

**STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY**

In the Matter of Remedial Action by:

AGREED ORDER

Port of Tacoma  
Arkema 2901 Taylor Way Site  
Tacoma, WA 98421

No. DE 5668

TO: Port of Tacoma  
P.O. Box 1837  
Tacoma, WA 98401-1837

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## **I. INTRODUCTION**

The mutual objective of the State of Washington, Department of Ecology (Ecology) and the Port of Tacoma (Port) under this Agreed Order (Order) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Order requires the Port to complete a remedial investigation, feasibility study, draft cleanup action plan, and an interim action work plan. Ecology believes the actions required by this Order are in the public interest.

## **II. JURISDICTION**

This Agreed Order is issued pursuant to the Model Toxics Control Act (MTCA), RCW 70.105D.050(1).

## **III. PARTIES BOUND**

This Agreed Order shall apply to and be binding upon the Parties to this Order, their successors and assigns. The undersigned representative of each party hereby certifies that he or she is fully authorized to enter into this Order and to execute and legally bind such party to comply with this Order. The Port agrees to undertake all actions required by the terms and conditions of this Order. No change in ownership or corporate status shall alter the Port's responsibility under this Order. The Port shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Order.

## **IV. DEFINITIONS**

Unless otherwise specified herein, the definitions set forth in Chapter 70.105D RCW and Chapter 173-340 WAC shall control the meanings of the terms in this Order.

A. Site: The Site is referred to as the **Arkema 2901 Taylor Way Site** and is generally located at 2901 Taylor Way in Tacoma, Washington, but also includes an adjacent property known as the Wypenn property. The Site is located on a peninsula that lies adjacent to the Hylebos Waterway in Commencement Bay. The Site is defined by the extent of contamination caused by the release of hazardous substances at the Site. Based upon factors currently known to Ecology, the Site is more particularly described in the Site Diagram (Exhibit A). The Site constitutes a Facility under RCW 70.105D.020(5).

B. Parties: Refers to the State of Washington Department of Ecology and the Port of Tacoma.

C. Potentially Liable Person (PLP): Refers to the Port for purposes of this Agreed Order. Other PLPs identified with respect to this site include Arkema, Inc. (formerly known as (f/k/a) Atofina Chemicals, Inc., f/k/a Elf Atochem North America, Inc., f/k/a Atochem North America, Inc., f/k/a Pennwalt Corporation, a Pennsylvania Corporation) (hereinafter "Arkema").

D. Agreed Order or Order: Refers to this Order and each of the exhibits to this Order. All exhibits are integral and enforceable parts of this Order. The terms "Agreed Order" or "Order" shall include all exhibits to this Order.

E. Property: Consists of the former Arkema chemical manufacturing facility, located at 2901 Taylor Way in Tacoma, Washington, and the adjacent property known as the Wypenn property.



## V. FINDINGS OF FACT

Ecology makes the following findings of fact, without any express or implied admissions of such facts by the Port:

A. Arkema operated a chloro-alkali manufacturing facility at 2901 Taylor Way that produced a variety of chemical products, including chlorine, sodium hydroxide (caustic soda), sodium chlorate, hydrochloric acid, and sodium arsenite (also known as Penite). Manufacturing operations ceased in 1997 and all of the plant chemical production facilities have been demolished.

B. Waste material (sludges, washdown water, and filter-cake) resulting from the production of Penite, an herbicide containing arsenic, was deposited in a number of pits (Penite pits) generally located within the central portion of the former manufacturing area. Leaching of arsenic from the pits contaminated soil and groundwater beneath the Site, including sediment along the shoreline. Sampling from 2003 to 2007 for arsenic in soil and groundwater indicated concentrations greater than 1,000 milligrams per kilogram (mg/kg) and 100 milligrams per liter (mg/l), respectively.

C. Wastewaters from plant production activities were discharged to portions of the Site, including areas referred to as "Taylor Lake" and "Waggoners Wallow." The Taylor Lake area consisted of several ponds, including the "asbestos pond," "chlorate pond," and "cell room (brine) pond." More specifically:

1. High pH wastewater (associated with the production of sodium hydroxide) was discharged to locations within the Site, including "Taylor Lake" generally, and the cell room brine pond in particular. These discharges created elevated pH conditions

(up to approximately pH 12) in groundwater beneath portions of the Site. In-situ treatment of groundwater began in 2004, in part to reduce the pH of groundwater.

