.0000	0.0044
EC >12-16	1876							200.0000	9.3800	0.3137	0.0006	0.0002	1.0000	0.0002
EC >16-21	1094							270.0000	4.0519	0.1355	0.0000	0.0000	1.0000	0.0000
Total aliphatic	4546	0.06				0.24								
Aromatics														
EC >8-10	5							120.0000	0.0417	0.0014	65.0000	0.0906	1.0000	0.0906
EC >10-12	30							130.0000	0.2308	0.0077	25.0000	0.1930	1.0000	0.1930
EC >12-16	250							150.0000	1.6667	0.0557	5.8000	0.3233	1.0000	0.3233
EC >16-21	605							190.0000	3.1842	0.1085	0.5100	0.0543	1.0000	0.0543
EC >21-35	85	0.03						240.0000	0.3542	0.0118	0.0086	0.0001	1.0000	0.0001
Total aromatic	975		0.029											
Benzene	0.0065		7.3				4.71E-11	78.0000	0.0001	0.0000	1780.0000	0.0050	1.0000	0.0050
c-PAHs	0						0.00E+00							
Ethylbenzene	2	0.10		3.125E-06	3.13E-05	0.00								
Toluene	1.7	0.20		3.125E-06	1.56E-05	0.00								
Xylenes	3	2.00		3.125E-06	1.56E-06	0.00		92.0000	0.0185	0.0006	520.0000	0.3214	1.0000	0.3214
Total aromatic+B-E	970	0.03		3.125E-06	1.04E-04	0.10								
Total						0.34	4.71E-11		29.8989	1.0000				1.0753
*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.														

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways:
 "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water
 must be considered (see "Interim Policy"). In addition to not exceeding a TPH level in the groundwater of 1.0 mg/L,
 there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

TABLE 7. TPH INTERIM POLICY CALCULATIONS - METHOD B (RESIDENTIAL) SOIL CLEANUP LEVELS

Worksheet: Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*														
1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column. 2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well." 3. Hazard quotients for individual substances or fractions cannot exceed 1.0 4. The hazard index (sum of the hazard quotients) cannot exceed 1.0 5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial. 6. The risk for the total cannot exceed 1x10E-05 for any land use. 7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH. 8. If any exceedance occurs in 3-7 above, then the cleanup level for TPH has not been met.														
1	2	3	4	5		6	3	4	11	6	12	8	13	
Compound	Soil Conc. (mg/kg)	RfD (mg/kg*day)	OCPP (kg*day/mg)	Residential Factor	Residential Multiplier	Risk	MW (g/mol)	Moles (mmol/kg)	Mol. Frac. (percent)	Solubility (mg/l)	Effect. Sol. (mg/l)	DF	Conc. @ well (mg/l)	
Aliphatics														
EC 5 - 6	1						81.0000	0.0123	0.0015	28.0000	0.0433	1.0000	0.0433	
EC > 6 - 8	5						100.0000	0.0500	0.0063	4.2000	0.0263	1.0000	0.0263	
EC > 8 - 10	185						130.0000	1.4231	0.1783	0.3300	0.0589	1.0000	0.0589	
EC > 10 - 12	229						160.0000	1.4313	0.1794	0.0260	0.0047	1.0000	0.0047	
EC > 12 - 16	530						200.0000	2.6500	0.3321	0.0006	0.0002	1.0000	0.0002	
EC > 16 - 21	309						270.0000	1.1444	0.1434	0.0000	0.0000	1.0000	0.0000	
Total aliphatic	1259	0.06		1.25E-05	2.08E-04	0.26								
Aromatics														
EC > 8 - 10	3						120.0000	0.0250	0.0031	65.0000	0.2036	1.0000	0.2036	
EC > 10 - 12	5						130.0000	0.0385	0.0048	25.0000	0.1205	1.0000	0.1205	
EC > 12 - 16	30						150.0000	0.2000	0.0251	5.8000	0.1454	1.0000	0.1454	
EC > 16 - 21	171						190.0000	0.9000	0.1128	0.5100	0.0575	1.0000	0.0575	
EC > 21 - 35	24						240.0000	0.1000	0.0125	0.0066	0.0001	1.0000	0.0001	
Total aromatic	233	0.03												
Benzene	0.0018		0.029			5.22E-11	78.0000	0.0000	0.0000	1780.0000	0.0051	1.0000	0.0051	
c-PAHs	0		7.3			0.00E+00								
Ethylbenzene	1	0.10		1.25E-05	1.25E-04	0.00								
Toluene	0.45	0.20		1.25E-05	6.25E-05	0.00								
Xylenes	2	2.00		1.25E-05	6.25E-06	0.00	92.0000	0.0049	0.0006	520.0000	0.3188	1.0000	0.3188	
Total aromatic: B+E+X	230	0.03		1.25E-05	4.17E-04	0.10								
Total						0.36		7.9795	1.0000				0.9844	
*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.														

TABLE 8. APPLICABLE SOIL CLEANUP CRITERIA

CONTAMINANT	METHOD A, mg/KG	BASIS	METHOD A INDUS- TRIAL, mg/KG	INGESTION			PROTECTION OF GROUNDWATER			BACK- GROUND
				METHOD B, (RESIDENTIAL) mg/KG	METHOD C COM- MERCIAL, mg/KG	BASIS	GW CLEANUP LEVEL, ug/L (Table 4)	RESIDEN- TIAL, mg/Kg	COMMER- CIAL, mg/Kg	
TPH										
TPH - aliphatic				1259	4546	ITPH		1259	4546	
TPH - aromatic				230	975	ITPH		230	975	
TPH, Total				1489	5521	ITPH		1489	5521	
Total Metals										
arsenic*		Back- ground	200							
lead*	20	Blood	1000	1.67	66.2	CAR	5			7
	250						3.2			17
Pesticides/PCBs										
4,4'-DDD				4.17	167	CAR				
4,4'-DDE				2.94	118	CAR				
4,4'-DDT				2.94	118	CAR				
aldrin				0.0588	2.35	CAR				
rochlor #1254				1.6	6.4	NCAR				
rochlor #1260										
dieldrin										
endosulfan sulfate				0.0625	2.5	CAR				
endrin aldehyde				480	1920	NCAR				
heptachlor epoxide				24	96	NCAR				
methoxychlor				0.11	4.4	CAR				
beta-BHC				400	1600	NCAR				
gamma-BHC										
LPAH										
acenaphthene										
acenaphthylene				4800	19200	NCAR				
anthracene				24000	96000	NCAR				
fluorene				3200	12800	NCAR				

* Ground water indicator

ITPH - Interim TPH Policy
(See Tables 6 and 7)** Based on ingestion/direct contact only.
Soil to ground water pathway is neglected.

TABLE 8. APPLICABLE SOIL CLEANUP CRITERIA

CONTAMINANT	METHOD A, mg/KG	BASIS	METHOD A INDUS- TRIAL, mg/KG	INGESTION			PROTECTION OF GROUNDWATER			BACK- GROUND
				METHOD B, (RESIDENTIAL) mg/KG	METHOD C COM- MERCIAL, mg/KG	BASIS	GW CLEANUP LEVEL, ug/L (Table 4)	RESIDEN- TIAL, mg/Kg	COMMER- CIAL, mg/Kg	
naphthalene*				3200	12800	NCAR	197	19.7	19.7	100XGW
phenanthrene										
HPAH										
benzo(a)anthracene**				0.137	5.48	CAR				
benzo(a)pyrene**				0.137	5.48	CAR				
benzo(b)fluoranthene**				0.137	5.48	CAR				
benzo(ghi)perylene										
benzo(k)fluoranthene**				0.137	5.48	CAR				
chrysene**				0.137	5.48	CAR				
dibenzo(ah)anthracene				0.137	5.48	CAR				
fluoranthene**				0.137	5.48	CAR				
indeno(123-cd)pyrene**				3200	12800	NCAR				
pyrene**				0.137	5.48	CAR				
				2400	9600	NCAR				
VOC										
benzene*	0.5	GW	0.5	34.5	1380	CAR		0.0018	0.0065	ITPH
ethylbenzene*	20	GW	20	8000	32000	NCAR		1	2	ITPH
toluene*	40	GW	40	16000	64000	NCAR		0.45	1.7	ITPH
xylene, total*	20	GW	20	160000	640000	NCAR		2	3	ITPH
1,2-dichloropropane*				1.47	588	CAR	2	0.2	0.2	100 x GW
1,2-dichlorobenzene				7200	28800	NCAR				
2-butanone				48000	192000	NCAR				
2-hexanone										
4-methyl-2-pentanone										
acetone										
carbon disulfide				8000	32000	NCAR				
chloroform*				8000	32000	NCAR				
methylene chloride				164	6560	CAR	1	0.1	0.1	100 x GW
vinyl acetate				80000	320000	NCAR				

* Ground water indicator

ITPH - Interim TPH Policy
(See Tables 6 and 7)

** Based on ingestion/direct contact only.
Soil to ground water pathway is neglected.

TABLE 8. APPLICABLE SOIL CLEANUP CRITERIA

CONTAMINANT	METHOD A, mg/KG	BASIS	METHOD A INDUS- TRIAL, mg/KG	BASIS	INGESTION			PROTECTION OF GROUNDWATER			BACK- GROUND
					METHOD B, (RESIDENTIAL) mg/KG	METHOD C COM- MERCIAL, mg/KG	BASIS	GW CLEANUP LEVEL, ug/L (Table 4)	RESIDEN- TIAL, mg/Kg	COMMER- CIAL, mg/Kg	
tetrachloroethene*	0.5	GW	0.5	GW	19.6	784	CAR	1.75	0.175	0.175	100 x GW
trichloroethene*					90	3640	CAR	2	0.2	0.2	100 x GW
cis-1,2-dichloroethene*					800	3200	NCAR	70	7	7	100 x GW

* Ground water indicator

ITPH - Interim TPH Policy
(See Tables 6 and 7)

** Based on ingestion/direct contact only.
Soil to ground water pathway is neglected.

TABLE 9. INDICATOR SUBSTANCE SCREENING - METHOD C COMMERCIAL SOILS

CONTAMINANT	Frequency of Detection	Maximum Concentration (mg/kg)	MTCA Cleanup Level, mg/kg	BASIS	SCREENING RESULTS
TPH					
TPH, TOTAL	0.86	27800	5521	ITPH	Indicator
Total Metals					
arsenic*	1	7.5	7	Background	Near background, 95% upper confidence level for
lead *	1	75.6	250	Method A	transformed data is 3.2 mg/Kg
Pesticides/PCBs					< cleanup level
4,4'-DDD	0.16	0.099	167	CCAR	< cleanup level
4,4'-DDE	0.13	0.012	118	CCAR	< cleanup level
4,4'-DDT	0.22	0.092	118	CCAR	< cleanup level
aldrin	0.01	0.00081	2.35	CCAR	< cleanup level, <=5% detection frequency
Arochlor #1254	0.01	0.13	6.4	CCAR	< cleanup level, <=5% detection frequency
Arochlor #1260	0.05	0.052		CCAR	<=5% detection frequency, no toxicity data
dieldrin	0.03	0.034	2.5	CCAR	< cleanup level, <=5% detection frequency
endosulfan sulfate	0.03	0.0021	1920	CNCAR	< cleanup level, <=5% detection frequency
endrin aldehyde	0.02	0.0018	96	CNCAR	< cleanup level, <=5% detection frequency
heptachlor epoxide	0.02	0.03	4.4	CCAR	< cleanup level, <=5% detection frequency
methoxychlor	0.04	0.3	1600	CNCAR	< cleanup level, <=5% detection frequency
beta-BHC	0.04	0.0024			<=5% detection frequency, no toxicity data
gamma - BHC	0.02	0.0013			<=5% detection frequency, no toxicity data
LPAH					
acenaphthene	0.05	1.3	19200	CNCAR	< cleanup level
acenaphthylene	0.08	1.8			No toxicity data
anthracene	0.25	3	96000	CNCAR	< cleanup level
fluorene	0.48	5.4	12800	CNCAR	< cleanup level
naphthalene *	0.42	28	19.7	100XGW	Indicator
phenanthrene	0.71	11			No toxicity data
HPAH					
benzo(a)anthracene *	0.17	0.57	5.48	CCAR	< cleanup level

ITPH - Interim TPH Policy
CCAR - C, carcinogen
CNCAR - C, noncarcinogen
100XGW - protection of ground water

TABLE 9. INDICATOR SUBSTANCE SCREENING - METHOD C COMMERCIAL SOILS

CONTAMINANT	Frequency of Detection	Maximum Concentration (mg/kg)	MTCA Cleanup Level, mg/kg	BASIS	SCREENING RESULTS
benzo(a)pyrene *	0.22	0.62	5.48	CCAR	< cleanup level
benzo(b)fluoranthene *	0.14	0.72	5.48	CCAR	< cleanup level
benzo(ghi)perylene	0.11	0.53			No toxicity data
benzo(k)fluoranthene *	0.2	4.1	5.48	CCAR	< cleanup level
chrysene *	0.18	0.93	5.48	CCAR	< cleanup level
dibenzo(a,h)anthracene	0.03	0.13	5.48	CCAR	< cleanup level
fluoranthene *	0.47	13	12800	CNCAR	<=5% detection frequency
indeno(123-cd)pyrene *	0.17	0.47	5.48	CCAR	< cleanup level
pyrene	0.26	8.6	9600	CNCAR	< cleanup level
VOC					
benzene *	0.2	29	0.0065	ITPH	Indicator
ethylbenzene *	0.31	200	2	ITPH	Indicator
toluene *	0.26	310	1.7	ITPH	Indicator
xylene, total *	0.4	1150	3	ITPH	Indicator
1,2-dichloropropane *	0.02	0.028	0.2	100XGW	<=5% detection frequency, < cleanup level
1,2-dichlorobenzene	0.01	0.95	28800	BNCAR	< cleanup level, <=5% detection frequency
2-butanone	0.03	1.1	192000	BNCAR	< cleanup level
2-hexanone	0.01	0.007			<=5% detection frequency, no toxicity data
4-methyl-2-pentanone	0.02	4.4			<=5% detection frequency, no toxicity data
acetone	0.27	5.6	3200	BNCAR	< cleanup level
carbon disulfide	0.01	0.0032	32000	BNCAR	<=5% detection frequency, < cleanup level
chloroform*	0.03	0.066	0.1	100XGW	<=5% detection frequency, < cleanup level
methylene chloride *	0.3	3.5			No toxicity data
vinyl acetate	0.02	3	320000	BNCAR	< cleanup level, <=5% detection frequency
tetrachloroethene *	0.14	31	0.175	100XGW	Indicator
trichloroethene *	0.05	2.5	0.2	100XGW	<= 5% detection frequency
cis-1,2-dichloroethene *	0.01	0.32	7	100XGW	< cleanup level, <=5% detection frequency

* Ground Water Indicator

ITPH - Interim TPH Policy
 CCAR - C, carcinogen
 CNCAR - C, noncarcinogen
 100XGW - protection of ground water

TABLE 10. RISK AND HAZARD QUOTIENT CALCULATIONS - METHOD C COMMERCIAL SOILS

INDICATOR	ADJUSTED CLEANUP LEVEL, mg/Kg	PQL, mg/Kg	FINAL CLEANUP LEVEL, Mg/Kg	BASIS	CANCER RISK	HAZARD QUOTIENT						W E I G H T	M O R T A L I T Y	P H O I N A S A C L P C R K H T E A A I A L T V S I A I E N S T D E E Y
						H E M O T O X I C I T Y	H E P A T O T O X I C I T Y	N E P H R O T O X I C I T Y	N E U R O T O X I C I T Y					
Aliphatics														
EC 5-6	1		1											
EC >6-8	5		5											
EC >8-10	760		760											
EC >10-12	810		810											
EC >12-16	1876		1876											
EC >16-21	1094		1094											
Total aliphatic	4546		4546	ITPH		0.237	0.237	0.237	0.237	0.237	0.237	0.237		0.237
Aromatics														
EC >8-10	5		5											
EC >10-12	30		30											
EC >12-16	250		250											
EC >16-21	605		605											
EC >21-35	85		85											
Total aromatic	975		975											
Benzene	0.0065	0.002	0.0065		4.713E-11									
c-PAHs	0		0											
Ethylbenzene	2	0.002	2											
Toluene	1.7	0.002	3			0.000	0.000	0.000	0.000					
Xylenes	3	0.002	3											
Total aromatic: +B-E-X	970.0065		970.0065			0.101	0.101	0.101	0.101	0.000	0.000	0.101	0.101	0.101
naphthalene	19.7	0.66	19.7											
tetrachloroethene	0.175	0.0003	0.175		2.232E-09	0.000	0.000				0.002			
Total soils cancer risk =					2.279E-09									
Total soils hazard quotient =						0.338	0.338	0.338	0.338	0.339	0.338	0.338		0.338

TABLE 11. INDICATOR SUBSTANCE SCREENING - SURFACE WATER (DITCH)

CONTAMINANT	FREQUENCY OF DETECTION	MAXIMUM CONCENTRATION, ug/l	MTCA CLEANUP STANDARD, ug/L	BASIS	SCREENING RESULTS
TPH					
TPH-D	0.5	320			
TPH-G	1	560			
TPH			1000	A, Aesthetics	< cleanup level
Metals					
total lead	0.5	2.4	3.2	AWQC - chronic	< cleanup level
VOCs					
benzene	1	14	5	MCL	indicator
ethylbenzene	1	12	700	MCL	< cleanup level
toluene	0.5	23	1000	MCL	< cleanup level
m,p-xylenes	1	57	1000	MCL	< cleanup level
o-xylene	1	28	1000	MCL	< cleanup level
1,2-dichloropropane	1	33	5	MCL	indicator
1,3-dichlorobenzene	1	4.9			no toxicity data
acetone	0.5	17	800	BCAR	< cleanup level
tetrachloroethene	1	11	5	MCL	indicator
trichloroethene	1	4.9	5	MCL	< cleanup level
cis-1,2-dichloroethene	1	6.9	70	MCL	< cleanup level
trans-1,2-dichloroethene	1	0.9	100	MCL	< cleanup level

AWQC - Ambient Water Quality Criteria

MCL - Maximum Contaminant Level
BCAR - B, carcinogen

TABLE 12. INDICATOR SUBSTANCE SCREENING - SEDIMENTS (DITCH)

CONTAMINANT	FREQUENCY OF DETECTION	MAXIMUM CONCENTRATION, mg/Kg	MTCA CLEANUP LEVEL, mg/Kg	BASIS	SCREENING RESULTS
TPH					
TPH-D	0.5	1600			
TPH-G	0.5	110			
TPH, Total	0.5	1710	1489	ITPH	See comment 1
Metals					
lead	1	32.1	250 450*	Method A	< cleanup level
VOCs					
2-butanone	0.5	0.0077	7200	BNCAR	< cleanup level
acetone	0.5	0.035	8000	BNCAR	< cleanup level
Methylene chloride	1	0.0049			no toxicity data
Comment 1: Total TPH concentration was analyzed using the WTPH Method. Cleanup level based on ITPH was obtained from VPH/EPH data. Theoretically, the two tests should give the same results. However, differences resulting from different chemistry techniques involved and the samples that were analyzed usually give different results for TPH. Therefore the maximum concentration of TPH can be assumed to be near cleanup level and therefore TPH is not an indicator for the sediments.					