2. Wastewater associated with off-gas chlorine production, containing volatile organic compounds (VOCs) including chloroform, appears to have been discharged to Waggoners Wallow and the cell room brine pond. VOC compounds detected in groundwater samples collected between 2003 and 2007 included chloroform (up to 403 mg/l) and tetrachloroethene (up to 46.5 mg/l). Other detected VOCs include carbon tetrachloride, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride.

D. Beginning in 1981, Arkema conducted investigations at the Site to locate sources of suspected contamination. Those investigations documented soil and groundwater contamination at the Site.

E. In 1987, Arkema and Ecology entered into Consent Decree No. 87-2-01199-0 under RCW 90.48 to provide a frame-work for an investigation and cleanup to prevent or mitigate the release of pollutants from the Site and/or contamination of the waters of the state. The Consent Decree required Arkema to conduct a remedial investigation, a focused feasibility study, design report, and remediation in the uppermost of three groundwater aquifers.

F. Arkema completed the work tasks described in Consent Decree No. 87-2-01199-0 (V. Work To Be Performed). The scope of work set forth in the decree included sampling of groundwater in all three aquifers (upper, middle, and lower) and sampling and analysis of sludge and supernatant, surface water, and soil with analysis for pH and various chemicals (VOCs and total metals). When reporting its findings, Arkema was to recommend appropriate remedial actions to mitigate groundwater contamination at the Site, and to implement the plan once approved by Ecology. The decree also specifically required implementation of an approved

alternative for mitigating arsenic contamination in the uppermost aquifer. Arkema completed the following actions under Ecology's Consent Decree:

1. Excavated and treated on-Site soil from the 1985 sodium chromate spill. Eliminated plant discharge to the cell room brine pond in 1990.
2. Excavated and removed approximately 3,000 cubic yards of arsenic-contaminated Penite sludge in early 1990. Removed an additional 185 cubic yards in 2003.
3. Excavated and disposed, off Site, of approximately 1,200 cubic yards from the asbestos pond in 1990.
4. Installed a sheet pile wall in 1990 along the shoreline to minimize the discharge of contaminated groundwater to the waterway. The sheet pile wall was extended in 1995 and 1997.
5. Installed and operated a VOC treatment system where high groundwater VOC concentrations were detected in the Waggoners Wallow area. The system consisted of groundwater extraction wells, two vapor extraction wells, a vertical air stripper, vacuum blower, thermal oxidation unit, and a caustic adsorption unit. The system operated between September 1996 and December 1999.
6. Installed and operated a pump and treat containment system downgradient of the plant area containing the highest arsenic concentrations (behind the sheet pile wall). Ecology required monitoring to determine the ability of the extraction system to maintain hydrologic control upland of the sheet pile wall. The system was estimated to have removed approximately 22,260 pounds of arsenic from groundwater between October 1992 and December 2003.
7. Implemented a trimester groundwater monitoring program.

G. Arkema performed other remedial actions, beyond the scope of work set forth in the Consent Decree (V. Work To Be Performed), including the following:

1. Consistent with the 1990 Final Remedial Action Plan (FRAP) prepared by ICF Technology, Inc., Arkema submitted a 2003 Residual Phase Arsenic Stabilization Work Plan prepared by Environmental Resources Management (ERM). In accordance with the FRAP, the Work Plan identified the approach to transition the Site groundwater remediation effort from the extraction and treatment phase, designed to remove solubilized mobile arsenic, to a stabilization phase designed to immobilize the residual arsenic. Ecology approved the ERM Work Plan, with modifications, on October 22, 2003. Arkema implemented an in-situ (injection) treatment program using hydrogen peroxide and ferric chloride between November 2001 and June 2004. This treatment chemically altered the arsenic into a form that adsorbs to Site soils, and thus is removed from the groundwater. The *in-situ* treatment process was later expanded, and results were documented in a 2005 Residual Phase Arsenic Stabilization Completion Report.

H. Substantial remediation work was completed under the Consent Decree pursuant to Ecology's authority under RCW 90.48. Additional remediation work is required consistent with the Model Toxics Control Act (MTCA) under RCW 70.105D, and its implementing regulations Chapter 173-340 WAC.