* Fresh water sediment quality value for lead, FSQV (Creation and Analysis of Freshwater Sediment Values in the State of Washington, July 1997)

TABLE 13. TOTAL SITE RISK AND HAZARD QUOTIENT CALCULATIONS

MEDIUM	CANCER RISK	HAZARD QUOTIENT					
		H E M O T O X I C I T Y	H E P A T O T O X I C I T Y	N E P H R O T O X I C I T Y	N E U R O T O X I C I T Y	W E I G H T	M O R T A L I T Y
							P H O I N A S A C L P C R K H T E A A I A L T V S I A I E N S T D E E Y
Ground Water (from Table 4)	1.01E-05	0.875	0.985	0.95	0.2	1	0.385
Soils (from Table 10)	2.28E-09	0.338	0.338	0.338	0.338	0.339	0.338
Total Site Cancer Risk =	1.01E-05						
Total Hazard Quotient =		1.213	1.323	1.288	0.538	1.339	0.723
							0.963

TABLE 14. GROUND WATER CLEANUP LEVELS READJUSTMENT/RISK AND HAZARD QUOTIENT CALCULATIONS

INDICATOR SUBSTANCE	ADJUSTED METHOD B CLEANUP LEVEL, ug/l (From Table 4)	BASIS	READJUSTED METHOD B CLEANUP LEVEL, ug/l	CANCER RISK **	HAZARD QUOTIENT				
					H E M O T O X I C I T Y	H E P A T O T O X I C I T Y	N E P H R O T O X I C I T Y	N E U R O T O X I C I T Y	W E I G H T
TPH									
TPH - D									
TPH - G									
TPH - O									
TPH, total	1000	A	1000						
Total Metals					not calculated, Method A number				
Arsenic	10	PQL	10						
lead	10	PQL	10						
LPAH					not calculated, Method A, background				
naphthalene	197	BNCAR	130						
HPAH									
cPAHs	0.1	A							0.40625
VOC					not calculated, Method A number				
benzene	5	MCL	5	3.31E-06					
ethylbenzene	600	MCL	320						
toluene	320	MCL	320		0.400	0.400			
xylene	6153	MCL	4100		0.2	0.2	0.2		
1,2-dichloropropane	2	MCL	2	3.11E-06					0.25625
chloroform	1	BCAR	1	1.39E-07					
1,1-dichloroethene	0.027	BCAR	0.027	3.70E-07	0.0125				
1,2-dichloroethane	0.3	BCAR	0.3	6.24E-07	3.75E-04				

A - Method A
 BNCAR - B, Noncarcinogen
 BCAR - B, carcinogen
 PQL - Practical Quantitation Limit
 MCL - Maximum Contaminant Limit

** at adjusted cleanup level

TABLE 15. TOTAL SITE CANCER RISK AND HAZARD QUOTIENT RECALCULATIONS

MEDIUM	CANCER RISK	HAZARD QUOTIENT					
		H E M O T O X I C I T Y	H E P A T O T O X I C I T Y	N E P H R O T O X I C I T Y	N E U R O T O X I C I T Y	W E I G H T	M O R T A L I T Y
							P H O I N A S A C L P C R K H T E A A I A L T V S I A I E N S T D E E Y
Ground Water (from Table 16)	1.01E-05	0.663	0.635	0.6	0.2	0.663	0.256
Soils (from Table 10)	1.32E-09	0.338	0.338	0.338	0.338	0.339	0.338
Total Site Cancer Risk =	1.01E-05						
Total Site Hazard Quotient =		1.001	0.973	0.938	0.538	1.002	0.594
							0.963

TABLE 16 SITE CLEANUP LEVELS

INDICATOR	CLEANUP LEVELS	
	GROUND WATER, ug/l	SOILS, mg/Kg
TPH		
Aliphatics		
EC 5-6		1
EC>6-8		5
EC>8-10		760
EC>10-12		810
EC>12-16		1876
EC>16-21		1094
Total aliphatic		4546
Aromatics		
EC>8-10		5
EC>10-12		30
EC>12-16		250
EC>16-21		605
EC>21-35		85
Total aromatic		975
TPH, TOTAL	1000	5521
VOCs		
Benzene	5	0.0065
Ethylbenzene	320	2
Toluene	320	1.7
Xylenes	4100	3
1,2-dichloropropane	2	
chloroform	1	
1,1-dichloroethene	0.027	
1,2-dichloroethane	0.3	
tetrachloroethene	1.75	0.175
trichloroethene	2	
cis-1,2-dichloroethene	53	
trans-1,2-dichloroethene	100	
Total Metals		
Arsenic	10*	
Lead	10*	
LPAH		
naphthalene	130	13
HPAH		
cPAHs	0.1*	
* PQL		

TABLE 17. COMPARISON OF PROPOSED ALTERNATIVES WITH MTCA REQUIREMENTS

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
	Free-phase Product Recovery Only	Free-phase Product Recovery, Ground Water Collection and Treatment; Soil Capping	Free-phase Product Recovery; Enhanced Ground water Collection and Treatment; Limited Soil Remediation	Free-phase Product Recovery; Enhanced Ground Water Collection and Treatment; Remediation of All Off-property Soil; Limited Remediation of On-Property Soil	Free-phase product Recovery; Ground Water Collection and Treatment; Remediation of On- and Off-property Soil; Remediation of Ground Water	Free-phase Product Recovery; Enhanced Ground water Collection and Treatment; Remediation of All On- and Off-property Soil; On-Property Ground Water Treatment
THRESHOLD CRITERIA						
• Protect Human Health and the Environment	NO	YES	YES	YES	YES	YES
• Comply with Cleanup Standards	NO	YES	YES	YES	YES	YES
• Comply with Applicable State and Federal Laws	NO	YES	YES	YES	YES	YES
• Provide for Compliance Monitoring	NO	YES	YES	YES	YES	YES
OTHER REQUIREMENTS						
• Permanent Solution	NO	NO	NO	NO	YES	YES
- Overall Protection	Low	Low	Medium	Medium	High	High
- Long Term Effectiveness	Low	Low	Medium	Medium-high	High	High
- Short Term Effectiveness	None	High	High	Medium	Medium-low	Low
- Reduction in Toxicity, Mobility and Volume	None	Low	Medium-low	Medium	High	High
- Implementability	High	High	High	High	High	High
- Cost	Low	Medium-low	Medium	Medium	Medium-high	High
• Restoration Time Frame	>20 YEARS	>20 YEARS	15-20 YEARS	15-20 YEARS	10-13 YEARS	5-10 YEARS
• Consider Public Concerns	NO	YES	YES	YES	YES	YES

TABLE 18. COST ESTIMATES FOR ALTERNATIVE CLEANUP ACTIONS

Remedial Alternative	Capital Costs	Operation & Maintenance	Total Cost
Alternative 1	\$ 678,645	\$ 56,400	\$ 735,045
Alternative 2	\$ 2,741,850	\$ 642,000	\$ 3,383,850
Alternative 3	\$ 3,184,110	\$1,125,600	\$ 4,309,710
Alternative 4	\$ 3,215,025	\$1,348,800	\$ 4,563,825
Alternative 5	\$ 2,729,025	\$2,326,800	\$ 5,055,825
Alternative 6	\$10,338,300	\$ 876,000	\$11,214,300

These costs are extracted from Table 5.2 of the Feasibility Study Report. Accuracy of these costs is estimated to be within -30 to +50 percent of the actual cost.

TABLE 19. FEDERAL AND STATE LAWS AND REGULATIONS APPLICABLE OR RELEVANT AND APPROPRIATE TO THE SELECTED CLEANUP ACTION

ACTION	CITATION	COMMENT
Cleanup Action Construction	29 CFR 1910	Occupational Safety and Health Act
	Chapter 43.21 RCW	State Environmental Policy Act
	40 CFR 260	Resource Conservation and Recovery Act
	WAC 173-303	Washington Dangerous Waste Regulations
	Chapter 173-160 WAC	Minimum Standards for Construction and Maintenance of Wells
	Chapter 296-155	Safety Standards for Construction
	Chapter 173-340	Model Toxics Control Act
	Chapter 173-14	Shoreline Management Act
	Chapter 173-304	Minimum Functional Standards for Solid Waste Handling
Cleanup Standards	Chapter 173-351	Criteria for Municipal Waste Landfills
	Chapter 173-340	Model Toxics Control Act
	42 USC 300; 40 CFR 141 and 143	Safe Drinking Water Act
	33 USC 1251	Clean Water Act
	42 USC 9601	CERCLA
	40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
	Chapter 246-290 WAC	Safe Drinking Water Act for Public Water Supplies
	Chapter 173-201A	Water Quality Standards for Surface Waters of the State of Washington

TABLE 19(continuation) FEDERAL AND STATE LAWS AND REGULATIONS
APPLICABLE OR RELEVANT AND APPROPRIATE TO THE
SELECTED CLEANUP ACTION

ACTION	CITATION	COMMENT
Soil Remediation	72 USC 7401; 40 CFR part 50	Clean Air Act; National Primary and Secondary Air Quality Standards
	Chapter 173-400 WAC	General Regulations for Air Pollution Sources
	Chapter 173-403 WAC	Implementation of Regulations for Air Contaminant Sources
	Chapter 173-460 WAC	Controls for New Sources of Toxic Air Pollutants
	Chapter 173-470	Washington State Ambient Air Quality Standards for Particulates
	Chapter 173-490 WAC	Emission Standards and Controls for Sources Emitting Volatile Organics
	40 CFR Part 264	Resource Conservation and Recovery Act
	Chapter 70.95 RCW; Chapter 173-304 WAC	Minimum Functional Standards for Solid Waste Handling
Ground Water Remediation	Chapter 174-50 WAC	Accreditation of Environmental Laboratories
	72 USC 7401; 40 CFR part 50	Clean Air Act; National Primary and Secondary Air Quality Standards
	Chapter 173-400 WAC	General Regulations for Air Pollution Sources
	Chapter 173-403 WAC	Implementation of Regulations for Air Contaminant Sources
	Chapter 173-460 WAC	Controls for New Sources of Toxic Air Pollutants
	Chapter 173-490 WAC	Emission Standards and Controls for Sources Emitting Volatile Organics
	33 USC 1251; 40 CFR 123; RCW 90.48;	NPDES Permit Program
	Chapter 70.95 RCW; Chapter 173-304 WAC	Model Toxics Control Act

FIGURES

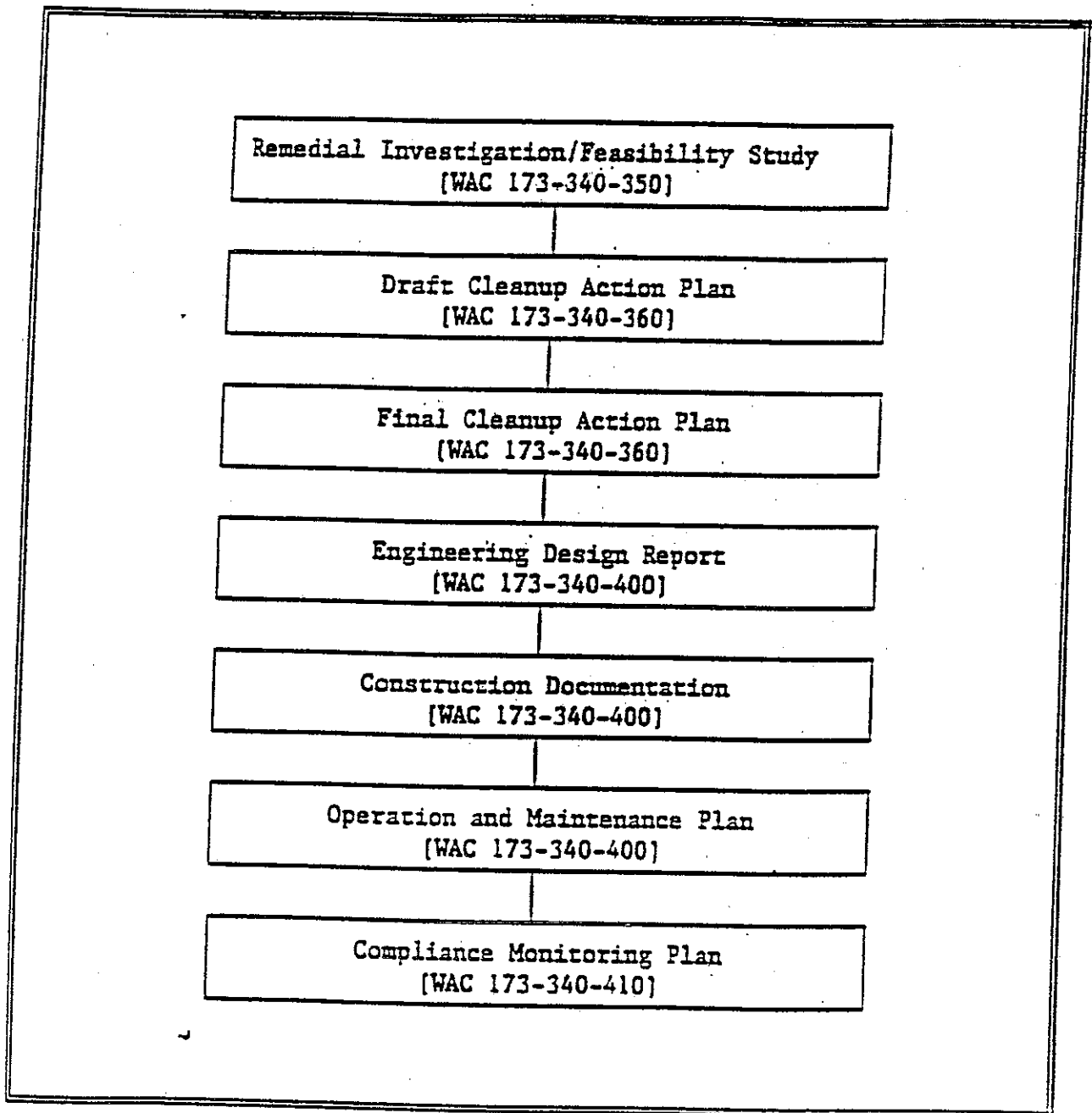


FIGURE 1

Documents required under Model Toxics Control Act
(Chapter 173-304 WAC).

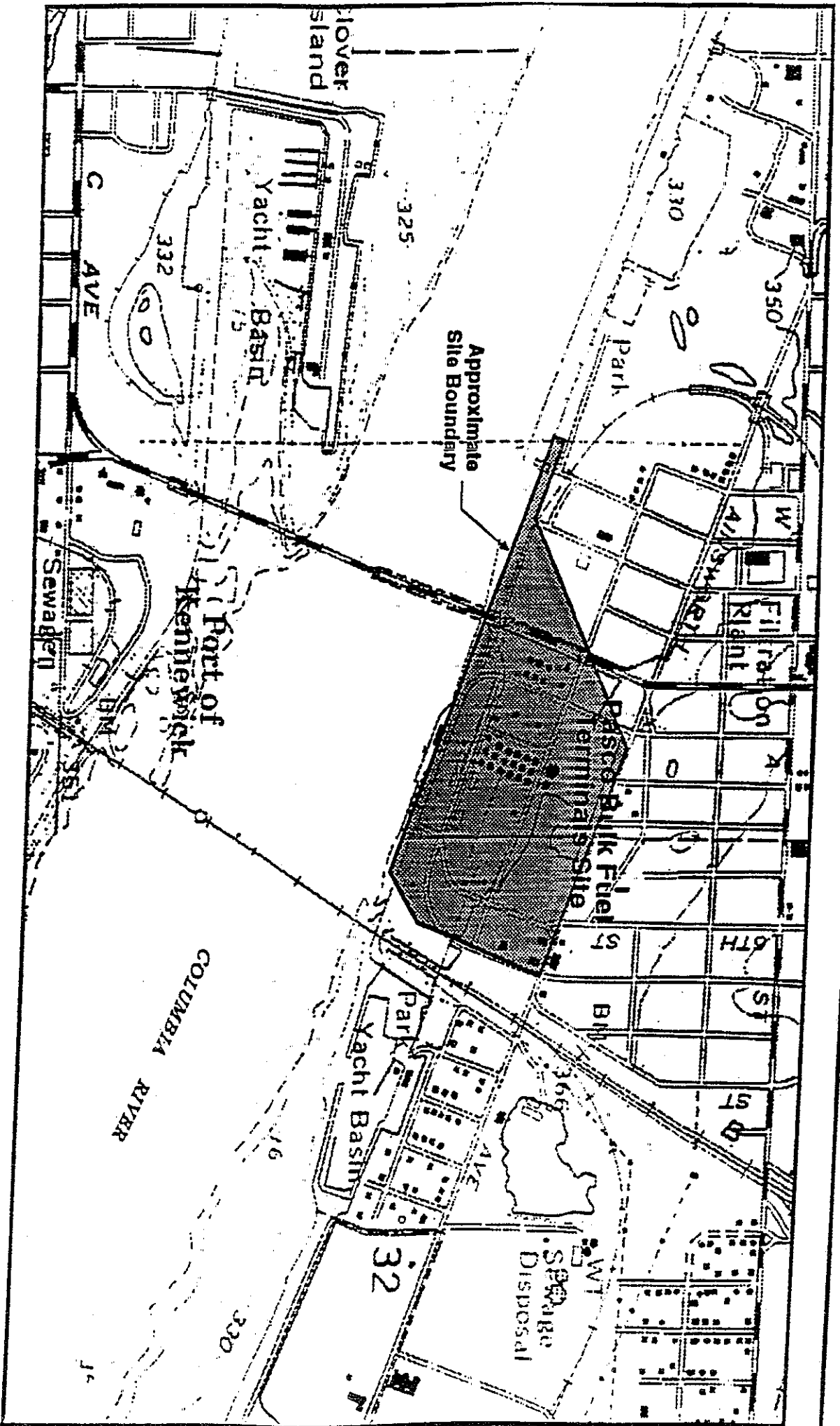


FIGURE 2

PROJECT LOCATION MAP

PASCO BULK FUEL TERMINALS SITE
 Pasco, Washington
 Feasibility Study

Project No.
 VB91
 Figure No.

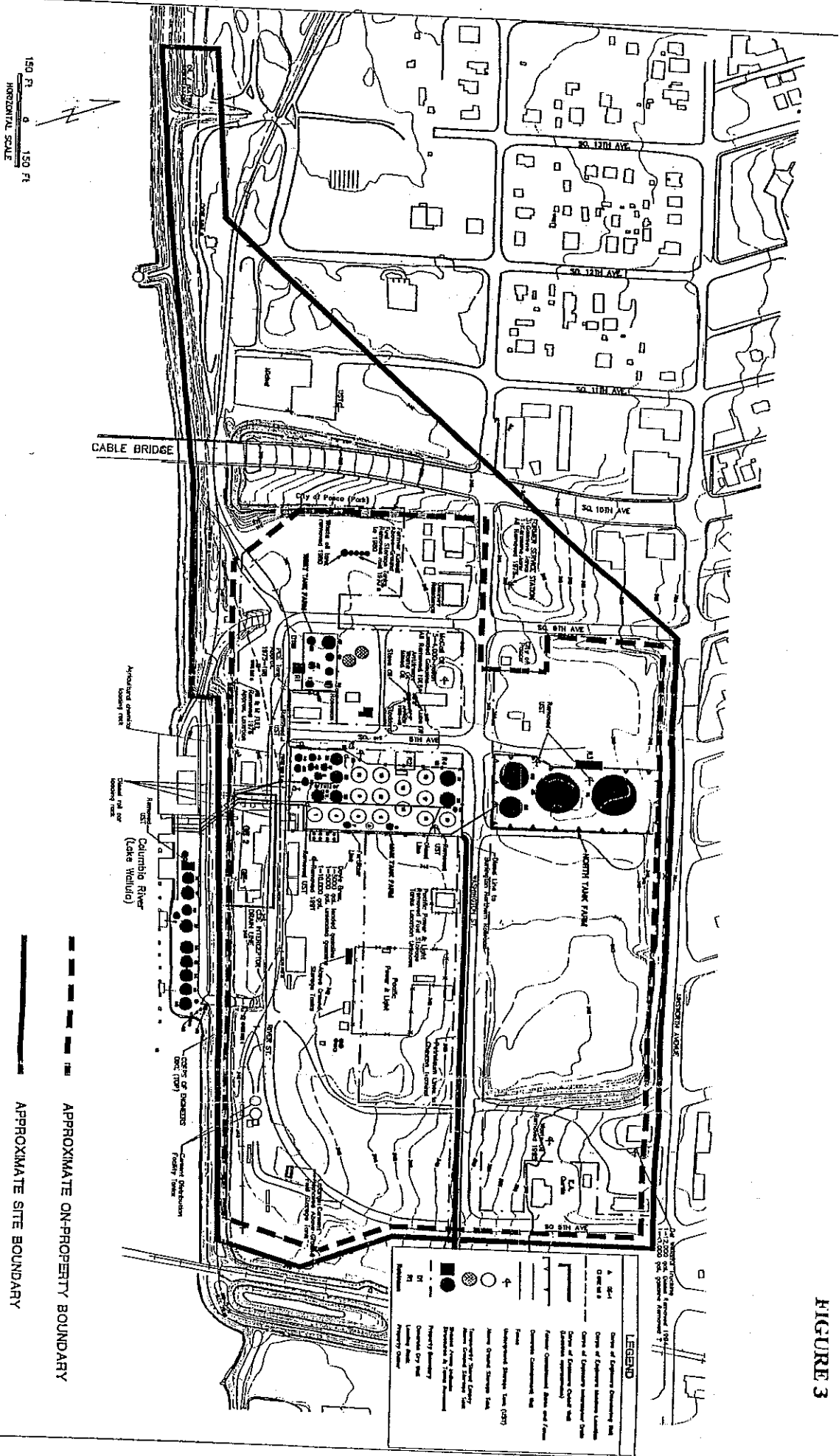


BLACK & VEATCH

170 Madison Lane North
 2007 JSC

SOURCE
 Pasco, Washington, 7 1/2"
 Topographic Quadrangle, U.S.G.S.

FIGURE 3



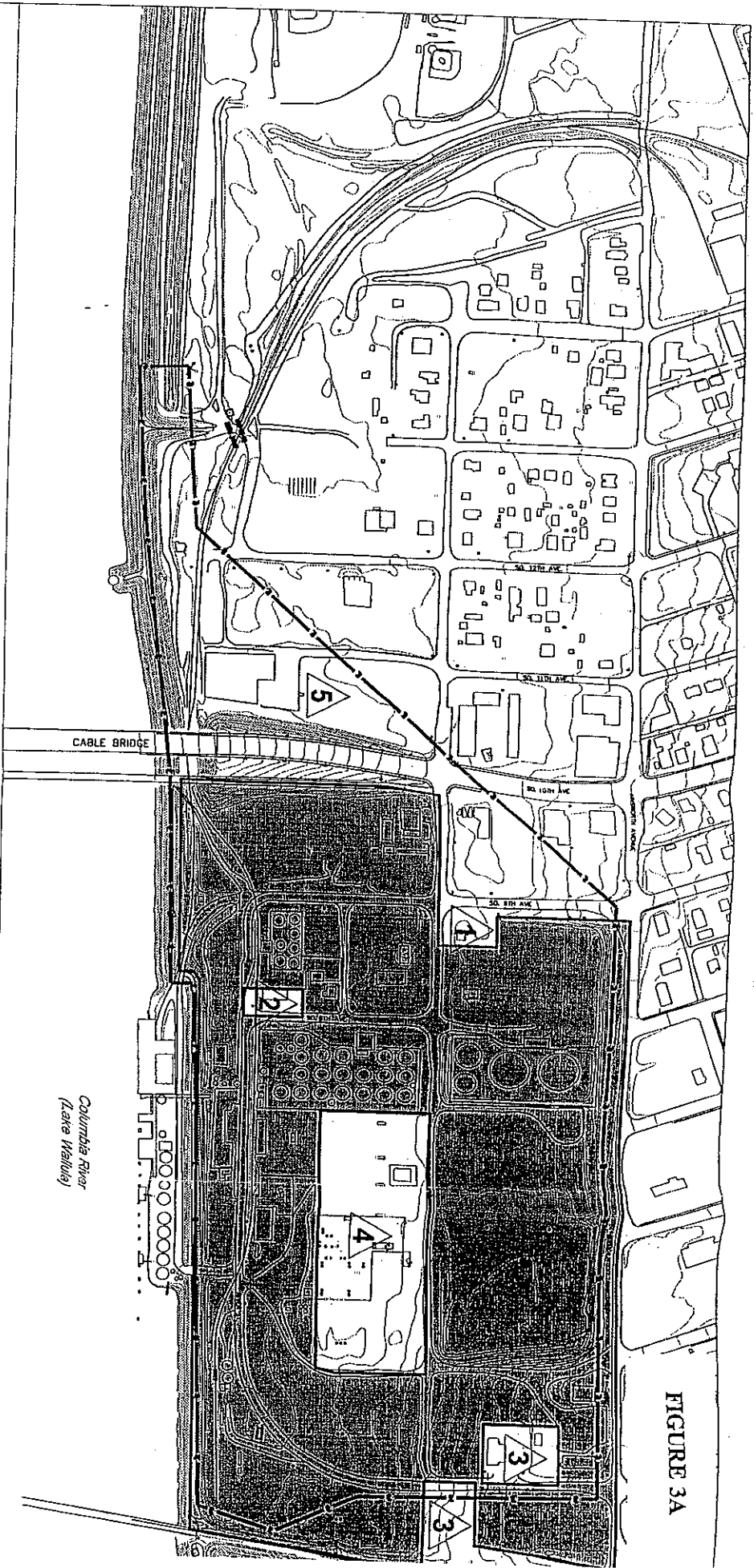


FIGURE 3A

LEGEND

- APPROXIMATE SITE BOUNDARY
- PORT OF PASCO PROPERTY
- ▲ CITY OF PASCO PROPERTY
- ▲ ROBINSON PROPERTY
- ▲ E. A. CURTIS PROPERTY
- ▲ PACIFIC CORP. PROPERTY
- ▲ JOHN MICHEL PROPERTY

NOTE: PROPERTY BOUNDARIES BASED ON UNDATED DRAWING C-1, "PROPERTY IDENTIFICATION PLAN, BULK FUEL TERMINAL SITE", BY MACY-TECHMEIER ASSOCIATES.



PASCO SITE AND
PROPERTY OWNERSHIP
CROWLEY/PASCO BULK FUEL/WA



HORIZONTAL SCALE

HORIZONTAL SCALE

LEGEND

Run	Monitoring Well Location
MW 17	Wells MW-1 through MW-30 except MW-5D and MW-26A (testified by Goldingers, Inc.)
MW 22	Monitoring Well Location Wells MW-1 through MW-57 and MW-3D, MW-25A (testified during Phase 42 RI)

▲	GE 1	Corps of Engineers Dewatering Well
◆	TW 1	Product Extraction Well/Location
□	CCE well 1	Corps of Engineers Cullet Well Location (Approximate)

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**ASSOCIATED
EARTH
SCIENCES, INC.**

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(206) 760-9370
(360) 760-9400

911 - 5th Avenue, Suite 100
Kirkland, WA 98033
(206) 827-7700
(360) 827-7446

PASCO BULK FUEL TERMINAL SITE
Pasco, Washington
Feasibility Study

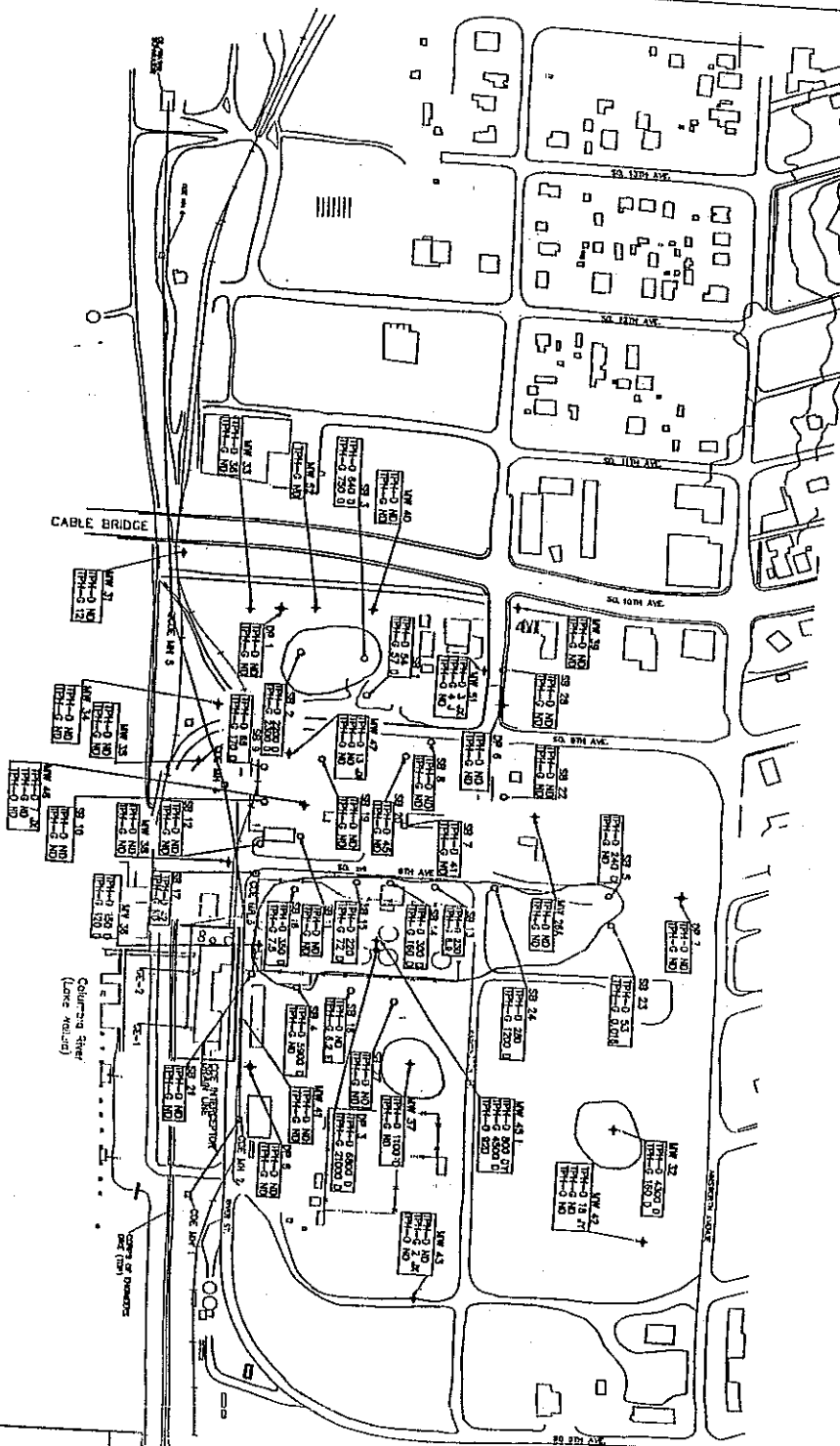
FREE-PHASE PRODUCT THICKNESS MAP
JULY 5, 1995

JULY 5, 1995

Project: 00
VB9501

22

FIGURE 6



LEGEND

- SS 25 Soil Boring Used for Subsurface Soil Sample Collection
- ◆ DP 3 Hydrocarbon Extraction Used for Subsurface Soil Sample Collection
- ◆ MW 7 Monitor Well Boring Used for Subsurface Soil Sample Collection
- ◆ MW 0 Total Petroleum Hydrocarbons (TPH) - Phase I (only)
- ◆ TPH-0 Diesel Fuel Hydrocarbons
- ◆ TPH-6 Total Petroleum Hydrocarbons (TPH) - Phase II (only)
- ◆ TPH-6 Baseline Fraction
- ◆ TPH-6 Aqueous Phase
- ◆ TPH-6 160.0
- ◆ TPH-6 160.0

Not Detected

Approximate boundary of area exceeding Method A detection limit (TPH-0 (200 mg/kg) and/or TPH-6 (100 mg/kg))

Corps of Engineers Kentucky Location (Location of Engineers Kentucky Location)

AREAS WITH TPH CONCENTRATIONS GREATER THAN
THAN 200 mg/kg IN SUBSURFACE SOIL
AT 2.0 - 4.0 FT DEPTH INTERVAL

HORIZONTAL SCALE

300FT 0 300FT



ASSOCIATED
EARTH
SCIENCES, INC.

179 Westport Lane N
Baltimore, MD 21110 (301) 726-9770
1000 (301) 726-9770
1000 (301) 726-9770

BLACK AND VEATCH
SPECIAL PROJECTS CORP.

PASCO BULK FUEL TERMINALS SITE

Pasco, Washington
Feasibility Study

Project No. V895011

Figure No.

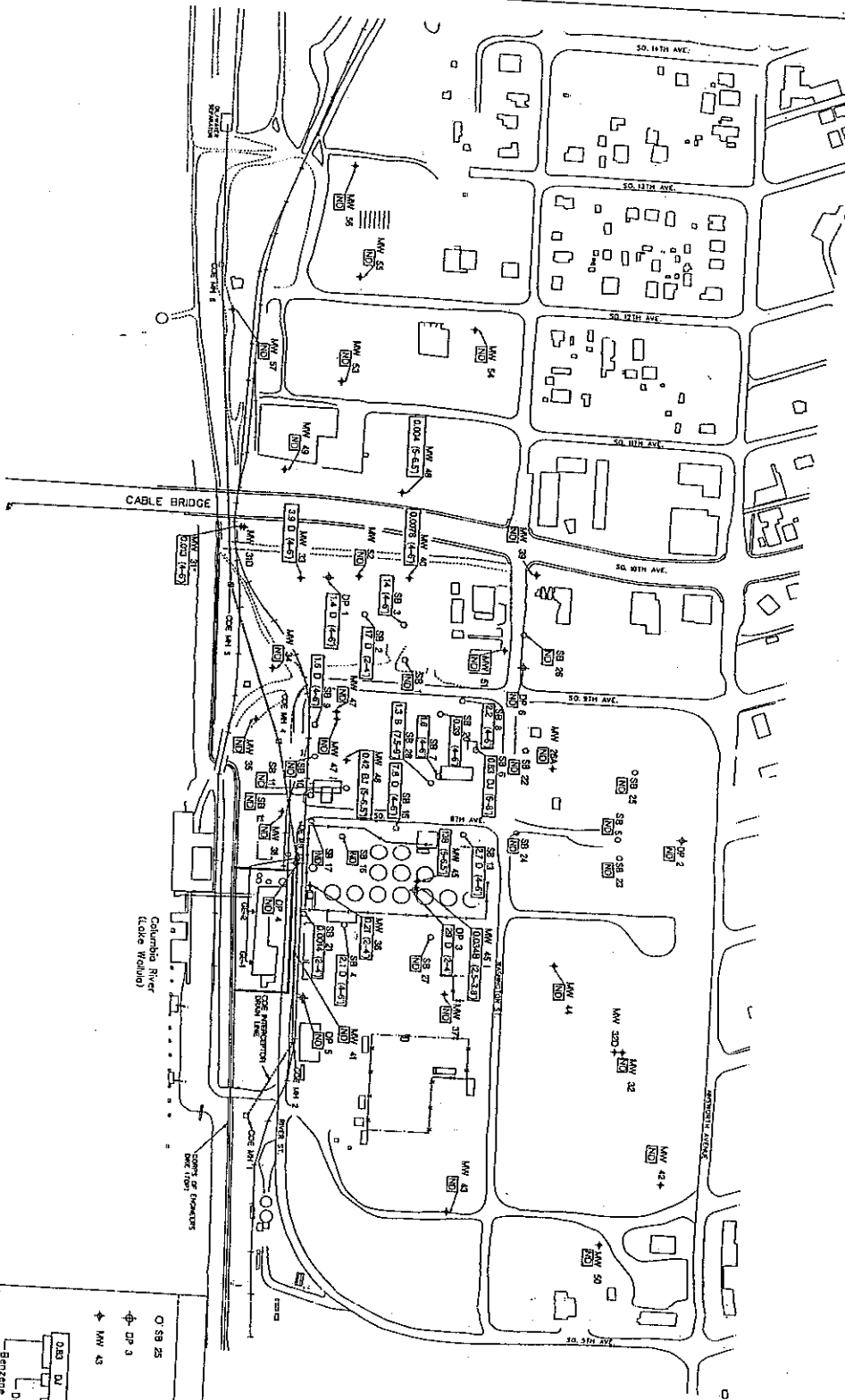
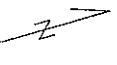


FIGURE 7A

LEGEND

- S9 25 Soil Boring Used for Subsurface Soil Sample Collection
- ◆ DP 3 Hydroneous Exploration Used for Subsurface Soil Sample Collection
- ◆ MW 45 Monitoring Well Boring Used for Subsurface Soil Sample Collections
- 0.83 DU (6-8) Sample Depth (feet, 1951)
- Benzenes Concentration (detection only) (milligrams per kilogram, mg/kg)
- SE: 28 and MW-42 through MW-51 sampled in August 1994, MW-53 through MW-57 sampled in June 1995 during Phase IRI. All other samples obtained May 1995
- Not Detected
- Corps of Engineers Interceptor Drain
- Corps of Engineers Washhole Location
- Corps of Engineers Cutoff Wall (Location Approximate)
- Corps of Engineers Dewatering Well
- COE MW 2
- COE 2

300FT
0
300FT
HORIZONTAL SCALE



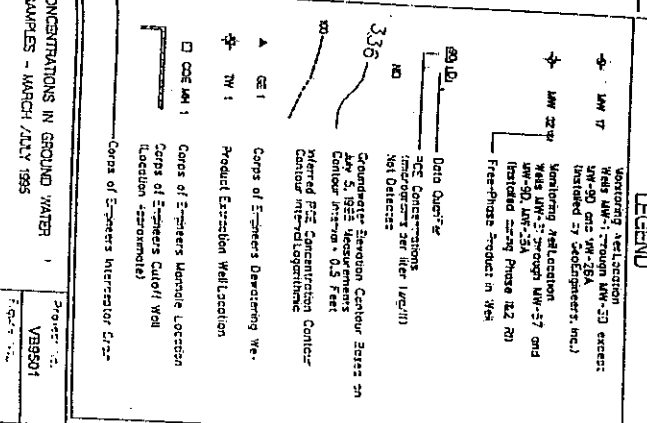
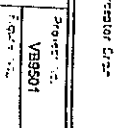
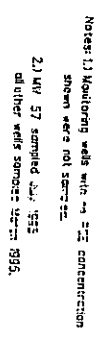
DATE	BY	REVISION
10/13/94	WJH/STW	1.0
11/13/94	WJH/STW	2.0
12/13/94	WJH/STW	3.0
1/13/95	WJH/STW	4.0
2/13/95	WJH/STW	5.0
3/13/95	WJH/STW	6.0
4/13/95	WJH/STW	7.0
5/13/95	WJH/STW	8.0
6/13/95	WJH/STW	9.0
7/13/95	WJH/STW	10.0
8/13/95	WJH/STW	11.0
9/13/95	WJH/STW	12.0
10/13/95	WJH/STW	13.0
11/13/95	WJH/STW	14.0
12/13/95	WJH/STW	15.0
1/13/96	WJH/STW	16.0
2/13/96	WJH/STW	17.0
3/13/96	WJH/STW	18.0
4/13/96	WJH/STW	19.0
5/13/96	WJH/STW	20.0
6/13/96	WJH/STW	21.0
7/13/96	WJH/STW	22.0
8/13/96	WJH/STW	23.0
9/13/96	WJH/STW	24.0
10/13/96	WJH/STW	25.0
11/13/96	WJH/STW	26.0
12/13/96	WJH/STW	27.0
1/13/97	WJH/STW	28.0
2/13/97	WJH/STW	29.0
3/13/97	WJH/STW	30.0
4/13/97	WJH/STW	31.0
5/13/97	WJH/STW	32.0
6/13/97	WJH/STW	33.0
7/13/97	WJH/STW	34.0
8/13/97	WJH/STW	35.0
9/13/97	WJH/STW	36.0
10/13/97	WJH/STW	37.0
11/13/97	WJH/STW	38.0
12/13/97	WJH/STW	39.0
1/13/98	WJH/STW	40.0
2/13/98	WJH/STW	41.0
3/13/98	WJH/STW	42.0
4/13/98	WJH/STW	43.0
5/13/98	WJH/STW	44.0
6/13/98	WJH/STW	45.0
7/13/98	WJH/STW	46.0
8/13/98	WJH/STW	47.0
9/13/98	WJH/STW	48.0
10/13/98	WJH/STW	49.0
11/13/98	WJH/STW	50.0
12/13/98	WJH/STW	51.0
1/13/99	WJH/STW	52.0
2/13/99	WJH/STW	53.0
3/13/99	WJH/STW	54.0
4/13/99	WJH/STW	55.0
5/13/99	WJH/STW	56.0
6/13/99	WJH/STW	57.0
7/13/99	WJH/STW	58.0
8/13/99	WJH/STW	59.0
9/13/99	WJH/STW	60.0
10/13/99	WJH/STW	61.0
11/13/99	WJH/STW	62.0
12/13/99	WJH/STW	63.0
1/13/00	WJH/STW	64.0
2/13/00	WJH/STW	65.0
3/13/00	WJH/STW	66.0
4/13/00	WJH/STW	67.0
5/13/00	WJH/STW	68.0
6/13/00	WJH/STW	69.0
7/13/00	WJH/STW	70.0
8/13/00	WJH/STW	71.0
9/13/00	WJH/STW	72.0
10/13/00	WJH/STW	73.0
11/13/00	WJH/STW	74.0
12/13/00	WJH/STW	75.0
1/13/01	WJH/STW	76.0
2/13/01	WJH/STW	77.0
3/13/01	WJH/STW	78.0
4/13/01	WJH/STW	79.0
5/13/01	WJH/STW	80.0
6/13/01	WJH/STW	81.0
7/13/01	WJH/STW	82.0
8/13/01	WJH/STW	83.0
9/13/01	WJH/STW	84.0
10/13/01	WJH/STW	85.0
11/13/01	WJH/STW	86.0
12/13/01	WJH/STW	87.0
1/13/02	WJH/STW	88.0
2/13/02	WJH/STW	89.0
3/13/02	WJH/STW	90.0
4/13/02	WJH/STW	91.0
5/13/02	WJH/STW	92.0
6/13/02	WJH/STW	93.0
7/13/02	WJH/STW	94.0
8/13/02	WJH/STW	95.0
9/13/02	WJH/STW	96.0
10/13/02	WJH/STW	97.0
11/13/02	WJH/STW	98.0
12/13/02	WJH/STW	99.0
1/13/03	WJH/STW	100.0

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PASCO BULK FUEL TERMINAL SITE
Pasco, Washington
Remedial Investigation