I. Site groundwater exceeds MTCA cleanup criteria for a number of toxic substances, including arsenic, lead, copper, nickel, zinc, hexachlorobutadiene, 4,4'-DDT, DDD, and DDE, chloroform, tetrachloroethene, and trichloroethene. The maximum recently measured arsenic

concentration in groundwater is 184,000 micrograms per liter (ug/l). For comparison purposes, note that the MTCA Method A cleanup level for arsenic in groundwater is 5 ug/l.

J. The Site lies within the Commencement Bay Nearshore Tideflats (CB/NT) Superfund site. The remedial action plan for contaminated sediments and sources within the CB/NT Superfund Site is described in the 1989 Record of Decision (ROD). Section 5.2 of the ROD describes the importance of coordination between source control and sediment remediation work. In 1989, a cooperative agreement was established between the U.S. Environmental Protection Agency (EPA) and Ecology to define the responsibilities of each agency at the CB/NT site. Under the agreement, Ecology took the lead for upland source control and EPA took the lead for remediation of sediment contamination in the area referred to as the Head of the Hylebos Waterway. The Port acknowledges the coordination roles between EPA and Ecology regarding contamination found within soil, groundwater, sediment, and surface water. By letter of August 24, 2010, the Port committed to pay EPA oversight costs, pursuant to the terms of the Head of the Hylebos Waterway Consent Decree, that EPA incurs and allocates to the Arkema shorelines and related upland areas with respect to work being performed under this Agreed Order.

K. The 2000 Explanation of Significant Differences (ESD) documents changes to the ROD, including elaboration on the performance criteria for the cleanup plans. Section IV of the ESD describes the specific performance criteria that the remedial actions must meet to ensure that the cleanup is protective of human health and the environment.

L. EPA entered into Consent Decree No. CO4-5319-RBL for Remedial Design and Remedial Action with Arkema and General Metals of Tacoma (also referred to collectively as the Head of Hylebos Cleanup Group) that required sediment dredging throughout the Head of the Hylebos, and sediment remediation along the Arkema shoreline that consisted of intertidal/bank cleanup, an intertidal cap, and a subtidal cap.

M. Pursuant to the EPA Consent Decree, Arkema remediated sediments along the intertidal and subtidal portions of the shoreline and installed sediment caps between 2004 and 2006. EPA's December 16, 2005 approval of Arkema Southeast Shoreline Subtidal Cap summarized performance standards, explained that attainment of performance standards would be required for certification of remedial action completion under the Consent Decree, and approved construction of the subtidal cap.

N. The Port purchased the Property from Arkema in May 2007. Arkema provided Notice of Transfer of Title under Consent Decree No. 87-2-01199-0 and C04-5319-RBL on June 8, 2007.

O. Chemical data available at the time of the purchase of the Property suggest that contaminated groundwater is being released to the Hylebos Waterway.

P. The Port submitted a draft Remedial Investigation (RI) Work Plan (including a Health & Safety Plan, Sampling and Analysis Plan, and Quality Assurance Project Plan) to Ecology and EPA in July 2008. The work plan was informally reviewed by Ecology and EPA, and the Port incorporated those agencies' comments into a revised draft work plan. A final work plan has not been approved by Ecology. The Port completed independent work on the Arkema Site during

the second half of 2008 based on this draft RI Work Plan. The Port has provided Ecology with data collected during 2008, along with data previously collected by Arkema.

## VI. ECOLOGY DETERMINATIONS

A. The Port is an "owner or operator" as defined in RCW 70.105D.020(12) of a "facility" as defined in RCW 70.105D.020(4).

B. Based upon all factors known to Ecology, a "release" or "threatened release" of "hazardous substance(s)" as defined in RCW 70.105D.020(25) and RCW 70.105D.020(10), respectively, has occurred at the Site.

C. Based upon credible evidence, Ecology issued a PLP status letter to the Port dated July 24, 2007, pursuant to RCW 70.105D.040, -.020(16) and WAC 173-340-500. After providing for notice and opportunity for comment, reviewing any comments submitted, and concluding that credible evidence supported a finding of potential liability, Ecology issued a determination that the Port is a PLP under RCW 70.105D.040 and notified the Port of this determination by letter dated March 26, 2008.

D. Pursuant to RCW 70.105D.030(1) and -.050(1), Ecology may require PLPs to investigate or conduct other remedial actions with respect to any release or threatened release of hazardous substances, whenever it believes such action to be in the public interest. Based on the foregoing facts, Ecology believes the remedial actions required by this Order are in the public interest.