MAXIMUM DETECTED BENZENE
CONCENTRATIONS IN SUBSURFACE SOIL SAMPLES

Project No.
V88501F
Figure No.
4.27



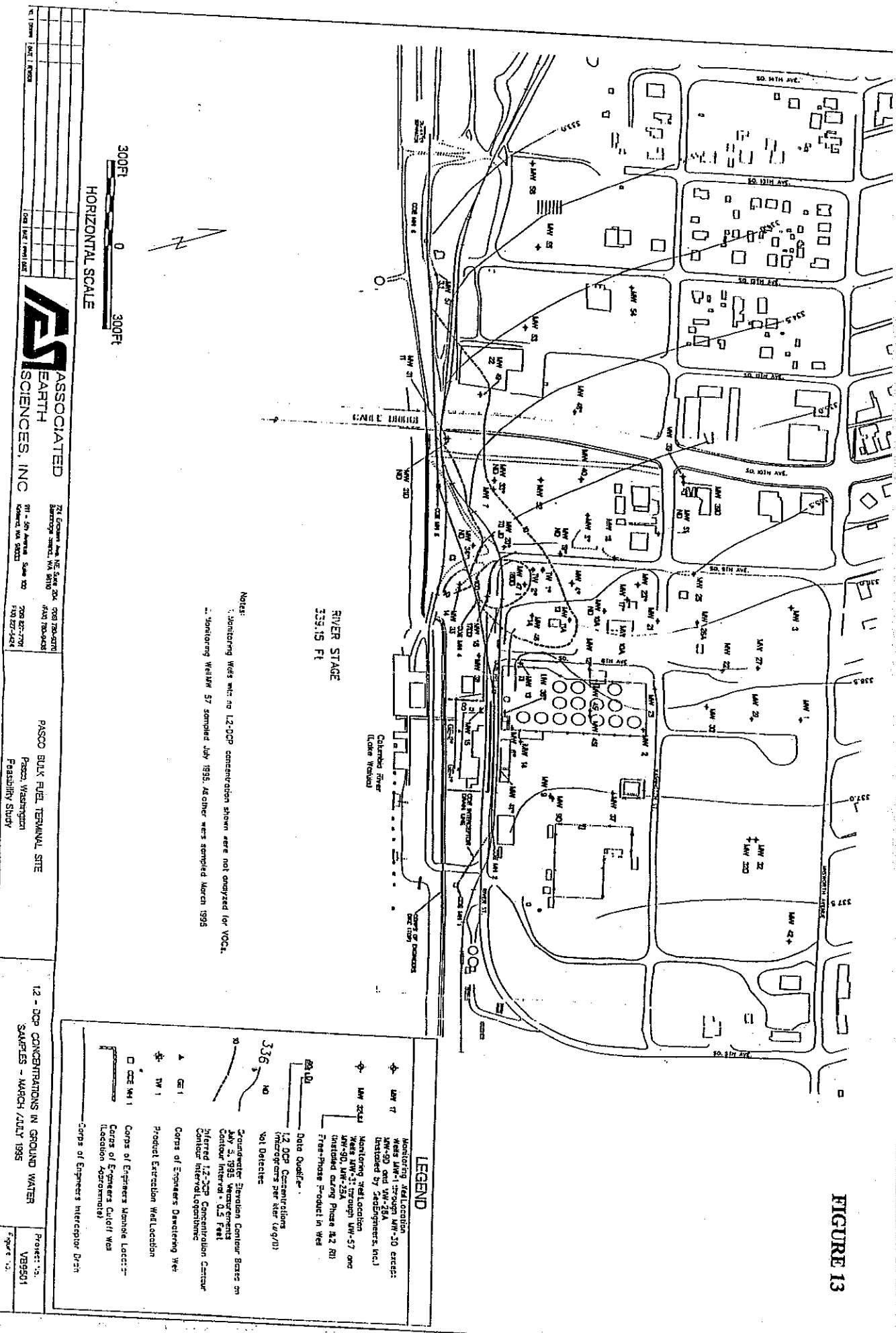
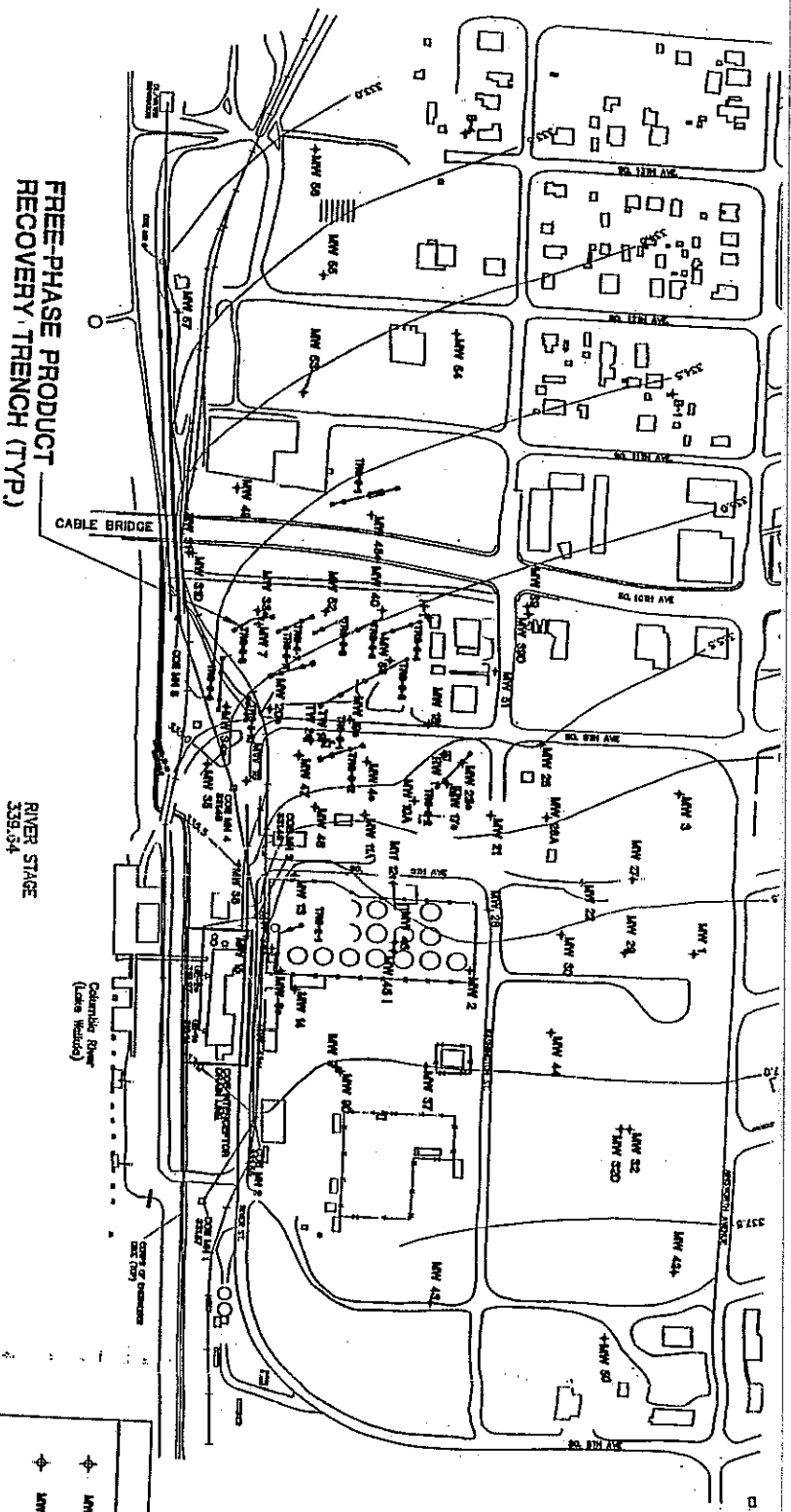


FIGURE 14



NOTES:

1. Water levels corrected for measured product thickness.
2. River stage measurement from Coker Island USGS gage.
3. Product recovery trenches used in all alternatives for interim action.

300Ft 0 300Ft
HORIZONTAL SCALE

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PASCO BULK FUEL TERMINALS SITE
Pasco, Washington
Feasibility Study

REMEDIAL ALTERNATIVE 1
INTERIM ACTION ONLY

LEGEND

- Monitoring Well Location
Wells MW-1 through MW-30 except MW-50 and MW-26A (Installed by Geoengineers, Inc.)
- Monitoring Well Location
Wells MW-31 through MW-51 and MW-50, MW-26A (Installed during Phase I&2 R)
- Free-Phase Product in Well
- Monitoring Well Location
- Proposed Free-Phase Product Trench Recovery System
- Groundwater Elevation Contour Based on July 5, 1995 Measurements Contour Interval = 0.5 Ft
- Corps of Engineers Dewatering Well
- Product Extraction Well Location
- Corps of Engineers Airside Location Corps of Engineers Gifford Well (Location Approximate)
- Corps of Engineers Interceptor Ditch

Project No. VB95011
Figure No. 4.1

FIGURE 15

PROPOSED LOCATION OF GROUND WATER TREATMENT SYSTEM

300FT 0 300FT
HORIZONTAL SCALE

- NOTES:
1. Water levels corrected for measured product thickness.
 2. River stage measurement from Clover Island USGS gage.
 3. Product recovery trenches used in all alternatives for interim action.

RIVER STAGE
339.64'

PROPOSED NEW STORM
WATER LINES

FREE-PHASE PRODUCT
RECOVERY TRENCH (TYP.)

CABLE BRIDGE

Columbia River
(Lake Wallula)

PUMP STATION

OIL/WATER
SEPARATOR

CAPPING OF CONTAMINATED
SURFACE SOILS

LEGEND

- Monitoring Well Location
Wells MW-1 through MW-30 except
MW-50 and MW-25A
(Installed by Geotek, Inc.)
- Monitoring Well Location
Wells MW-51 through MW-55 and
MW-50, MW-25A
(Installed during Phase 1&2 R)
- Free-Phase Product in Well
- MW 7 Monitoring Well Location
- MW 7 Proposed Free-Phase Product
Trench Recovery System
- Groundwater Elevation Contour Based on
July 5, 1995 Measurements
Contour Interval = 0.5 Ft
- GE 1 Corps of Engineers Dewatering Well
- TW 1 Product Extraction Well Location
- COE MW 1 Corps of Engineers Mound Location
(Location Approximate)
- Corps of Engineers Interceptor Drain



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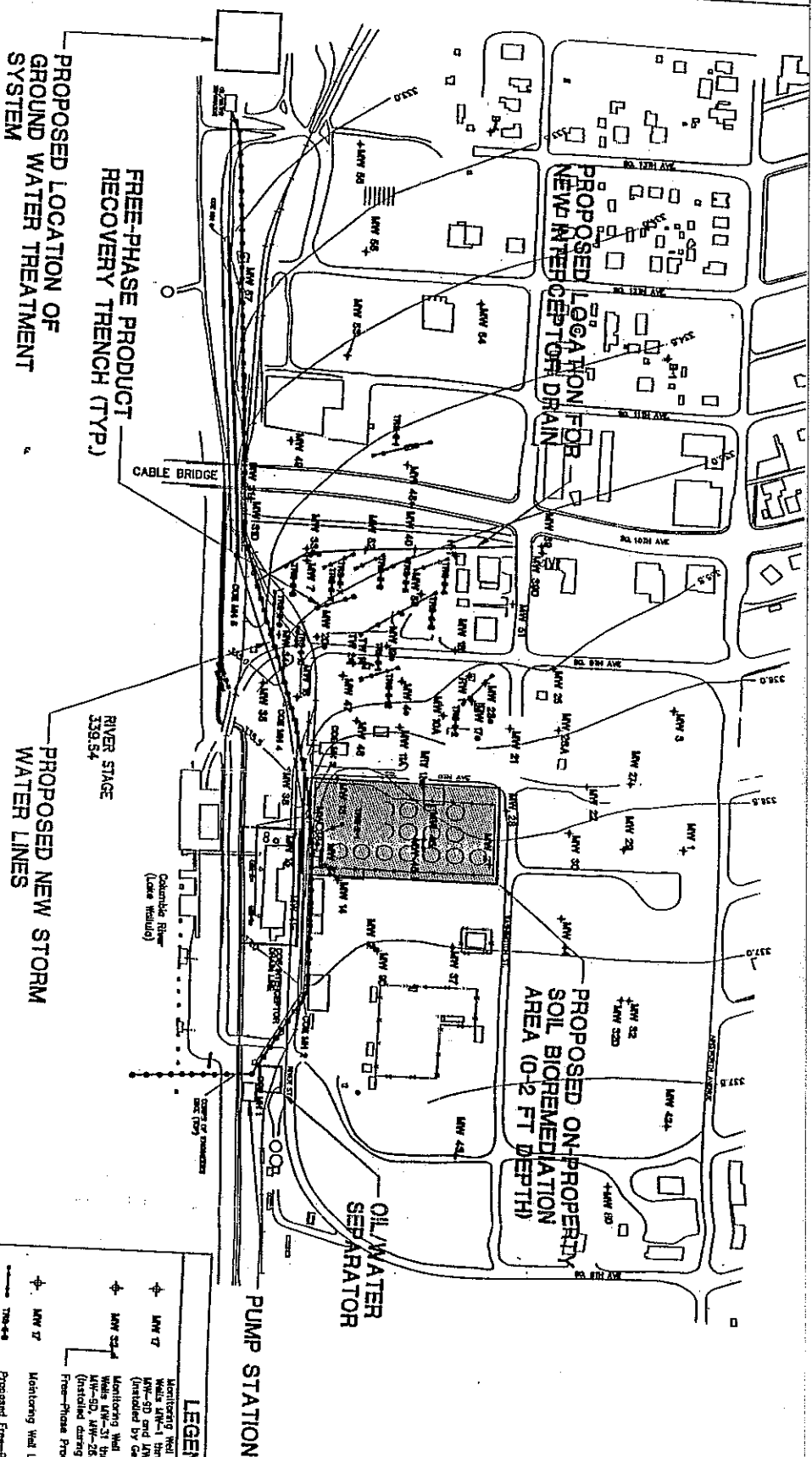
PASCO BULK FUEL TERMINAL SITE

Pasco, Washington
Feasibility Study

REMEDIAL ALTERNATIVE 2
GROUND WATER COLLECTION AND
TREATMENT, SOIL CAPPING

Project No.
V855011
Figure No.
4.2

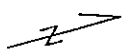
FIGURE 16



NOTES:

1. Water levels corrected for measured product thickness.
2. River stage measurement from Clover Island USGS gage.
3. Product recovery trenches used in all alternatives for interim action.

300FT 0 300FT
HORIZONTAL SCALE



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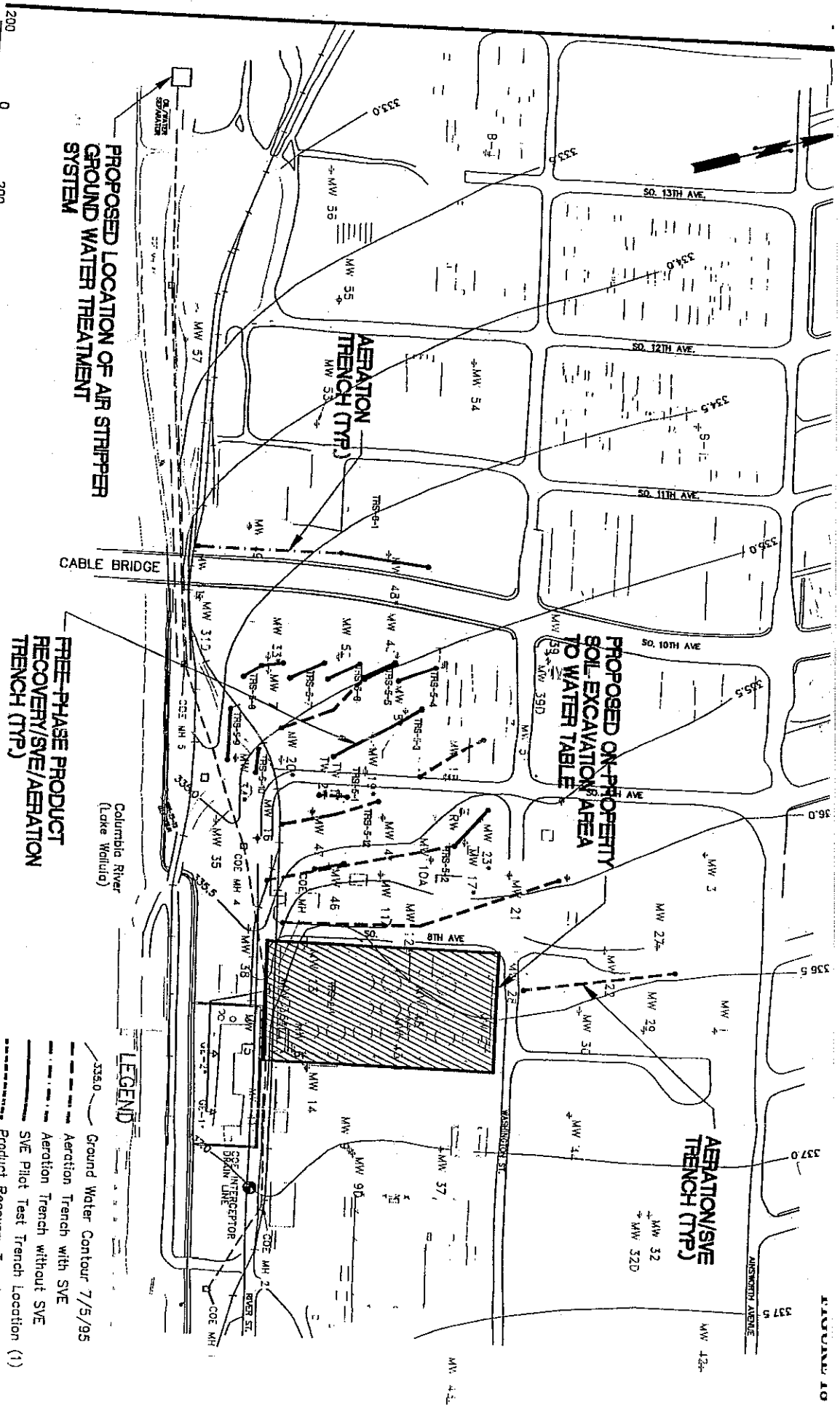
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PASCO BULK FUEL TERMINALS SITE
Pasco, Washington
Feasibility Study

REMEDIAL ALTERNATIVE 3
GROUND WATER COLLECTION AND TREATMENT,
LIMITED ON-PROPERTY SOIL REMEDIATION

Project No.
V895011
Figure No.
16

FIGURE 10



**PROPOSED LOCATION OF AIR STRIPPER
GROUND WATER TREATMENT
SYSTEM**

**FREE-PHASE PRODUCT
RECOVERY/SVE/AERATION
TRENCH (TTP)**

**PROPOSED ON-PROPERTY
SOIL EXCAVATION AREA
TO WATER TABLE**

**AERATION/SVE
TRENCH (TTP)**

LEGEND

- 335.0 Ground Water Contour 7/5/95
- - - Aeration Trench with SVE
- - - Aeration Trench without SVE
- - - SVE Pilot Test Trench Location (1)
- - - Product Recovery Trench
- - - Product Recovery/SVE/Aeration Trench
- Proposed Monitoring Well

(1) SVE TEST IN WESTERN PART OF SITE WILL UTILIZE
1A TRENCH TRS-5-5



**ASSOCIATED
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(206) 827-6424

DESIGNED	DRAWN	CHECKED	APPROVED
E.W.M.	E.W.M.	E.W.M.	M.E.S.

PASCO BULK TERMINAL SITE
Pasco, Washington

**ALTERNATE 5
EXCAVATION AND REMEDIATION
TRENCH PLAN**

PROJECT NO.
VB9501W
TRENCH NO.
4.5

SEPA



DETERMINATION OF NONSIGNIFICANCE

Description of proposal:

Implementation of cleanup action at the Port of Pasco Site. The cleanup will involve remediation of soils and ground water contaminated with petroleum and chlorinated solvents. Cleanup activities will include: removal or free-phase product; cleanup of soils by a combination of soil vapor extraction (SVE) and ex-situ bioremediation; and cleanup of ground water by a combination of in-situ and ex-situ treatment technologies.

Proponent:

Pasco Bulk Fuel Terminals Site Coordinating Group

Location of proposal, including street address if any:

Section 31, Township 9 North, Range 30 East, Willamette Meridian, on the north bank of the Columbia River in Pasco, Washington.

Lead agency:

Washington State Department of Ecology

The lead agency for this proposal has determined that it does not have a probable significant impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

- This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 15 days from the date below. Comments must be submitted by March 22, 1999.

Responsible official: Flora J. Goldstein

Position/title: Section Manager, Toxics Cleanup Program

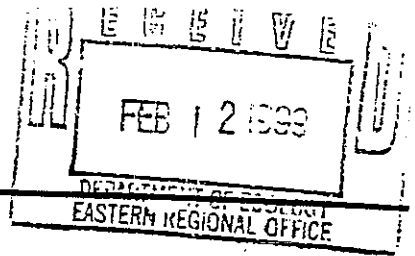
Address: 4601 N. Monroe Street
Spokane, WA 99205-1295

Telephone: (509) 456-7693

Date 2.16.99

Signature

Flora J. Goldstein



SEPA ENVIRONMENTAL CHECKLIST
(RCW 197-11-960)

A. BACKGROUND

1. Name of proposed project, if applicable:

Cleanup Action, Pasco Bulk Fuel Terminals Site, Pasco, Washington

2. Name of applicant:

Pasco Bulk Fuel Terminals Site Coordinating Group

3. Address and phone number of applicant and contact person:

Stephen Wilson
2401 Fourth Avenue
Post Office Box 2287
Seattle, Washington 98111-2287
(206) 443-8042

4. Date checklist prepared:

February 10, 1997

5. Agency requesting checklist:

Washington State Department of Ecology

6. Proposed timing or schedule (include phasing, if applicable):

The Implementation Schedule for cleanup actions is given in Section 10 of the Cleanup Action Plan (CAP).

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No The intent of the cleanup proposed in the CAP is to complete all remedial action required under the Model Toxics Control Act (MTCA).

8. List any environmental information you know about that has been prepared or will be prepared, directly related to this proposal.

Previous environmental information is summarized on Table 1 (attached). Additional information is contained in the CAP (February 1999 draft) that this SEPA Checklist accompanies.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

See Item 10

10. List any government approvals or permits that will be needed for your proposal, if known.

The cleanup actions will be conducted under a Consent Decree. Under MTCA, the cleanup actions are exempt from the administrative portions of specified permitting requirements. However, the substantive provisions of these permits must be met. The Washington State Department of Ecology will review submittals (including those specified in Section 10 of the CAP) associated with design, construction, and operation of cleanup actions. Opportunity for public review and comment will be provided in accordance with MTCA. Determination that the substantive requirements have been met will be made through review and approval of cleanup planning documents.

Some cleanup activities will be associated with the subsurface drain and associated oil-water separator owned by the U S. Army Corps of Engineers (COE). COE permissions will be required for cleanup activities directly involving the COE drain and oil-water separator.

Some activities may involve discharge to the City of Pasco sewers, which will be done in accordance with applicable permitting requirement of the City of Pasco. Some building permits and inspections may be required in association with some construction associated with cleanup activities.

In addition, a list of all applicable or relevant and appropriate laws and regulations are listed in the CAP.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

The cleanup actions are described in Section 8 of the CAP. In summary, the cleanup actions consist of:

- Removal of free-phase product;
- Cleanup of soils containing petroleum hydrocarbons by a combination of soil vapor extraction (SVE) and ex-situ bioremediation; and

-
- Cleanup of groundwater containing petroleum hydrocarbons and, in some areas, chlorinated volatile organic compounds, by a combination of in-situ and ex-situ treatment technologies

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and Section, Township, and Range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The Pasco Bulk Fuel Terminals Site is located on the north bank of the Columbia River in the south eastern portion of the City of Pasco, Franklin County, Washington. The area investigated for possible cleanup included properties east and west of the South 10th Avenue Bridge in the northern half of Section 31, Township 9 North, Range 30 East, Willamette Meridian. Based on the results of the Remedial Investigation (RI), the Site has been determined to be approximately 90 acres in size, with boundaries as shown in Figure 3 of the CAP

TO BE COMPLETED BY APPLICANT	AGENCY USE ONLY
B. ENVIRONMENTAL ELEMENTS	
1. Earth	
<p>a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, or other _____.</p> <p>Flat</p> <p>b. What is the steepest slope on the site (approximate percent slope)?</p> <p>Less than 1 percent</p> <p>c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.</p> <p>Site soils are divided into 4 stratigraphic units, consisting of fill, alluvium, Pasco gravel, and the Ringold Formation (in order from top to bottom). See Section 2.5 of the CAP for further information.</p> <p>d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.</p> <p>No.</p> <p>e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill material.</p> <p>Contaminated soils will be stockpiled on site prior to treatment. No other filling is proposed.</p> <p>f. Could erosion occur as a result of clearing, construction or use? If so generally describe.</p> <p>Contaminated soils will be excavated and remediated by ex-situ bioremediation in a suitable area. These soils could potentially be subject to erosion.</p> <p>g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?</p> <p>Some impervious surfaces may be created to create a surface seal for soil vapor extraction (SVE). The extent and duration (permanent or temporary) will be determined during detailed design of the cleanup actions.</p> <p>h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:</p> <p>Appropriate stormwater controls, such as berms or dikes, will be employed to prevent uncontrolled runoff of stormwater from contaminated soils exposed to rainfall.</p>	

TO BE COMPLETED BY APPLICANT		AGENCY USE ONLY
2. AIR		
<p>a. What types of emissions to the air would result from the proposal (i.e. dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximately quantities if known.</p> <p>During excavation and ex-situ bioremediation activities, soils saturated with petroleum hydrocarbons will cause emissions by evaporation of volatile petroleum constituents. At this time, quantities are unknown by thought to be minimal. SVE, air sparging and ex-situ air stripping have associated air emissions.</p> <p>b. Are there any off-site sources of emissions or odor that may effect your proposal? If so generally describe.</p> <p>No.</p> <p>c. Proposed measures to reduce or control emissions or other impacts to air, if any:</p> <p>Air emission controls, as required, will be used to meet applicable air quality standards and criteria.</p>		
3. WATER		
<p>a. Surface:</p> <p>1) Is there any surface water body on or in the immediate vicinity of the site including year-round and seasonal streams, saltwater, lakes, ponds, or wetlands? If yes, describe type and provide names. If appropriate, state what stream or river flows into the surface water body.</p> <p>The Site is located on the north bank of the Columbia River, in Pasco, Washington.</p> <p>2) Will the project require any work over, in or adjacent to (within 200 feet) of the described waters? If yes, please describe and attach available plans.</p> <p>Yes. The Site is separated from the Columbia River by a dike constructed and maintained by the U.S. Army Corps of Engineers (COE).</p> <p>3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.</p> <p>None.</p> <p>4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.</p> <p>No.</p>		

TO BE COMPLETED BY APPLICANT	AGENCY USE ONLY
<p>5) Does the proposal lie within a 100 year floodplain? If so, note location on the site plan.</p> <p>No, the COE dike separates the Site from the Columbia River.</p>	
<p>6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.</p> <p>No untreated waste will be discharged to any surface water. Treated groundwater may be discharged into the COE drain, which discharges to an open ditch running parallel to the Columbia River. See Section 2.2 of the CAP for additional description of surface water in relation to the COE drain.</p> <p>b. Ground:</p> <p>1) Will ground water be withdrawn, or will water be discharged to ground water? Give a general description, purpose, and the approximate quantities, if known.</p> <p>Some groundwater extraction and treatment is anticipated. ReInjection of treated groundwater is not anticipated at this time, but may be incorporated into design of groundwater treatment if found necessary.</p> <p>Groundwater will be treated by a combination of in-situ and ex-situ technologies such that groundwater discharging to surface water via the COE drain will meet applicable cleanup levels (specified in the CAP).</p> <p>2) Describe waste material that will be discharged into the ground, if any, from septic tanks or other sources, such as domestic sewage, industrial or agricultural wastes. Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.</p> <p>None</p> <p>c. Water Runoff: (including storm water)</p> <p>1) Describe the source of runoff, including storm water and the method of collection and disposal, if any (include quantities if known). Where will this water flow? Will this water flow into other waters? If so describe.</p> <p>The storm water runoff system in most of the project site will not be impacted. Runoff will be controlled for exposed contaminated soil, which will occur with ex-situ biotreatment. Contaminated stormwater will be reapplied to the biotreatment cells or treated as needed to meet applicable cleanup levels prior to discharge.</p> <p>2) Could waste materials enter ground or surface waters? If so, generally describe.</p> <p>No. Stockpiled soils will be stored in a lined and bermed area.</p> <p>d. Proposed measures to reduce or control surface, ground, and runoff impacts, if Any.</p>	

TO BE COMPLETED BY APPLICANT	AGENCY USE ONLY
See C. 1) above.	
4. PLANTS	
<p>a. Check or circle types of vegetation found on the site:</p> <p>__deciduous tree: alder, maple, aspen, other.</p> <p>__evergreen tree: fir, cedar, pine, other.</p> <p>__shrubs</p> <p>__grass</p> <p>__pasture</p> <p>__crop or grain</p> <p>__wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other</p> <p>__water plants: water lily, eelgrass, milfoil, other</p> <p>__other types of vegetation</p> <p>No vegetation on site.</p> <p>b. What kind and amount of vegetation will be removed or altered?</p> <p>None.</p> <p>c. List threatened or endangered plant species known to be on or near the site.</p> <p>None.</p> <p>d. Proposed landscaping, use of native plants or other measures to preserve or enhance vegetation on the site, if any:</p> <p>N/A.</p>	
5. ANIMALS	
<p>a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:</p> <p>birds: hawk heron eagle songbirds other:</p> <p>mammals: deer bear elk beaver other:</p> <p>fish: bass salmon trout herring shellfish other:</p> <p>Birds: hawk, seagull</p> <p>Fish: salmon, trout</p> <p>b. List any threatened or endangered species known to be on or near the site.</p> <p>Salmon within the Columbia River.</p> <p>c. Is the site part of a migration route? If so, explain.</p> <p>Salmon migrate up the adjacent Columbia River.</p> <p>d. Proposed measures to preserve or enhance wildlife, if any:</p> <p>Project will not affect salmon or other wildlife.</p>	

TO BE COMPLETED BY APPLICANT	AGENCY USE ONLY
6. ENERGY AND NATURAL RESOURCES	
<p>a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.</p> <p>Electricity will be used to supply power to pumps, air stripping and sparing and SVE equipment.</p> <p>b. Would the project affect the potential use of solar energy by adjacent properties? If yes, generally describe.</p> <p>No.</p> <p>c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:</p> <p>None.</p>	
7. ENVIRONMENTAL HEALTH	
<p>a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.</p> <p>Cleanup actions will be designed to minimize environmental health hazards. Appropriate personal protective equipment (PPE) will be employed to minimize worker exposure to site contaminants.</p> <p>The risk of fire and explosion, spill of hazardous or toxic materials, or spill of hazardous waste will be minimal.</p> <p>Site cleanup activities will be conducted in accordance with a Health and Safety Plan approved by the Washington State Department of Ecology.</p> <p>1) Describe special emergency services that might be required.</p> <p>Construction accidents may require use of existing emergency services.</p> <p>2) Describe proposed measures to reduce or control environmental health hazards, if any.</p> <p>A site Health and Safety Plan will be followed during all cleanup activities. Appropriate control measures will be included in the detailed design of cleanup actions.</p> <p>b. Noise</p> <p>1) What types of noise exist in the area which may affect your project?</p> <p>None.</p> <p>2) What types and levels of noise would be created by or associated with the project on a short-term basis (for example traffic, construction)? Indicate what hours noise would come from the site.</p>	

TO BE COMPLETED BY APPLICANT	AGENCY USE ONLY
<p>Treatment equipment (e.g., pumps and blowers) will generate noise, but the noise is not expected to be noticable beyond Site boundaries. Noise typical of normal construction activities will also be generated during construction required for cleanup actions</p> <p>3) Describe proposed measures to reduce or control noise impacts. None needed.</p>	
<p>8. LAND AND SHORELAND USE</p>	
<p>a. What is the current use of the site and adjacent properties?</p> <p>Current use is light industrial. Light industrial property lies to the west. Commercial and Port of Pasco industrial property bound the project area in the blocks to the north and east. Residential properties lie north of Ainsworth Avenue.</p> <p>b. Has the site been used for agriculture? If so, describe.</p> <p>No. There is no cultivated land on site.</p> <p>c. Describe any structures on the site.</p> <p>Decommissioned above-ground fuel storage tanks, grain elevator, administrative buildings.</p> <p>d. Will any structures be demolished? If so what?</p> <p>The above-ground fuel storage tanks will be removed.</p> <p>e. What is the current zoning of the site?</p> <p>Light Industrial (I-1).</p> <p>f. What is the current comprehensive plan designation of the site?</p> <p>Light Industrial (I-1).</p> <p>g. If applicable, what is the current shoreline master program designation of the site.</p> <p>Urban/Industrial/Commercial.</p> <p>h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify (RCW 197-11-908).</p> <p>No.</p> <p>i. Approximately how many people would reside or work in the completed project?</p> <p>None</p> <p>j. Approximately how many people would the completed project displace?</p> <p>None.</p>	
<p>k. Describe any proposed measures to avoid or reduce displacement impacts, if any:</p>	

TO BE COMPLETED BY APPLICANT	AGENCY USE ONLY
<p>N/A</p> <p>I. Describe any proposed measures to ensure compatibility with existing and projected land use and plans.</p> <p>N/A</p>	
<p>9. HOUSING</p>	
<p>a. Approximately how many units would be provided, if any? Indicate whether high, middle or low income.</p> <p>N/A</p> <p>b. Approximately how many units, if any would be eliminated? Indicate whether high, middle, or low income.</p> <p>N/A</p> <p>c. Proposed measures to reduce or control housing impacts, if any.</p> <p>N/A.</p>	
<p>10. AESTHETICS</p>	
<p>a. What is the tallest height of any proposed structure(s), not including antennas? What is the principal exterior material proposed for the building?</p> <p>Cleanup equipment such as air strippers will be installed on site. This equipment may be outside or may be housed inside buildings. The tallest piece of equipment anticipated would be a air stripping tower that would be less than 40 feet high.</p> <p>b. What views in the immediate vicinity would be altered or obstructed?</p> <p>None.</p> <p>c. Describe any proposed measures to reduce or control aesthetic impacts.</p> <p>None.</p>	
<p>11. LIGHT AND GLARE</p>	
<p>a. What type of light or glare will the proposal produce? What time of day would it mainly occur?</p> <p>None.</p> <p>b. Could light of glare from the finished project be a safety hazard or interfere with views?</p> <p>No.</p> <p>c. What existing off-site sources of light or glare may affect your proposal?</p> <p>None</p>	
<p>d. Describe any proposed measures to reduce or control light and glare impacts.</p>	

TO BE COMPLETED BY APPLICANT	AGENCY USE ONLY
<p>e. Will the project use or occur in the immediate vicinity of water, rail, or air transportation? If so generally describe.</p> <p>No.</p> <p>f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.</p> <p>N/A</p> <p>g. Proposed measures to reduce or control transportation impacts, if any:</p> <p>No impacts on transportation.</p>	
15. PUBLIC SERVICES	
<p>a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, septic system, or other).</p> <p>No.</p> <p>b. Proposed measures to reduce or control direct impacts on public services, if any:</p> <p>No impacts.</p>	
16. UTILITIES	
<p>a. Circle utilities currently available at the site: electricity, natural gas, water, refuse collection, telephone, sanitary sewer, septic system, or other.</p> <p>Electricity, natural gas, water, refuse service, telephone, septic system.</p> <p>b. Describe the utilities that are proposed for the project, the utility providing the service and the general construction activities on the site or in the immediate vicinity which might be needed.</p> <p>Electricity</p>	
<p>C. SIGNATURE</p> <p>The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.</p> <p>Signature: <u>R. Stepe</u></p> <p>Date Submitted: <u>February 11, 1999</u></p>	

TABLE 1
SUMMARY OF SITE ENVIRONMENTAL EVENTS(1)
Pasco Bulk Fuel Terminals Site

Date	Event and Description
Early 1940s	Start of site use for petroleum storage and distribution.
1953-1954	U. S. Army Corps of Engineers (COE) constructed levee and drainage systems in the vicinity of the Pasco Bulk Fuel Terminals Site (the Site).
1953	There was frequent correspondence between the City of Pasco and the Pollution Control Commission regarding the source of oil in the collection pond and the handling of storage tank condensate.
March 24, 1969	A letter from COE described investigation of oil in the collection pond and interception trench. Inspection of manholes detected "faint odor of gasoline or diesel oil," suggesting contamination could be migrating from upgradient source areas (e.g., bulk fuel terminals). Sheetpiles and metal weir installed downstream at outlet of interceptor drain.
1973	Port of Pasco constructed three 24-inch-diameter concrete wells to monitor product accumulation on ground water. Limited success was achieved in attempts to recover petroleum product. Washington State Department of Ecology (Ecology) (Robert Russell) documented existing subsurface "oil pool" beneath the Pasco Bulk Fuel Terminals Site (Russell, R., 1973).
April 2, 1973	Ecology memorandum noted presence of petroleum in collection pond. The COE, the City of Pasco, and the Pasco Fire Chief were notified. The memorandum mentioned that the oil accumulations within the ditch were periodically burned off.
March 14, 1974	Gordon Weed (Port of Pasco employee) filed a report discussing the results of pumping manholes in the vicinity of the site. He observed product at one location and odors at several others.
January 4, 1985	Ecology notified the Port of Pasco that the site was assessed under provisions of Section 3012 of the Resource Conservation and Recovery Act (RCRA). A site inspection was not recommended. Potential environmental problems were identified and were being addressed.
1985	Fuel products found in the sump of the Delaney residence ignited during the operation of the sump pump. Dissolved fuel products were found in an irrigation well at this residence.
April 26, 1987	A letter to Pacific Northwest Bell (now US West) indicated elevated levels of hydrocarbon vapors were detected in utility vault located at the intersection of 9th Avenue and River Street.
May 27, 1987	A report presented by consultant to Columbia Marine Lines (GeoEngineers, 1987) summarized investigations conducted at the site in late 1986 and 1987. Free-phase product was observed in 9 of 20 monitoring wells installed.
June 1987	Art Johnson of Ecology performed a site investigation designed to evaluate contamination at collection pond sediment and surface water locations (Johnson, A., 1987).

TABLE 1 (continued)
SUMMARY OF SITE ENVIRONMENTAL EVENTS⁽¹⁾
Pasco Bulk Fuel Terminals Site

Date	Event and Description
February 2, 1988	A report presented by consultant to Columbia Marine Lines (GeoEngineers, 1988) summarized an investigation conducted at the site in late 1987. Free-phase product was observed in 18 of 32 wells.
July 8, 1988	A letter from Sherman Spencer (Ecology representative) to the Pasco Fire Chief concerned about possible fire hazard at the Delaney residence.
September 1988	McCall Oil Company distribution facility removed five underground storage tanks, in addition to seven above-ground storage tanks, including associated piping. Results of the investigation are documented in January 20, 1989, letter report (EMCON, 1989).
February 1989	Laura Chern of Ecology performed a site investigation. Twelve ground water samples and six composite soil samples were collected. Results of the investigation were documented in a report dated October 1989 (Chem, 1989).
1990	Port of Pasco replaced sheetpiles and weir within the drainage ditch with an oil/water separator.
February 28, 1990	US West (formerly Pacific Northwest Bell) collected a product sample from a utility vault located at corner of 9th Avenue and Washington Street at the Site. Sample was analyzed and identified as a petroleum hydrocarbon mixture, such as diesel or fuel oil.
November 23, 1990	Historical Research Associates, Inc. documented site history to identify potentially liable parties associated with the site (Historical Research Associates, 1990).
December 9, 1991	Earth Science Applications, Inc. reviewed previous site data and discussed site remediation considerations (Earth Science Applications, 1991).
January 6, 1992	Report documented tank and piping removal activities at the Doyle Brothers Property (January 6, 1992). Eight aboveground, two underground, and a single rack drainage tank and associated piping/structures were removed from the Site in December 1991 3D Tank and Petroleum Equipment Company, 1992a, b, c).
May 1992	EMCON Northwest was hired to assist Pasco Bulk Fuel Terminals Site Coordinating Group with site work plan development prior to entering into Consent Decree with Ecology.
July 1992	EMCON Northwest performed field work at the site, conducting product baildown testina and collecting product thickness measurements.
October 15, 1992	Ecology issues Enforcement Order No. DE 92TC-EI06 to initiate Interim Action and Remedial Investigation/Feasibility Studies at the site.
January 1993	EMCON prepared work plan for Phase I RI and Interim Action to address Ecology Enforcement Order (EMCON, 1993b).

TABLE 1 (continued)
SUMMARY OF SITE ENVIRONMENTAL EVENTS⁽¹⁾
Pasco Bulk Fuel Terminals Site

Date	Event and Description
March 1994	Converse Consultants NW completes Phase I RI and summarizes results in technical memorandum. Recommendations for Phase II RI and Feasibility Study are made. Interim Action is ongoing with free-phase product recovery wells on-site (Converse Consultants NW, 1994).
February 1995	Converse Consultants NW completes a risk evaluation scoping memorandum outlining risk-related tasks to be performed during the final stages of the feasibility study (Converse Consultants, 1995).
February 1995	Petco, Inc. excavates the test pits immediately east of South 10th Avenue (Petco, 1995).
March 1995	Associated Earth Sciences, Inc. report on the methods and findings of the interim action (Associated Earth Sciences, 1995a).
May 1995	Associated Earth Sciences, Inc. prepares an addendum to the Phase II work plan to define the extent of the contamination west of South 10th Avenue (Associated Earth Sciences, 1995b).
June 1995	Associated Earth Sciences, Inc. prepares a test pit investigation summary letter presenting results of the test pit explorations and recommending monitoring well locations (Associated Earth Sciences, 1995c).
January 8, 1996	Final Remedial Investigation report submitted to Ecology (Associated Earth Sciences, 1996a).
July 18, 1996	Draft Feasibility Study report submitted to Ecology (Associated Earth Sciences, 1996b).
February 1997	Final Interim Action Work Plan Addendum submitted to Ecology (Associated Earth Sciences, 1997a).
June 1997	Final Feasibility Study report submitted to Ecology (Associated Earth Sciences, 1997b).
1997 - 1999	Operation and maintenance of interim action facilities.
February 1999	Draft Cleanup Action Plan (DCAP) submitted for public comment (accompanies this SEPA Checklist).
Notes:	
⁽¹⁾ Modified from EMCON, 1993a and the SEPA Checklist for Interim Action at the Pasco Bulk Fuel Terminals Site (dated March 19, 1997).	

May not be a complete record of environmental events at the Site.

TABLE 1 (continued)
SUMMARY OF SITE ENVIRONMENTAL EVENTS⁽¹⁾
Pasco Bulk Fuel Terminals Site

References:

3D Tank and Petroleum Equipment Company, 1992a. Letter report by Edward Mitchell describing tank and piping removal for Doyle Brothers, Inc. Unpublished consulting report dated November 1991.

3D Tank and Petroleum Equipment Company, 1992b. Letter report by Edward Mitchell describing tank and piping removal for Doyle Brothers, Inc. Unpublished consulting report dated January 16, 1992.

3D Tank and Petroleum Equipment Company, 1992c. Letter report by Edward Mitchell describing site assessment and sampling for Doyle Brothers, Inc. Unpublished consulting report dated January 6, 1992.

~ Associated Earth Sciences, Inc., 1995a. *Interim Action Report - Pasco Bulk Fuel Terminal Site, Pasco, Washington*. Unpublished consulting report dated March 30, 1995.

Associated Earth Sciences, Inc., 1995b. *Phase II RI Work Plan Addendum*. Unpublished consulting report dated May 1, 1995.

Associated Earth Sciences, Inc., 1995c. *Results of Test Pit Investigation - Pasco Bulk Fuel Terminal Phase H Remedial Investigation*. Unpublished consulting report dated June 19, 1995.

Associated Earth Sciences, Inc., 1996a. *Remedial Investigation Report, Pasco Bulk Fuel Terminals Site, Pasco, Washington*. Four volumes. Unpublished consulting report dated January 8, 1996.

Associated Earth Sciences, Inc., 1996b. *Feasibility Study Report, Pasco Bulk Fuel Terminals Site, Pasco, Washington*. Draft version. Unpublished consulting report dated July 18, 1996.

Associated Earth Sciences, Inc., 1997a. *Interim Action Work Plan Addendum, Pasco Bulk Fuel Terminals Site, Pasco, Washington*. Unpublished consulting report dated February 6, 1997.

Associated Earth Sciences, Inc., 1997b. *Feasibility Study Report, Pasco Bulk Fuel Terminals Site, Pasco, Washington*. Final version, dated June 12, 1997.

Chern, L., 1989. *Investigation of Hydrocarbon Contamination in Ground Water and Soil, Port of Pasco, Pasco, Washington*. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Toxics Investigations/Ground Water Monitoring Services. Segment 19-36-GW. Olympia, Washington.

Converse Consultants NW, 1994. *Pasco Bulk Fuel Terminal Site - Phase I RI Technical Memorandum*. Unpublished consulting report dated March 17, 1994.

Converse Consultants NW, 1995. *Risk Evaluation Scoping Memorandum*. Unpublished consulting report dated February 16, 1995.

Earth Science Applications, 1991. *Peer Review of Interim Remediation, Pasco Bulk Terminal, Pasco, Washington*. Unpublished consulting report dated December 9, 1991.

EMCON Associates, 1989. Letter Report regarding Underground Tank Closures at 812 West Washington Street, Pasco, Washington. Unpublished consulting report dated January 20, 1989.

EMCON Northwest, 1993a. *Work, Plan for Phase I Remedial Investigation of Pasco Bulk Fuel Terminal Site*. Unpublished consulting report prepared for Pasco Bulk Fuel Terminal Coordinating Group.

EMCON Northwest, 1993b. *Phase I RI Work Plan and Interim Action Work Plan*. Unpublished consulting report prepared for Pasco Bulk Fuel Terminal Coordinating Group.

GeoEngineers, 1987. *Report of Geotechnical Services Evaluation of Free Fuel Contamination Pasco Bulk Terminal, Pasco, Washington*. Unpublished consulting letter report to CML Corporation, dated May 27, 1987.

GeoEngineers, 1988. *Report of Phase 3 Geotechnical Services Evaluation of Free Phase Fuel Contamination Pasco Bulk Terminal, Pasco, Washington*. Unpublished consulting letter Report to CML Corporation, dated February 2, 1988.

Historical Research Associates, Inc., 1990. *Historical Records Assessment to Identify Potentially Liable Parties Associated with the Port of Pasco Site, Pasco, Washington*. Unpublished consulting report.

Johnson, A., 1987. *Screening Survey for Contaminants in Ground Water and Surface Drainage at the Port of Pasco*. Washington State Department of Ecology, Water Quality Investigation Section.

Petco, Inc., 1995. *Sample Recovery for 77iree Test Pits at the Port of Pasco - Pasco, Washington*. Unpublished consulting report dated February 28, 1995.

Russell, Robert H., 1973. *Geo-Hydrologic Evaluation of Pacific Inland Navigation Company Tank Farm Oil Spill Problem, Port of Pasco, Washington*. Washington State Department of Ecology.