E. Under WAC 173-340-430, an interim action is a remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or

substantially reducing one or more pathways for exposure to a hazardous substance, that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed, or that is needed to provide for completion of a site hazard assessment, remedial investigation/feasibility study or design of a cleanup action.

The Port desires to remediate the Wypenn property so that this property may be transferred to the Puyallup Tribe of Indians for redevelopment. This Interim Action is warranted to protect human health and the environment, based on the factors listed above. The Wypenn Area interim action is more fully described in the Scope of Work (Exhibit B). Other circumstances may trigger the need for an additional interim action at the Site.

F: Adjacent or nearby properties, as shown on Exhibit A, are either undergoing or have completed remediation under separate Ecology or EPA orders, including:

- **Hylebos Waterway [EPA Consent Decree C055319RBL (September 2004)]**
- **Arkema Mound [Ecology Agreed Order DE 6129 (November 2008)]**
- **Petroleum Reclaiming (RCRA Corrective Action WAD 980511729)**
- **Kaiser Aluminum [Ecology Consent Decree 902062096 (July 1990)]**
- **Puyallup Land Transfer [EPA Consent Decree C94-5648 (September 1994)]**
- **Reichhold Chemical (RCRA Corrective Action WAD 009252819)**
- **Superlon [Ecology Agreed Order DE 5940 (March 2009)]**
- **Murray Pacific No. 1 [Ecology Consent Decree MP 03527 (November 1995)]**
- **USG Interiors Ecology Agreed Order DE 3405 (June 2006)**

The regulatory framework associated with all of these orders, decrees, or permits is intended to provide for the remediation of pollutants released from each property. The degree to which contamination from each of these properties may be comingled among themselves, or comingled with the release of hazardous substances from the former Arkema manufacturing facility, has not yet been established. The Port will endeavor to define the Site boundary. If the Port is unable to



adequately define those areas where hazardous materials released from the former Arkema manufacturing facility have come to be located; and, develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the Arkema Site, then Ecology may require the Port to prepare a draft interim action work plan to address contamination from the Arkema Property. Such an approach to cleanup of the Arkema Property addresses the areas of greatest contamination and promotes re-use of a portion of what may be a larger Site in an area where both parties agree to expedite work without waiting for the full nature and extent of contamination to be defined. In the context of this Site, these circumstances would warrant an interim action consistent with WAC 173-340-430.

## **VII. WORK TO BE PERFORMED**

Based on the Findings of Fact and Ecology Determinations, it is hereby ordered that the Port take the following remedial actions at the Site and that these actions be conducted in accordance with Chapter 173-340 WAC unless otherwise specifically provided for herein:

A. The work to be performed will be conducted as set forth in the Scope of Work included as Exhibit B. Exhibit B outlines the deliverables required for Ecology's review and approval. For each draft of all deliverables identified below, the Port shall incorporate all comments from Ecology into the next draft of that deliverable. Once approved by Ecology, the deliverables become an integral and enforceable part of this Order. The Scope of Work includes the following deliverables and actions:

1. Site Characterization Data Report
2. Draft Data Gap Work Plan and Sampling and Analysis Plan (SAP)
3. Final Data Gap Work Plan and SAP
4. Data Gap Work Plan and SAP Implementation
5. Draft Data Gap Technical Memorandum

6. Final Data Gap Technical Memorandum
7. Draft Wypenn Area Interim Action Work Plan
8. Final Wypenn Area Interim Action Work Plan
9. Draft Remedial Investigation Report
10. Final Remedial Investigation Report
11. Draft Feasibility Study Report
12. Final Feasibility Study Report
13. First Draft Cleanup Action Plan
14. (Contingency) – Draft Interim Action Work Plan
15. (Contingency) – Final Interim Action Work Plan

B. Schedule. The schedule for implementation of the Scope of Work by the Port is included as Exhibit C.

C. If, at any time after the first exchange of comments on drafts, Ecology determines that insufficient progress is being made in the preparation of any of the deliverables required by this Section, Ecology shall provide written notice to the Port that it has 30 days to demonstrate sufficient progress in preparation of the required deliverable. If not cured within 30 days, then Ecology may complete and issue the final deliverable. Ecology need provide this written notice and opportunity to cure only once per deliverable.

## **VIII. TERMS AND CONDITIONS OF ORDER**

### **A. Public Notice**

RCW 70.105D.030(2)(a) requires that, at a minimum, this Order be subject to concurrent public notice. Ecology shall be responsible for providing such public notice and reserves the right to modify or withdraw any provisions of this Order should public comment disclose facts or

considerations which indicate to Ecology that this Order is inadequate or improper in any respect.