RESPONSIVENESS SUMMARY

Pasco Bulk Fuel Terminal Citizen's Committee

c/o Port of Pasco

P.O. Box 769

Pasco, WA 99301-0769

March 19, 1999

Dr. Teresita Bala
Dept. of Ecology
Toxics Cleanup Program
4601 N. Monroe, Suite 202
Spokane, WA 99205-1295

Dear Dr. Bala:

The Citizen's Committee for the Pasco Bulk Fuel Terminal Cleanup was established in early 1993 as part of the Public Participation Plan in response to Ecology's Enforcement Order No. DE 92 TC-E 106 for cleanup of the site. The Committee has been periodically briefed by Port of Pasco staff on planning, activities, and results of the Interim Cleanup Actions, Remedial Investigations, Feasibility Studies and the Draft Cleanup Action Plan (DCAP).

The Committee met on March 9, 1999 with Port Officials to be updated on the resolution of cleanup levels and actions between Ecology and the Port's Engineering Contractor, and to develop comments on the DCAP. We submit the following comments.

- We support the Ecology selected Alternate 5 and the Site Cleanup Actions of Section 8. of the Plan.
- We support use of the Interim Policy for TPH for calculating risk based soil cleanup levels of 5,521 mg./kg. maximum. We expect that this value will not be raised or lowered by any further MTCA revisions.
- We encourage Ecology to assure that prompt decisions are made on the many implementing actions that will be required in order that this effort may progress to completion as soon as practicable.

Committee members present at our meeting have authorized the undersigned to sign this letter on behalf of all members. This does not invalidate the right of any member to submit comments for him or her self.

Sincerely,



Gordon J. Rogers



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

4601 N. Monroe, Suite 202 • Spokane, Washington 99205-1295 • (509) 456-2926

March 26, 1999

Pasco Bulk Fuel Terminal Citizen's Committee
c/o Port of Pasco
P. O. Box 769
Pasco WA 99301-0769

Dear Committee Members:

Thank you for your March 19, 1999 letter to Ecology commenting on the Draft Cleanup Action Plan for the Port of Pasco Site. This is the only comment letter received by Ecology during the public comment period. The following are Ecology's responses to the three comments presented in your letter:

- Ecology appreciates your support of our selected alternative.
- The risk-based Method C Commercial soil TPH cleanup level of 5,521 mg/Kg, as calculated using Ecology's Interim TPH Policy, is based on the protection of human exposure via direct contact and on protection of ground water. Ecology does not expect this cleanup level to change with upcoming revisions to MTCA. However, a reevaluation of the cleanup level may take place under the following conditions:
 - The DCAP states that actual soils concentrations based on protection of ground water will be determined from ground water monitoring data and will over-ride the theoretical calculations (see page 17, Section 4.3.1 of the DCAP). If ground water monitoring data will show that the calculated TPH concentration is not protective of ground water, this TPH cleanup level will have to be reconsidered.
 - MTCA, under WAC 173-340-420, requires the Department of Ecology to review a cleanup action no less frequently than every five years after the initiation of the cleanup action if the department selects or approves a cleanup action that results in cleanup levels which exceed Method A or Method B, to assure that human health and the environment are being protected. The factors to be considered during this review include: the effectiveness of ongoing or completed cleanup actions; new scientific information for individual hazardous substances or mixtures present at the Site, and new applicable state and federal laws for hazardous substances present at the Site.

- Ecology is now ready to issue a Final Cleanup Action Plan and will soon commence negotiations for a Consent Decree, which will provide the legal agreement for implementing the cleanup action. The public will have a chance to review and comment on the draft Consent Decree.

Ecology appreciates your involvement on the cleanup of this Site. If you have any questions, please feel free to call me at (509) 456-6337.

Sincerely,

Teresita F. Bala

Teresita F. Bala
Toxics Cleanup Program

TFB:mg

cc: Stephen Wilson, PBFTSCG
Tanya Barnett, AAG/Olympia

EXHIBIT C

AMENDMENT TO
FINAL CLEANUP ACTION PLAN

EXHIBIT C

AMENDMENT TO FINAL CLEANUP ACTION PLAN PASCO BULK FUEL TERMINALS SITE (formerly PORT OF PASCO SITE)

Having satisfied the public review and comment requirements of MTCA, the Cleanup Action Plan (CAP) for the Pasco Bulk Fuel Terminals Site became final in March 1999. Section 8.0 of the CAP (Exhibit B) specifies the cleanup action to be implemented at the Site for each of the following: Free-Phase Product, Soils, Ground Water, and Surface Water.

Section 8.2 specifies that contaminated soils in the main tank farm will be excavated as close as practicable to the seasonal low water table. The excavated soils will be treated by ex-situ bioremediation (land farming) in a suitable area of the Site to be determined during remedial design. It also states that small on-property areas of contaminated soil outside of the main tank farm will also be excavated to the water table where practical and treated by ex-situ bioremediation. Contaminated soils remaining after excavation will be treated by Soil Vapor Extraction (SVE) contingent upon the success of a SVE pilot test.

Two recent activities at the Site have shown that:

1. The soil contamination in the main tank farm area is not uniformly distributed as observed during the recent tank demolition activities. It was previously assumed that the soil contamination was everywhere throughout the area from the surface down to the water table.
2. In-Situ Air Sparging/ Soil Vapor Extraction (IAS/SVE) is effective in treating site contaminants as demonstrated in initial pilot tests conducted at the Site.

As a result of these two findings, it is proposed that the main tank farm soils (as with all the contaminated soils on site) be treated in-situ by SVE in combination with IAS. IAS/SVE will continue until ground water levels are met. Upon completion of the in-situ treatment, remaining soils on site that exceed the cleanup levels will be treated by bioremediation.

Ecology has evaluated and approved this proposed modification to soil treatment. Ecology has determined that this modification is still protective of human health and the environment and meets the selection criteria under WAC 173-340-360.

4. The third paragraph of Section 8.7, Permit Requirements, shall be amended as follows:

The proposed actions use air to treat ground water and soils. If necessary, soils may have to be treated further using bioremediation. Substantive requirements for applicable air permits must also be satisfied.

5. Section 10.0, Implementation Schedule, shall be amended as follows:

- (a) The second paragraph shall read as:

The Construction Plans and Specifications, and the Operation and Maintenance Plan will be submitted following finalization of the Engineering Design Report. These plans (not including the bioremediation treatment of soils) will be required to provide for a six-month construction period to start not later than twelve (12) months after the effective date of the Consent Decree. A cleanup action report will be submitted no later than 3 months after completion of the cleanup action construction.

- (b) The following will be added as the last paragraph:

A Soil Sampling and Analysis Plan to evaluate the need for bioremediation of soils will be submitted 30 days after Ecology's concurrence of IAS/SVE completion. This Plan will include a schedule for submittal of a Data and Cleanup Levels Analysis Report for Ecology's review and approval. If bioremediation is found to be necessary, a Construction Plan and Specifications, and a Compliance and Monitoring Plan will be submitted 30 days after Ecology's approval. An Addendum to the Cleanup Action Report will be submitted no later than 3 months after construction of the biotreatment cell, if applicable.

EXHIBIT D

**SCOPE OF WORK
AND
SCHEDULE**

EXHIBIT D
SCOPE OF WORK AND SCHEDULE
FOR CLEANUP ACTION
PASCO BULK FUEL TERMINALS SITE

This Scope of Work is to be used by the PLPs and the consultants to develop plans and reports for the Pasco Bulk Fuel Terminals Site. The PLPs shall furnish all personnel, materials, and services necessary for, or incidental to, preparing plans and reports, and the implementation of the Cleanup Action. Submittals of deliverables shall be prepared in accordance with WAC 173-340-840, General Submittal Requirements.

Task I. Engineering Design Report

Contents of the Engineering Design Report shall be as specified in WAC 173-340-400(a). This report shall include sufficient information for the development and review of construction plans and specifications. It shall document engineering concepts and design criteria used for the design of the cleanup action.

Deliverables: Engineering Design Report – Draft
Engineering Design Report – Final

Task II. Other Work Plans

1. Compliance Monitoring Plan

This plan shall describe the monitoring to be performed during construction, and during operations and maintenance to meet the requirements of WAC 173-340-410. A Sampling and Analysis Plan/Quality Assurance Procedures Plan meeting the requirements of WAC 173-340-820 shall be included.

2. Data Management Plan

This shall contain data analysis and evaluation procedures (including statistical methods) that will be used to demonstrate and confirm compliance, and justification for these procedures [WAC 173-340-410(3)(b)].

Task IV. Operation and Maintenance Plan

This presents the technical guidance and regulatory requirements to assure effective operations and shall include the requirements of WAC 173-340-400(4)(c). This may be submitted in phases to match the Construction Plans and Specifications Report.

Deliverables: Operation and Maintenance Plan – Draft
Operation and Maintenance Plan – Final

Task V. Implementation of the Cleanup Action (Construction) – excluding bioremediation

Construction shall be conducted in accordance with the plans and specifications prepared under this Scope of Work.

Detailed records shall be kept of all aspects of the work performed during the operation and construction including materials used, items installed, test and measurements performed.

Deliverables: Progress Reports

Task VI. Cleanup Action Report

At the completion of construction specified under Task V, a Cleanup Action Report is required. The engineer responsible for the supervision of the construction shall prepare:

1. As-builts reports that shall contain as built drawings and a documentation of all construction activities.
2. Documentation of any changes or modifications that were necessary and approved during the course of implementing cleanup actions

Deliverables: Cleanup Action Report – Draft
Cleanup Action Report – Final

Task VII. Compliance Monitoring

Compliance monitoring shall be conducted as specified in the Compliance Monitoring Plan.

Deliverables: Compliance Monitoring Reports.

SCHEDULE OF DELIVERABLES

Effective Date of Consent Decree

Start

Task I/Task II

Engineering Design Report – Draft
Compliance Monitoring Plan – Draft
Data Management Plan – Draft
Waste Management Plan – Draft
Institutional Controls Plan – Draft
Health and Safety Plan – Draft

90 calendar days from start

Engineering Design Report – Final
Compliance Monitoring Plan – Final
Data Management Plan – Final
Waste Management Plan – Final
Institutional Controls Plan – Final
Health and Safety Plan – Final

30 calendar days following
receipt of Ecology's comments

Task III/Task IV

Construction Plans and Specifications – Draft
Operation and Maintenance Plan – Draft

May be submitted in phases,
the first submittal to be made 30
calendar days after the Engineering
Design Report has completed public
review and comment and is final.

Construction Plans and Specifications – Final
Operation and Maintenance Plan – Final

30 calendar days following
receipt of Ecology's comments

Construction Plans and Specifications – Draft

30 calendar days following
Ecology's approval of Cleanup
Levels Analysis Report

Construction Plans and Specifications – Final

30 calendar days following receipt
of Ecology's comments

Task IX

Implementation of bioremediation

As specified in Construction Plans
and Specifications

Progress Report

As specified in Construction Plans
and Specifications

Task X

Addendum to Cleanup Action Report

Not later than 90 months after
completion of construction

EXHIBIT E

PUBLIC PARTICIPATION PLAN

PORT OF PASCO SITE

DRAFT

PUBLIC PARTICIPATION PLAN

FOR

CONSENT DECREE AND

CLEANUP ACTION PLAN

PREPARED BY:

WASHINGTON STATE

DEPARTMENT OF ECOLOGY

AND

PASCO BULK FUEL TERMINALS SITE

COORDINATING GROUP

JANUARY 2000

INTRODUCTION

OVERVIEW OF PUBLIC PARTICIPATION PLAN

This Public Participation Plan (Plan) is an amendment to the 1993 Plan prepared for the Port of Pasco Site (Site). The Site, also known as the Pasco Bulk Fuel Terminals, is located on the north bank of the Columbia River in the southeastern part of the City of Pasco, Franklin County, Washington. The 1993 version of the Plan was prepared to outline proposed public participation for the Interim Action and Remedial Investigation/Feasibility Study conducted from 1993 to 1995. It is available for review at the repositories listed on page seven of this Plan.

This amended Plan is being updated to include the Consent Decree that will implement the Cleanup Action Plan and encourage public participation during the final cleanup stages of the Port of Pasco Site. The Plan in its final format will become an official part of the Consent Decree. Similar to the 1993 Plan, this current version is intended to promote public understanding of the Washington Department of Ecology's (Ecology) responsibilities, planning activities, and remedial activities at hazardous waste sites. It also serves as a means of gathering information from the public that will help Ecology and the Pasco Bulk Fuel Terminals Site Coordinating Group (the Group) complete the final phase of Site cleanup that is protective of human health and the environment. Ultimately, the Plan will help the community of Pasco continue to be informed regarding Site cleanup activities and contribute to the decision making process.

If individuals are interested in knowing more about the Site or have comments regarding this Plan, please contact one of the individuals listed below:

<p>Teresita Bala Site Manager Washington State Department of Ecology Toxics Cleanup Program 4601 North Monroe, Suite 200 Spokane, WA 99205 (509) 456-6337 E-mail: tbal461@ecv.wa.gov</p> <p>Stephen Wilson, Technical Coordinator Pasco Bulk Fuel Terminals Site Coordinating Group 2401 Fourth Avenue P. O. Box 2287 Seattle, WA 98111-2287 Stephen.Wilson@Crowley.com</p>	<p>Carol Bergin Public Involvement Washington State Department of Ecology Toxics Cleanup Program 4601 North Monroe, Suite 200 Spokane, WA 99205 (509) 456-6360 E-mail: cabe461@ecv.wa.gov</p>
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THE MODEL TOXICS CONTROL ACT AND PUBLIC PARTICIPATION COMMITMENT

The Model Toxics Control Act (MTCA) is a "citizen-mandated" law that became effective in 1989 to provide guidelines for the clean up of contaminated sites in Washington State. This law sets up strict standards to ensure that the clean up of sites is protective of human health and the environment. The Department of Ecology's Toxics Cleanup Program investigates reports of contamination that may threaten human health or the environment. If an investigation confirms the presence of contaminants, the site is ranked and placed on a Hazardous Sites List. Current or former owner(s) or operator(s), as well as any other potentially liable persons (PLPs), of a site may be held responsible for cleanup of contamination to the standards set under MTCA. These PLPs are notified by Ecology that their site has contaminants and the process of cleanup begins with Ecology implementing and overseeing the project.

Public participation is an important part of the MTCA process during cleanup of sites. A Public Participation Plan is required to be developed to encourage

community awareness and public involvement from the beginning to the final stages of cleanup. The participation needs are assessed at each site with regard to the level of interest by the public and degree of risk posed by contaminants. Individuals who live near the site, community groups, businesses, organizations and other interested parties are provided an opportunity to become involved in commenting on the cleanup process. This Plan includes requirements for public notice such as: identifying reports on the site and repositories where they may be read; providing public comment periods; and holding public meetings or hearings. Other forms of participation may be interviews, establishment of citizen advisory groups, questionnaires, or workshops. Additionally, citizen groups living near contaminated sites may apply for public participation grants to help receive technical assistance to understand the cleanup process and create additional public participation avenues.

Public participation activities for the Port of Pasco Site are coordinated between Ecology and the Group. In accordance with MTCA, Ecology has the overall responsibility for the Public Participation Plan with the Group contributing comments.

SITE BACKGROUND

SITE DESCRIPTION AND HISTORY

The Site is located on the north bank of the Columbia River in the southeastern part of the City of Pasco, Franklin County, Washington (See Figure 1 Appendix A). It lies behind dikes maintained by the U.S. Army Corps of Engineers (COE).

The Site, most of which is owned by the Port of Pasco (Port), was a bulk fuel terminal (sometimes referred to as a tank farm) beginning in the 1940s. It was used primarily as a petroleum storage and distribution facility until 1992 although other industrial uses have occurred. These other uses include storage of agricultural chemicals, soil fumigants and fertilizers.

In the 1950s oil films on water had been observed coming from the interceptor drain going to a collection pond. In late 1969 and again in 1973, oil contaminants were detected in the pond about 1500 feet from the tank farm site. Release was from the COE's interceptor drain. Corrective action was taken using a weir arrangement to collect the oil. An oil/water separator was installed in 1990 to improve the collection.

Free petroleum products were detected in the early 1970's in recovery wells installed by the Port at the Site. An additional thirty (30) monitoring wells were installed in 1986 and 1987 to define the plume of free products. Sampling showed free products in 19 of the wells. A 1989 Ecology study showed measurable thicknesses of floating petroleum in 5 of 12 wells sampled. Ground water was also found to contain dissolved petroleum products. The contaminant 1,2-dichloropropane was also found in ground water at concentrations exceeding the maximum contaminant level.

In September of 1992, most of the operating storage tanks were emptied of petroleum products and agricultural chemicals, and tanks not owned by the Port were removed. Storage of petroleum products has diminished, although some tank facilities are still present on Site. A grain terminal, a truck wash area, and an electrical substation are also active on the Site. Several actions have been taken to clean up the Site, and they are outlined under Site Cleanup Process on page five.

CONTAMINANTS OF CONCERN

The Site contains contamination in soils and ground water from industrial uses that began in the early 1900s. The Remedial Investigation conducted from 1993 to 1995 defined the nature and extent of contamination at this Site. Petroleum contamination was confirmed to be distributed in surface and subsurface soils, as a dissolved phase in ground water in the shallow aquifer, and as a free phase on top of the water table. Volatile organic compounds (VOCs) in the form of perchloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichloropropane (1,2-DCP) were also found in soils and ground water. Petroleum and VOCs were also detected in the ditch immediately downstream of the oil/water separator.

COMMUNITY BACKGROUND

COMMUNITY PROFILE

Pasco is located along the Columbia river where the Yakima and Snake rivers merge with the Columbia. It is a city with a population of 26,000 and is the county seat of Franklin County. It is also part of a larger community known as the Tri-Cities. The industries located in Pasco relate primarily to agriculture and transportation. Additionally, many citizens of this area work at the federal government's Hanford Nuclear Reservation.

COMMUNITY CONCERNS

Initially, the majority of interest in the community was from current and past operators of the Site who were concerned about being officially designated Potentially Liable Persons (PLPs). However, as news stories about the Site were printed, citizens became more involved in offering help and advice regarding cleanup of the Site.

In the spring of 1993 community involvement became more formal and the Port of Pasco Citizens Advisory Committee was formed. The Committee began meeting once or twice a year to provide feedback to the Port on their plans for Site cleanup. This Advisory Committee continues to meet and provide feedback on cleanup issues.

SITE CLEANUP PROCESS

Enforcement Order

The cleanup process for the Site began in October of 1992. An Enforcement Order was issued by Ecology to assist the Potentially Liable Persons (PLPs) in focusing on a specific cleanup action. It required the PLPs to conduct Interim Actions and a Remedial Investigation along with a Feasibility Study.

Interim Actions

The Interim Actions focused on immediate removal of free petroleum floating on the ground water. These actions started in 1993, and as of May 1997, 4,388 gallons of free product had been removed from ground water, and ten additional recovery trenches were installed to remove additional free product.

Remedial Investigation

Phase I and Phase II Remedial Investigations were conducted from 1993 to 1995 to determine the nature and extent of contamination at the Site. The results of these studies were combined into the Remedial Investigation Report. These studies confirmed petroleum contamination was widely distributed in surface and subsurface soils, as a dissolved phase in ground water in the shallow aquifer, and as a free phase on top of the water table. Volatile organic compounds in the form of PCE, TCE, and 1,2-dichloropropane were also found in soils and ground water.

Petroleum and VOCs were also detected in the ditch immediately downstream of the oil/water separator.

Feasibility Study

The Feasibility Study evaluated alternatives for cleanup that would be protective of human health and the environment by eliminating, reducing and/or controlling potential risks posed by the Site. The preferred approach was a combination of recovery of free phase product, ground water collection and treatment, in-situ and ex-situ soil cleanup and ground water cleanup via air sparging.

Draft Cleanup Action Plan (DCAP) and Cleanup Action Plan (CAP)

Based upon results of the Remedial Investigation and Feasibility Study, Ecology prepared a Draft Cleanup Action Plan which described and justified the selected cleanup action for the Site. The selected action is the recommended alternative in the Feasibility Study with some modifications. A Responsiveness Summary was prepared to answer comments submitted by the Port of Pasco Citizens Advisory Committee regarding the DCAP. The DCAP has now become final and is referred to as the Cleanup Action Plan (CAP). Recent activities at the Site have led to proposed amendments to this final CAP.

Consent Decree and Public Participation Plan

The Consent Decree that will lead to implementation of the Cleanup Action Plan, as amended, will be entered into by the Washington State Department of Ecology and the Group. The purpose of the Decree is to require the completion of the cleanup actions outlined in the CAP and protect human health and the environment from contaminants at the Site. The Public Participation Plan will become part of the Consent Decree in its final format.

PUBLIC PARTICIPATION AND TIMELINE

The following are public participation efforts which have been made and will continue until the Cleanup Action is completed:

- ❖ A **mailing list** was developed of all individuals who reside within the potentially affected area of the Site. The potentially affected vicinity, which included the property bounded by Tenth Street on the west to include a strip of land west of Tenth Street occupied by the interception drain line, an oil/water separator, the drain line drainage ditch, and the U.S. Army Corps of Engineers (COE) Collection Pond, Ainsworth Avenue on the north, the COE dike on the south, and Fifth Street on the east, was included in the mailing. Additionally, individuals, organizations, local, state and federal governments, and any other interested parties were added to the mailing list.
- ❖ **Public Repositories** have been established and documents may be reviewed at the following offices:

Mid-Columbia Library Pasco Branch 1320 West Hopkins Pasco, WA 99301	Washington State Department of Ecology Eastern Regional Office 4601 North Monroe, Suite 200 Spokane, WA 99205-1295
--	---
- ❖ During each stage of cleanup, **fact sheets** are created by Ecology and distributed to individuals on the mailing list. These fact sheets explain the stage of cleanup, the Site background, what happens next in the cleanup process and ask for comments from the public. A **thirty (30) day comment period** allows interested parties time to comment on the process. The information from these fact sheets is also published in a **Site Register** which is distributed to the public.
- ❖ **Display ads or legal notices** are published in the Tri-City Herald to inform the general public. These notices correlate with the 30-day comment period and associated stage of cleanup. They are also used to announce public meetings and workshops or public hearings.
- ❖ **Public meetings, workshops and public hearings** are held based upon the level of community interest. If ten or more persons request a public meeting based on the subject of the public notice, Ecology will hold a meeting and gather comments.
- ❖ Written comments which are received during the 30-day comment period will be responded to in a **Responsiveness Summary**. The Responsiveness Summary will be sent to those who make the written comments and will be available for public review at the Repositories.

ANSWERING QUESTIONS FROM THE PUBLIC

Individuals in the community may have questions they want to discuss to clarify the cleanup process. Page two lists the various contacts for the Site. Interested persons are encouraged to contact these persons by phone or e-mail to obtain information about the Site, the process and potential decisions.

OBTAINING COMMUNITY INPUT ON SITE DECISIONS

The Port of Pasco Citizens Advisory Committee will continue to oversee the project cleanup and offer suggestions and comments in the final process.

PUBLIC NOTICE AND COMMENT PERIODS

Ecology has already conducted a public comment period for 30 days to collect input regarding the Draft Cleanup Action Plan. One letter was received from the Port of Pasco Citizens Advisory Committee, and a Responsiveness Summary was prepared to address the comments contained in that letter.

The DCAP is now final and is referred to as the Cleanup Action Plan. There will be public comment periods for the Proposed Consent Decree which leads to implementation of the CAP. An additional public comment period will be conducted for the Engineering Design Report.

TIME LINE

DATE	ACTION TAKEN
October 15, 1992	Enforcement Order Issued
October 20, 1992 through November 19, 1992	30-Day Public Comment Period for Enforcement Order (Fact Sheet)
January 14, 1993	Work Plan for Interim Action with SEPA Documents
February 12, 1993 through March 15, 1993	30-Day Public Comment Period for Interim Action (Fact Sheet)
January 8, 1996	Draft Remedial Investigation Report (Vols I - IV)
April 30, 1996 through May 29, 1996	30-Day Comment Period for Draft Remedial Investigation (English/Spanish fact sheet)
May 1997	Site Update - Fact Sheet
June 12, 1997	Feasibility Study Report
July 25, 1997 through August 23, 1997	30-Day Comment Period for Draft Feasibility Study (English/Spanish Fact Sheet)
February 1999	Draft Cleanup Action Plan (DCAP) with State Environmental Policy Act (SEPA) Checklist and Determination of Nonsignificance
February 18, 1999 through March 22, 1999	30-Day Comment Period for Draft Cleanup Action Plan (DCAP) (English/Spanish Fact Sheet)
March 1999	Responsiveness Summary
	Consent Decree/CAP Amendments with Accompanying 30-Day Comment Period
	Engineering Design Report with Accompanying 30-Day Comment Period

APPENDIX A

FIGURE 1 PORT OF PASCO SITE MAP

APPENDIX B

CURRENT MAILING LIST – PORT OF PASCO

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APPENDIX C
DRAFT CLEANUP ACTION PLAN
FACT SHEETS
AND
LEGAL NOTICES

PORT OF PASCO DRAFT CLEANUP ACTION PLAN (DCAP)



WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

The Washington State Department of Ecology (Ecology) has prepared a Draft Cleanup Action Plan (DCAP) for the Port of Pasco Site (Site) also referred to as the Pasco Bulk Fuel Terminals Site. Under an Enforcement Order issued by Ecology, the Pasco Bulk Fuel Terminals Site Coordinating Group conducted a Remedial Investigation (RI) and Feasibility Study (FS), and interim actions. The RI determined the extent of contamination at the Site and the FS evaluated cleanup alternatives.

The DCAP is a document prepared by Ecology, under the Model Toxics Control Act (MTCA), which describes and justifies the selected cleanup action for the Site based on information from the RI and FS. Ecology invites the public to review and comment on the DCAP. Public comment will be accepted **February 18, 1999 through March 22, 1999**. The box at the right provides information on where to review the DCAP and how to submit written comments.

SITE BACKGROUND

This Site is located on the north bank of the Columbia River in the southeastern part of the City of Pasco, Franklin County, Washington (Figure 1). The Site, most of which is owned by the Port of Pasco (the Port), was a bulk fuel terminal since the 1940s. It served

primarily as a petroleum storage and distribution facility. Other industrial uses have occurred at the Site including storage of agricultural chemicals, soil fumigants, and fertilizers. In September 1992, most of the operating storage tanks were emptied of petroleum products and agricultural chemicals, and tanks not owned by the Port were removed. Usage of the facility for the storage of petroleum products has diminished, although some tank facilities are present on Site. A grain terminal, a truck wash area, and an electrical substation are also still active on the Site.

The Site lies behind dikes maintained by the U.S. Army Corps of Engineers (COE). The COE facilities on the Site include an embankment levee and cutoff wall that parallel the river, a cut-off wall surrounding the Continental Grain facility with two dewatering wells inside these walls, and a 42-inch-diameter interceptor drain located beneath the southern portion of the Site. All of these facilities were constructed prior to 1952. The underground interceptor drain was constructed to dewater the area behind the dikes. Water in the interceptor drain flows by gravity to an outlet approximately 1500 feet west of the tank farm. Following discharge through an oil/water separator, the water flows through an open channel and discharges into the COE collection

FACT SHEET:
FEBRUARY 1999

REPOSITORIES:

Department of Ecology
Eastern Regional Office
4601 N. Monroe, Suite 202
Spokane, WA 99205-1295

Mid-Columbia Library
Pasco Branch
1320 West Hopkins Street
Pasco, WA 99301-5097

For more information and/or submission of written comments, please contact:

Dr. Teresita Bala
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(509) 456-6337 or 1-800-826-7716
e-mail: tbala461@ecy.wa.gov

Please include name and address if you wish your comments to be formally considered.

MAILING LIST:

If you are currently not on the Port of Pasco mailing list and want to be, please call Carol Bergin of Ecology toll free at 1-800-826-7716 or in Spokane at (509) 456-6360.

PUBLIC COMMENT PERIOD FOR THE DRAFT CLEANUP ACTION PLAN:

FEBRUARY 18, 1999 through
MARCH 22, 1999.

pond where water is periodically pumped to the river.

Oil films have been observed on the water discharging from the interceptor drain to the collection pond since the 1950s. Various investigations conducted at the Site have identified petroleum and volatile organic compounds (VOCs) contamination in soils and ground water with free petroleum product floating on ground water. Ecology's Site Hazard Assessment conducted in 1990 ranked this Site a 1 on a scale of 1 to 5, with 1 being the rank of highest risk.

Under the authority of MTCA, Ecology has named the following Potentially Liable Persons (PLPs) for this Site: Burlington Northern Railroad Company; Conoco, Inc.; Crowley Maritime Corporation; Doyle Brothers, Inc.; Piute Energy and Transportation Company; Port of Pasco; Tidewater Barge Lines, Inc.; and the U.S. Army Corps of Engineers. An Enforcement Order issued to the PLPs required the parties to conduct an interim action and a Remedial Investigation (RI)/Feasibility Study (FS). Crowley Maritime Corporation and the Port of Pasco formed the Pasco Bulk Fuel Terminals Site Coordinating Group, and these two parties have complied with the requirements of the Order.

INTERIM ACTIONS

Interim actions started in 1993 and included the following: the installation of a recovery system consisting of a trench and a well with skimmer pumps to recover free product from ground water; and, the evaluation and abatement of risks posed by the free product in a basement sump of a family residence and in utility manholes.

The sump in the basement of the residence was sealed; the Port of Pasco has since purchased this property and this residence has been demolished. The utility companies had been warned of the dangers of vapors in the manholes. As of May 1997, 4,388 gallons of free product have been removed from ground water. Ten additional recovery trenches were installed in the summer of 1997 to remove more free product from ground water.

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS)

The RI, conducted from 1993 to 1995, defined the nature and extent of contamination at this Site. Petroleum contamination was confirmed to be widely distributed throughout subsurface soils, as a dissolved phase in ground water in the shallow aquifer, and as a free phase on top of the water table. Volatile organic compounds in the form of perchloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichloropropane (1,2-DCP) were also found in soils and ground water. Petroleum and VOCs were also detected in the ditch immediately downstream of the oil/water separator. The RI Report includes the maps illustrating these various contaminant plumes.

The FS Report discusses and evaluates alternatives that protect human health and the environment by eliminating, reducing and/or controlling potentials risks posed by the Site. Remedial alternatives for both the ground water and soil are analyzed to determine which combination of alternatives will be most appropriate for the Site. Six Remedial Action Alternatives are proposed and evaluated based on the criteria specified under MTCA

An alternative involving free-product recovery; ground water collection and treatment; in-situ and ex-situ remediation of soils; and, in-situ ground water remediation is selected as the preferred alternative.

DRAFT CLEANUP ACTION PLAN (DCAP)

MTCA requires all cleanup action to be protective of human health and the environment, to comply with cleanup standards and applicable state and federal laws, and to provide for compliance monitoring. In addition, the cleanup action shall use permanent solutions to the maximum extent practicable, provide for a reasonable restoration time frame, and consider public comment on the DCAP.

The DCAP contains the following:

- Description of the Site
- A brief summary of the extent of contamination presented in the RI Report
- Site cleanup levels and points of compliance
- Alternative cleanup actions evaluated in the FS
- Description of the cleanup action
- Evaluation and justification for choosing the cleanup action.

Ecology's proposed cleanup action is the recommended alternative in the FS with some modifications. The proposed cleanup action includes the following:

- Free product recovery using the interim action trenches
- Excavation and treatment by ex-situ bioremediation of

- main tank farm area
- Treatment of soils remaining after excavation using SVE and aeration (depending on results of a proposed SVE pilot test)
- Treatment of ground water discharging to the ditch to meet cleanup levels.
- Remediation of ground water by aeration or combined aeration and soil vapor extraction (SVE)
- Institutional controls will be placed on property deeds to limit ground water use and extraction and to limit future use to commercial use.

A State Environmental Policy Act (SEPA) Checklist for the proposed action has been completed. Ecology has determined that the action does not have a significant adverse impact on the environment and has issued a Determination of Nonsignificance.

WHAT HAPPENS NEXT?

The DCAP will be finalized as soon as all public comments received during the 30-day comment period are addressed. Ecology will then start negotiations with the PLPs for a Consent Decree in order to implement the final Cleanup Action Plan (CAP). The public will have an opportunity to review and comment on the proposed Consent Decree.

ECOLOGY WANTS YOUR COMMENTS!

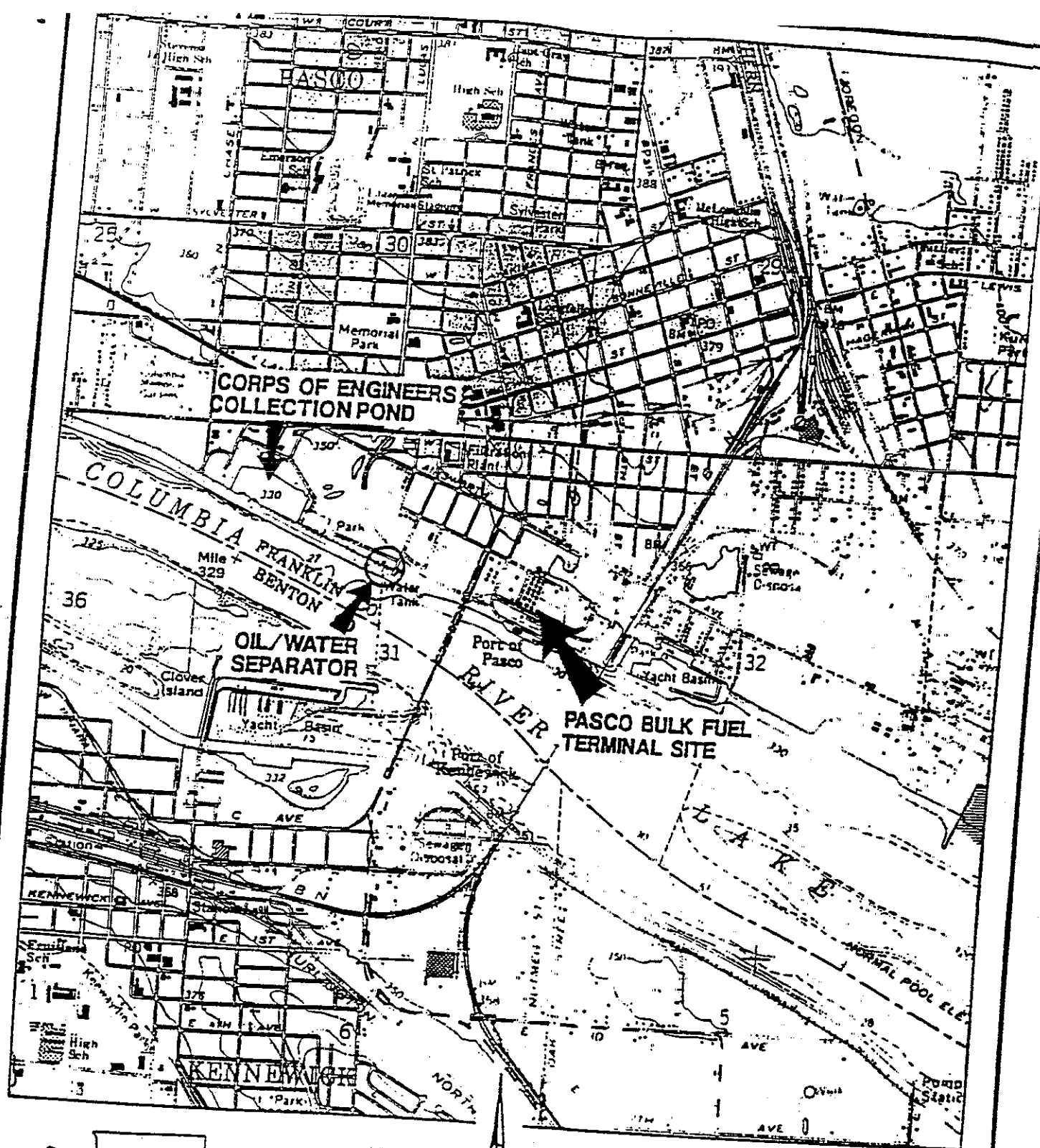
The public comment period represents an opportunity to have your ideas and comments heard by Ecology. You may review and comment on the DCAP

March 22, 1999. Copies are available for public review at the repositories listed in the shaded box on the first page of this fact sheet. To review more detailed Site documents than those in the information repositories, contact Johnnie Harris of Ecology at (509) 456-2751 to schedule an appointment. Files may be reviewed Monday through Thursday, 8-5 p.m. by appointment only.

Please submit written comments by March 22, 1999 to Teresita Bala, Site Manager, at the Ecology address listed in the shaded box on page one. Ecology will review and respond to all written comments received, and will revise the DCAP, if necessary. A Responsiveness Summary will be prepared by Ecology and made available for public review at the repository locations should significant public comments be received.

A Regional Citizen's Advisory Committee (Committee) member may also be contacted for general information or discussion of regional environmental issues. The Pasco Committee member is Sally Simmons. She may be contacted at (509) 372-7395.

However, Technical questions and formal comments regarding the Port of Pasco Site should be addressed to Dr. Teresita Bala at the address and number in the shaded box on page one.



WASHINGTON

REFERENCE: U.S.G.S. 7.5' Quadrangle Map, "Pasco, Washington."



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PROJECT NO.
0759-001.01

Figure 1
PASCO BULK FUEL TERMINAL SITE
PASCO, WASHINGTON
SITE LOCATION MAP

PUERTO DE PASCO BORRADOR DEL PLAN DE ACCION DE LIMPIEZA (DCAP)



WASHINGTON STATE
DEPARTMENT OF
ECOLGY

El Departamento Ecología del Estado de Washington (Ecology) tiene preparado un Borrador del Plan de Acción de Limpieza (DCAP) para el Sitio del Puerto de Pasco (Sitio) también conocido como el Sitio de las Terminales Petroleros de Pasco. Según la Orden de Amonestación emitida por Ecology, el Grupo Coordinador del Sitio de las Terminales Petroleros de Pasco condujo una Investigación Remediadora (RI) y un Estudio de Factibilidad (FS), tanto como para las acciones interinas necesarias. La RI determinó el extenso de la contaminación en el sitio mientras el FS evaluó las alternativas de limpieza.

El DCAP es un documento preparado por Ecology, según el Acta Modelo de Control de Tóxicos (MTCA), lo cual describe y justifica la acción de limpieza seleccionada para el sitio y basada en la información presentada en la RI y el FS. Ecology invita al público a revisar y comentar sobre el DCAP. Se aceptarán los comentarios públicos entre el 18 de febrero de 1999 al 22 de marzo de 1999. Dentro del cuadro especial a la derecha, se encuentra la información sobre donde se puede ir para revisar el DCAP y cómo se deben entregar los comentarios públicos.

ANTECEDENTES DEL SITIO

Este sitio está ubicado en el lado norte del Río Columbia que está localizado en el parte sureste de la ciudad de Pasco, Condado de Franklin, Estado de Washington (vea la figura no. 1). El dueño de la mayor parte del sitio es el Puerto de Pasco (el Puerto). El sitio fue usado como una terminal petrolera desde los años cuarenta (1940s) y todavía sirve como una entidad petrolera de almacenaje y distribución. Otros usos industriales han ocurrido en el sitio incluyendo el almacenaje de químicos agrícolas, fumigantes para el suelo, y fertilizantes. En el mes de septiembre de 1992, casi todos los tanques de almacenaje en uso fueron vaciados de sus productos petroleros y químicos agrícolas. Los tanques que no eran propiedad del Puerto los sacaron del sitio. El uso del sitio para el almacenaje de los productos petroleros ha reducido, aunque todavía quedan algunos tanques en el sitio. También existe en el sitio una terminal de granos, un área para lavar camiones y una subestación eléctrica.

El sitio está ubicado detrás de algunos diques que mantienen el Cuerpo de Ingenieros del Ejercito Nacional (COE). El COE mantiene en el sitio un terraplén y un rastrillo impermeable situados en paralelo con el río, un rastrillo impermeable que encierra el

**BOLETIN INFORMATIVO:
FEBRERO DE 1999**

REPOSITORIOS:

Departamento de Ecología
Oficina Regional Este
4601 N. Monroe, Suite 202
Spokane, WA 99205-1295

Biblioteca Mid-Columbia
Sucursal de Pasco
1320 West Hopkins Street
Pasco, WA 99301-5097

Para recibir más información,
favor contactar a:

Dr. Teresita Bala
Department of Ecology
Toxics Cleanup Program
4601 N. Monroe, Suite 202
Spokane, WA 99205-1295
tel: (509) 456-6337 o 1-800-
826-7716
e-mail: tbala461@ecy.wa.gov

Favor incluir su nombre y
dirección si quiere que se
tomen en cuenta formalmente
sus comentarios.

LISTA DE CORREO:

Si no está en la lista de correo para el Puerto de Pasco y desea estarlo. Favor de contactar a Carol Bergin de Ecology al tel: 1-800-826-7716 o si está en la ciudad de Spokane, tel: (509) 456-6360.

HORARIO PARA SOMETER LOS COMENTARIOS PUBLICOS:

El 18 de febrero de 1999 al 22 de marzo de 1999.

equipo de la empresa "Continental Grain" además dos pozos de agotamiento dentro del rastrillo y, por último, un drenaje de interceptación de 42 pulgadas de diámetro localizado debajo de la parte más al sur del sitio. Todas de estas cosas fueron construidas antes del año 1952. Se construyó el drenaje de interceptación para desaguar el área detrás de los diques. El agua que está dentro del drenaje de interceptación fluye por gravedad al desagüe que está ubicado aproximadamente 1500 pies al oeste del área de los tanques. Después de pasar por un separador de agua/aceite, el agua fluye por medio de un canal abierto hasta que se descarga en un estanque de recogimiento hecho por el COE donde se bombea periódicamente el agua al río.

Desde los años cincuentas, se han observado manchas de aceite encima del agua que está descargando del drenaje de interceptación al estanque de recogimiento. Varias investigaciones del sitio han identificado la contaminación del petróleo y de los compuestos orgánicos volátiles (VOCs) dentro del suelo y agua subterránea. La Evaluación de Peligro del sitio hecho por Ecology en el año 1990 calificó este sitio como 1 en una escala de 1 a 5, con el 1 siendo el grado más alto de riesgo.

Según la autoridad del MTCA, Ecology ha nombrado las siguientes entidades potencialmente responsables (PLPs) para este sitio: "Burlington Northern Railroad Company"; "Conoco, Inc."; "Crowley Maritime Corporation"; "Doyle Brothers, Inc."; "Piute Energy and Transportation Company"; Puerto de Pasco; "Tidewater Barge Lines,

Inc."; y el Cuerpo de Ingenieros del Ejercito Nacional". Una Orden de Amonestación emitida a las PLPs requirió que las entidades conduzcan una acción interina y una RI/FS. La empresa "Crowley Maritime Corporation" y el Puerto de Pasco formaron el Grupo Coordinador del Sitio de las Terminales Petroleros de Pasco, y estas dos entidades han cumplido con los requisitos de la Orden de Amonestación.

ACCIONES INTERINAS

Las acciones interinas comenzaron en 1993 y incluyeron los siguientes: la instalación de un sistema de recogimiento que consiste de una zanja y un pozo con unas bombas superficiales para recoger el producto libre de petróleo del agua subterránea; y la evaluación y mitigación del peligro impuesto por tener el producto libre dentro del sumidero de una casa residencial cercana y en las alcantarillas municipales. Una vez que se selló el sumidero de la casa residencial, el Puerto de Pasco la compró y destruyó la propiedad. También, se avisaron a las compañías de servicios municipales del peligro de los vapores dentro de las alcantarillas municipales. Hasta la fecha de mayo de 1997, se han sacado unos 4,388 galones de producto libre de petróleo del agua subterránea. Diez zanjas de recogimiento adicionales fueron instaladas durante el verano de 1997 para sacar más producto libre de petróleo del agua subterránea.

INVESTIGACION REMEDIADORA/ESTUDIO DE FACTIBILIDAD (RI/FS)

La RI, que se condujo entre los años 1993 al 1995, definieron la

extensión y tipo de la contaminación en este sitio. Se confirmó que la contaminación petrolera está distribuida: por muchos de los subsuelos, como una fase disuelta dentro del agua subterránea del acuífero poco profundo y como una fase libre encima del nivel freático. También, se encontraron dentro suelo y el agua subterránea los siguientes compuestos orgánicos volátiles (VOCs) de percloruroetileno (PCE), tricloruroetileno (TCE) y bicloruropropano-1,2 (1,2-DCP). Además, se encontraron el petróleo y los VOCs dentro de la zanja inmediatamente después del separador de aceite/agua. El reporte del RI incluye los mapas que ilustran los varios desparros de contaminación.

El reporte FS discute y evalúa las alternativas que protegen a la salud humana y el medio ambiente por eliminar, reducir y/o controlar los riesgos potenciales existentes en el sitio. Las alternativas remediadoras para el suelo y el agua subterránea estaban analizadas para determinar cuál combinación sería la más apropiada para el sitio. Se han propuesto y evaluado seis alternativas de acción remediadora según el criterio especificado en la regulación MTCA. Se seleccionó la alternativa preferida que contiene el recogimiento del producto de fase libre, el recogimiento y el tratamiento del agua subterránea; el remedio de los suelos dentro y fuera del sitio, tanto como el remedio del agua subterránea debajo del sitio.

ACCION DE LIMPIEZA (DCAP)

La regulación MTCA requiere que todas las acciones de limpieza: protejan la salud humana y el medio ambiente, cumplen con los estándares de limpieza tanto como las reglas estatales y federales aplicables, e incluyen el muestreo cumplidor. Además, la acción de limpieza tendría que: utilizar las soluciones permanentes al extenso máximo practicable, asegurar un horario razonable para la limpieza, tanto como considerar los comentarios públicos sobre el DCAP.

El DCAP contiene las siguientes partes:

- Una descripción del sitio;
- Un resumen breve sobre el extenso de la contaminación presentada en el reporte RI;
- Los niveles de limpieza del sitio y los lugares específicos de cumplimiento;
- Las acciones alternativas de limpieza que se evaluaron en el reporte FS;
- Una descripción de la acción de limpieza;
- Una evaluación y justificación para la selección de la acción de limpieza.

La acción de limpieza propuesta por Ecology es la alternativa recomendable seleccionada por el reporte FS con algunas modificaciones. La acción propuesta incluye las siguientes partes:

- El recogimiento del producto libre usando las zanjas de la acción interina;
- La excavación de los suelos contaminados del área de los

tanques perforados y el tratamiento bioremediador de estos mismos en el sitio;

- El tratamiento de los suelos que quedan después de la excavación y la aeración de ellos (dependiendo de los resultados de la prueba piloto de SVE);
- El tratamiento del agua subterránea que descarga a la zanja para cumplir con los niveles de limpieza;
- La remediación del agua subterránea por la aeración o la combinación de aeración y la extracción de vapores del suelo (SVE);
- Los controles institucionales (hipotecas) estarán puesto dentro de los títulos de propiedad para limitar el uso del agua subterránea y su extracción tanto para limitar el uso futuro de la misma agua.

Se completó el formulario del Acta Estatal de la Política Ambiental (SEPA) para la acción propuesta. Ecology determinó que la acción no tiene un impacto adverso significativo para el medio ambiente y así emitió una Determinación de Insignificancia (DNS).

¿QUE PASARA AHORA?

Se finalizará el DCAP tan pronto que se contesten todos los comentarios públicos recibidos durante el horario de 30 días. Entonces, Ecology comenzará las negociaciones con las PLPs para formular un Decreto de Consentimiento que implementará el Plan de Acción de Limpieza final (CAP). El público tendrá una oportunidad para revisar y comentar sobre el Decreto de Consentimiento propuesto.

ECOLOGY QUIERE SUS COMENTARIOS!

El horario para entregar sus comentarios públicos representa una oportunidad para que Ecology escuche sus ideas. Podría revisar y comentar sobre el DCAP entre el 18 de febrero de 1999 al 22 de marzo de 1999. Se mantendrán copias disponibles para la revisión del público en los repositorios listados en el cuadro especial de la primera página de este boletín informativo. Para revisar unos documentos más detallados que los de los repositorios, se debe contactar a Johnnie Harris de Ecology con tel: (509) 456-2751 y hacer una cita. Se pueden ver unos documentos más detallados de lunes a jueves, 8-5 p.m pero solamente por medio de una cita.

Favor entregar los comentarios escritos antes el 22 de marzo de 1999 a Teresita Bala, Gerente del Sitio, con la dirección de Ecology listada en el cuadro especial de la primera página. Ecology revisará y responderá a todos los comentarios escritos recibidos, y si es necesario revisará el DCAP. Si se reciben muchos comentarios públicos, Ecology preparará un Resumen Respondedor que estará disponible para la revisión del público en los repositorios mencionados arriba.

También se puede contactar a un miembro del Comité Consejero Regional de Ciudadanos (Comité) para conseguir información general o para discutir los asuntos regionales del medio ambiente. El miembro del Comité se llama Sally Simmons. Se puede contactar al tel: (509) 372-7395.

Sin embargo, si tiene preguntas técnicas o comentarios formales sobre el sitio del Puerto de Pasco,

número telefónico listados en el
cuadro especial de la primera
página.



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Figure 1
PASCO BULK FUEL TE
PASCO, WASHIN
SITE LOCATION



WASHINGTON

0 2000 4000
SCALE (ft)

REFERENCE USGS 7.5

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deposes and says, I am the Legal Clerk of the Tri-City Herald, a
daily newspaper. That said newspaper is a legal newspaper and
has been approved as a legal newspaper by order of the superior
court in the county in which it is published and it is now and has
been for more than six months prior to the date of the publication
hereinafter referred to, published continually as a daily newspa-
per in Benton County, Washington. That the attached is a true
copy of a #0301 DCAP / PORT OF PASCO as it
was printed in the regular and entire issue of the Tri-City Herald
itself and not in a supplement thereof, 1 time(s),
commencing on 02/28/1999, and ending on
02/28/1999, and that said newspaper was regulary
distributed to its subscribers during all of this period.

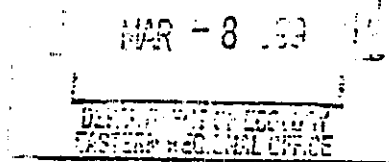
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DAY OF February, 1999

Janice Kay Sherry

Notary public in and for the State of Wash-
ington, residing at Richland



PORT OF PASCO
DRAFT CLEANUP ACTION PLAN (DCAP)

The Washington State Department of Ecology (Ecology) invites the public to review and comment on the Draft Cleanup Action Plan (DCAP) for the Port of Pasco Site. The Site lies behind dikes maintained by the U.S. Army Corps of Engineers and is located on the north bank of the Columbia River in the southeastern part of the City of Pasco, Franklin County, Washington. The Site served as a bulk fuel terminal, primarily for petroleum storage and distribution. However, other industrial uses have occurred, including storage of agricultural chemicals, soil fumigants and fertilizers.

Ecology's proposed cleanup action is the recommended alternative in the Feasibility Study with some modification. It includes free product recovery; excavation and treatment by ex-situ bioremediation of contaminated soils from the main tank farm area; treatment of remaining soils using soil vapor extraction (SVE) and aeration; treatment of ground water discharging to the ditch to meet cleanup levels; remediation of ground water by aeration or combined aeration and SVE; and institutional controls on property deeds to limit ground water use/extraction and to limit future use to commercial.

Copies of the Draft Cleanup Action Plan are available for public review at the Mid Columbia Library, Pasco Branch, 1320 West Hopkins Street, Pasco, WA and Ecology's Eastern Regional Office located at 4601 North Monroe in Spokane, WA. Written comments should be submitted to Dr. Teresita Bala, Department of Ecology, Toxics Cleanup Program, N. 4610 Monroe, Spokane, WA 99205-1295 or via e-mail at tbala461@ecv.wa.gov. Please include your name, address and phone number so comments may be answered. For more information contact Dr. Bala at (509) 456-6337 or 1-800-826-7716.

A Regional Citizen's Advisory Committee member may also be contacted for general information or discussion of regional environmental issues. The Pasco Committee member is Sally Simmons at (509) 372-7395. However, technical questions and formal comments regarding the Port of Pasco Site should be addressed to Dr. Bala. Should significant public comments be received, a Responsiveness Summary will be prepared by Ecology and made available at the Mid-Columbia Library and the Eastern Regional Office of Ecology.

Public comments will be accepted February 18, 1999 through March 22, 1999.

PASCO, WASHINGTON 99302-2608
PHONE (509) 582-1500

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been for more than six months prior to the date of the publication
hereinafter referred to, published countinually as a daily newspa-
per in Benton County, Washington. That the attached is a true
copy of a #0302 DCAF SPANISH PORT OF PASCO as it
was printed in the regular and entire issue of the Tri-City Herald
itself and not in a supplement thereof, 1 time(s),
commencing on 02/28/1999, and ending on
02/28/1999, and that said newspaper was regulary
distributed to its subscribers during all of this period.

Ann Henderson

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DAY OF February, 1999

Janice Kay Sherry

Notary public in and for the State of Wash-
ington, residing at Richland

BORRADOR DEL PLAN DE ACCION DE LIMPIEZA (DCAP)

El Departamento de Ecología del Estado de Washington (Ecology) invita al público revisar y comentar sobre el Borrador del Plan de Acción de Limpieza (DCAP) para el sitio del Puerto de Pasco. El sitio queda detrás de unos diques mantenidos por el Cuerpo de Ingenieros del Ejercito Nacional y está ubicado en la ribera norte del Río Columbia en la parte sureste de la ciudad de Pasco, Condado de Franklin, Estado de Washington. El sitio sirvió como una terminal petrolera, principalmente para el almacenaje y distribución de petróleo. Sin embargo, otros usos industriales han ocurrido, incluyendo el almacenaje de químicos agrícolas, fumigantes para el suelo y fertilizantes.

La acción de limpieza propuesta por Ecology es la alternativa recomendada en el Estudio de Factibilidad (FS) con algunas modificaciones. El reporte FS incluye el recogimiento del producto libre; la excavación de los suelos contaminados del área de los tanques y el tratamiento por la bioremediación fuera del sitio de los mismos suelos; el tratamiento de los suelos que quedan usando la extracción de los vapores de suelo (SVE) y la aeración; el tratamiento del agua subterránea que descarga a la zanja para que esta cumple con los niveles de limpieza; la remediación del agua subterránea por medio de aeración o por la combinación de aeración y la SVE; y los controles institucionales sobre títulos de propiedad para limitar el uso/extracción del agua subterránea tanto como para limitar el uso comercial futuro del agua.

Hay copias del Borrador del Plan de Acción de Limpieza disponibles para la revisión pública en la biblioteca Mid Columbia, Surcursal Pasco, 1320 West Hopkins Street, Pasco, WA y en la Oficina Regional Este de Ecology con dirección de 4601 North Monroe en la ciudad de Spokane, Estado de WA. Se deben entregar todos los comentarios escritos a Dra. Teresita Bala, Department of Ecology, Toxics Cleanup Program, N. 4610 Monroe, Spokane, WA 99205-1295, o por medio del correo electrónico (e-mail): tbala461@ecy.wa.gov. Favor incluir su nombre, dirección y número telefónico para que se puede contestar sus comentarios. Para recibir más información se debe contactar a Dra. Bala a tel: (509) 456-6337 o 1-800-826-7716.

También, se puede contactar a un miembro del Comité Consejero Regional de Ciudadanos para obtener información general o para discutir los asuntos regionales del medio ambiente. El miembro del Comité de Pasco se llama Sally Simmons. Su número telefónico es el (509) 372-7395. Sin embargo, si tiene preguntas técnicas o comentarios formales sobre el sitio del Puerto de Pasco, se debe mandarlos a la Dra. Bala. Si el Departamento recibe una cantidad significativa de comentarios públicos, Ecology preparará un Resumen Respondedor que se tendrá disponible en la biblioteca Mid-Columbia y en la Oficina Regional Este de Ecology.

Se recibirán los comentarios públicos entre el 18 de febrero de 1999 al 22 de marzo de 1999.

APPENDIX D

GLOSSARY

AGREED ORDER: A legal document issued by Ecology which formalizes an agreement between the department and potentially liable persons (PLPs) for the actions needed at a site. An agreed order is subject to public comment. If an order is substantially changed, an additional comment period is provided.

Applicable State and Federal Law: All legally applicable requirements and those requirements that Ecology determines are relevant and appropriate requirements.

Area Background: The concentrations of hazardous substances that are consistently present in the environment in the vicinity of a site which are the result of human activities unrelated to releases from that site.

Carcinogen: Any substance or agent that produces or tends to produce cancer in humans.

Chronic Toxicity: The ability of a hazardous substance to cause injury or death to an organism resulting from repeated or constant exposure to the hazardous substance over an extended period of time.

Cleanup: The implementation of a cleanup action or interim action.

Cleanup Action: Any remedial action, except interim actions, taken at a site to eliminate, render less toxic, stabilize, contain, immobilize, isolate, treat, destroy, or remove a hazardous substance that complies with cleanup levels; utilizes permanent solutions to the maximum extent practicable; and includes adequate monitoring to ensure the effectiveness of the cleanup action.

CLEANUP ACTION PLAN: A document which identifies the cleanup action and specifies cleanup standards and other requirements for a particular site. After completion of a comment period on a Draft Cleanup Action Plan, Ecology will issue a final Cleanup Action Plan.

Cleanup Level: The concentration of a hazardous substance in soil, water, air or sediment that is determined to be protective of human health and the environment under specified exposure conditions.

Cleanup Process: The process for identifying, investigating, and cleaning up hazardous waste sites.

CONSENT DECREE: A legal document, approved and issued by a court which formalizes an agreement reached between the state and potentially liable persons (PLPs) on the actions needed at a site. A decree is subject to public comment. If a decree is substantially changed, an additional comment period is provided.

Containment: A container, vessel, barrier, or structure, whether natural or constructed, which confines a hazardous substance within a defined boundary and prevents or minimizes its release into the environment.

CONTAMINANT: Any hazardous substance that does not occur naturally or occurs at greater than natural background levels.

Enforcement Order: A legal document, issued by Ecology, requiring remedial action. Failure to comply with an enforcement order may result in substantial liability for costs and penalties. An enforcement order is subject to public comment. If an enforcement order is substantially changed, an additional comment period is provided.

Environment: Any plant, animal, natural resource, surface water (including underlying sediments), ground water, drinking water supply, land surface (including tidelands and shorelands) or subsurface strata, or ambient air within the state of Washington.

Exposure: Subjection of an organism to the action, influence or effect of a hazardous substance (chemical agent) or physical agent.

EXPOSURE PATHWAYS: The path a hazardous substance takes or could take from a source to an exposed organism. An exposure pathway describes the mechanism by which an individual or population is exposed or has the potential to be exposed to hazardous substances at or originating from the site. Each exposure pathway includes an actual or potential source or release from a source, an exposure point, and an exposure route. If the source exposure point differs from the source of the hazardous substance, exposure pathway also includes a transport/exposure medium.

Facility: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly-owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a

hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed or, placed, or otherwise come to be located.

FEASIBILITY STUDY (FS): A study to evaluate alternative cleanup actions for a site. A comment period on the draft report is required. Ecology selects the preferred alternative after reviewing those documents.

Free Product: A hazardous substance that is present as a nonaqueous phase liquid (that is, liquid not dissolved in water).

GROUNDWATER: Water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater occurs in sufficient quantities that it can be used for drinking water, irrigation, and other purposes.

HAZARDOUS SITES LIST: A list of sites identified by Ecology that requires further remedial action. The sites are ranked from 1 to 5 to indicate their relative priority for further action.

Hazardous Substance: Any dangerous or extremely hazardous waste as defined in RCW 70.105.010 (5) (any discarded, useless, unwanted, or abandoned substances including, but not limited to, certain pesticides, or any residues or containers of such substances which are disposed of in such quantity or concentration as to pose a substantial present or potential hazard to human health, wildlife, or the environment because such wastes or constituents or combinations of such wastes; (a) have short-lived, toxic properties that may cause death, injury, or illness or have mutagenic, teratogenic, or carcinogenic properties; or (b) are corrosive, explosive, flammable, or may generate pressure through decomposition or other means,) and (6) (any dangerous waste which (a) will persist in a hazardous form for several years or more at a disposal site and which in its persistent form presents a significant environmental hazard and may affect the genetic makeup of man or wildlife; and is highly toxic to man or wildlife; (b) if disposed of at a disposal site in such quantities as would present an extreme hazard to man or the environment), or any dangerous or extremely dangerous waste as designated by rule under Chapter 70.105 RCW: any hazardous substance as defined in RCW 70.105.010 (14) (any liquid, solid, gas, or sludge, including any material, substance, product, commodity, or waste, regardless of quantity, that exhibits any of the characteristics or criteria of hazardous waste as described in rules adopted under this chapter,) or any hazardous

substance as defined by rule under Chapter 70.105 RCW; petroleum products.

Hazardous Waste Site: Any facility where there has been a confirmation of a release or threatened release of a hazardous substance that requires remedial action.

Independent Cleanup Action: Any remedial action conducted without Ecology oversight or approval, and not under an order or decree.

Initial Investigation: An investigation to determine that a release or threatened release may have occurred that warrants further action.

INTERIM ACTION: Any remedial action that partially addresses the cleanup of a site.

Mixed Funding: Any funding, either in the form of a loan or a contribution, provided to potentially liable persons from the state toxics control account.

MODEL TOXICS CONTROL ACT (MTCA): Washington State's law that governs the investigation, evaluation and cleanup of hazardous waste sites. Refers to RCW 70.105D. It was approved by voters at the November 1988 general election and known is as Initiative 97. The implementing regulation is WAC 173-340.

MONITORING WELLS: Special wells drilled at specific locations on or off a hazardous waste site where groundwater can be sampled at selected depths and studied to determine the direction of groundwater flow and the types and amounts of contaminants present.

Natural Background: The concentration of hazardous substance consistently present in the environment which has not been influenced by localized human activities.

National Priorities List (NPL): EPA's list of hazardous waste sites identified for possible long-term remedial response with funding from the federal Superfund trust fund.

Owner or Operator: Any person with any ownership interest in the facility or who exercises any control over the facility; or in the case of an abandoned

facility, any person who had owned or operated or exercised control over the facility any time before its abandonment.

POLYNUCLEAR AROMATIC HYDROCARBON (PAH): A class of organic compounds, some of which are long-lasting and carcinogenic. These compounds are formed from the combustion of organic material and are ubiquitous in the environment. PAHs are commonly formed by forest fires and by the combustion of fossil fuels.

Potentially Liable Persons (PLPs): Any person whom Ecology finds, based on credible evidence, to be liable under authority of RCW 70.105D.040.

Public Notice: At a minimum, adequate notice mailed to all persons who have made a timely request of Ecology and to persons residing in the potentially affected vicinity of the proposed action; mailed to appropriate news media; published in the local (city or county) newspaper of largest circulation; and opportunity for interested persons to comment.

Public Participation Plan: A plan prepared under the authority of WAC 173-340-600 to encourage coordinated and effective public involvement tailored to the public's needs at a particular site.

Recovery By-Products: Any hazardous substance, water, sludge, or other materials collected in the free product removal process in response to a release from an underground storage tank.

Release: Any intentional or unintentional entry of any hazardous substance into the environment, including, but not limited to, the abandonment or disposal of containers of hazardous substances.

REMEDIAL ACTION: Any action to identify, eliminate, or minimize any threat posed by hazardous substances to human health or the environment, including any investigative and monitoring activities of any release or threatened release of a hazardous substance and any health assessments or health effects studies.

REMEDIAL INVESTIGATION: A study to define the extent of problems at a site. When combined with a study to evaluate alternative cleanup actions it is referred to as a Remedial Investigation/Feasibility Study (RI/FS). In both cases, a comment period on the draft report is required.

Responsiveness Summary: A compilation of all questions and comments to a document open for public comment and their respective answers/replies by Ecology. The Responsiveness Summary is mailed, at a minimum, to those who provided comments and its availability is published in the Site Register.

RISK ASSESSMENT: The determination of the probability that a hazardous substance, when released into the environment, will cause an adverse effect in exposed humans or other living organisms.

Sensitive Environment: An area of particular environmental value, where a release could pose a greater threat than in other areas including: wetlands; critical habitat for endangered or threatened species; national or state wildlife refuge; critical habitat, breeding or feeding area for fish or shellfish; wild or scenic river; rookery; riparian area; big game winter range.

Site: See Facility.

Site Characterization Report: A written report describing the site and nature of a release from an underground storage tank, as described in WAC 173-340-450 (4) (b).

Site Hazard Assessment (SHA): An assessment to gather information about a site to confirm whether a release has occurred and to enable Ecology to evaluate the relative potential hazard posed by the release. If further action is needed, an RI/FS is undertaken.

Site Register: Publication issued every two weeks of major activities conducted statewide related to the study and cleanup of hazardous waste sites under the Model Toxics Control Act. To receive this publication, please call (360) 407-7200.

Surface Water: Lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the state of Washington or under the jurisdiction of the state of Washington.

TCP: Toxics Cleanup Program at Ecology

TOTAL PETROLEUM HYDROCARBONS (TPH): A scientific measure of the sum of all petroleum hydrocarbons in a sample (without distinguishing one hydrocarbon from another). The "petroleum hydrocarbons" include

compounds of carbon and hydrogen that are derived from naturally occurring petroleum sources or from manufactured petroleum products (such as refined oil, coal, and asphalt).

TOXICITY: The degree to which a substance at a particular concentration is capable of causing harm to living organisms, including people, plants and animals.

Underground Storage Tank (UST): An underground storage tank and connected underground piping as defined in the rules adopted under Chapter 90.76 RCW.

Washington Ranking Method (WARM): Method used to rank sites placed on the hazardous sites list. A report describing this method is available from Ecology.