**B. Remedial Action Costs**

The Port shall pay to Ecology costs incurred by Ecology pursuant to this Order and consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology or its contractors for, or on, the Site under Chapter 70.105D RCW, including remedial actions and Order preparation, negotiation, oversight, and administration. These costs shall include work performed both prior to and subsequent to the issuance of this Order. Ecology's costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). Ecology has accumulated **\$91,282.13** in remedial action costs related to this facility as of **December 31, 2010**. Payment for this amount shall be submitted within ninety (90) days of the effective date of this Order. For all costs incurred subsequent to, **December 31, 2010** the Port shall pay the required amount within ninety (90) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be provided upon request. Itemized statements shall be prepared quarterly. Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges at the rate of twelve percent (12%) per annum, compounded monthly.

In addition to other available relief, pursuant to RCW 19.16.500, Ecology may utilize a collection agency and/or, pursuant to RCW 70.105D.055, file a lien against real property subject to the remedial actions to recover unreimbursed remedial action costs.

**C. Implementation of Remedial Action**

If Ecology determines that the Port has failed without good cause to implement the remedial action required by Section VII of this Order, in whole or in part, Ecology may, after notice to the Port, perform any or all portions of such remedial action that remain incomplete. If Ecology performs all or portions of any remedial action because of the Port's failure to comply with its obligations under this Order, the Port shall reimburse Ecology for the costs of doing such work in accordance with Section VIII.B (Remedial Action Costs), provided that the Port is not obligated under this Section to reimburse Ecology for costs incurred for work inconsistent with or beyond the scope of this Order.

Except where necessary to abate an emergency situation, the Port shall not perform any remedial actions at the Site outside those remedial actions required by this Order, unless Ecology concurs, in writing, with such additional remedial actions.

**D. Designated Project Coordinators**

The project coordinator for Ecology is:

Dom Reale  
PO Box 47775  
Olympia, WA 98504-7775  
(360) 407-6266

The project coordinator for the Port is:

Scott Hooton  
PO Box 1837  
Tacoma, WA 98401-1837  
(253) 383-9428

Each project coordinator shall be responsible for overseeing the implementation of this Order. Ecology's project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and the Port, and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order shall be directed through the project

coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the work to be performed required by this Order.

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

**E. Performance**

All geologic and hydrogeologic work performed pursuant to this Order shall be under the supervision and direction of a geologist or hydrogeologist licensed in the State of Washington or under the direct supervision of an engineer registered in the State of Washington, except as otherwise provided for by Chapters 18.220 and 18.43 RCW.

All engineering work performed pursuant to this Order shall be under the direct supervision of a professional engineer registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

All construction work performed pursuant to this Order shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

Any documents submitted containing geologic, hydrologic or engineering work shall be under the seal of an appropriately licensed professional as required by Chapter 18.220 RCW or RCW 18.43.130.

The Port shall notify Ecology in writing of the identity of any engineer(s) and geologist(s), hydrogeologist(s) contractor(s) and subcontractor(s), and others to be used in carrying out the terms of this Order, in advance of their involvement at the Site.

**F. Access**

Ecology, or any Ecology authorized representative, including EPA, shall have the full authority to enter and freely move about all property at the Site that the Port either owns, controls, or has 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 Order; reviewing the Port's progress in carrying out the terms of this Order; 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 Order; and verifying the data submitted to Ecology by the Port. The Port shall make all reasonable efforts to secure access rights for those properties within the Site not owned or controlled by the Port where remedial activities or investigations will be performed pursuant to this Order. Ecology, or any Ecology authorized representative shall give reasonable notice before entering any Site property owned or controlled by the Port unless an emergency prevents such notice. All persons who access the Site pursuant to this Section shall comply with any applicable Health and Safety Plan(s). Ecology or EPA employees and their representatives shall not be required to sign any liability release or waiver as a condition of Site property access.

**G. Sampling, Data Submittal, and Availability**

With respect to the implementation of this Order, the Port shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section VII. (Work to be Performed), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal.

If requested by Ecology, the Port shall allow Ecology and/or its authorized representative to take split or duplicate samples of any samples collected by the Port pursuant to implementation of this Order. The Port shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow the Port and/or its authorized representative to take split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Order, provided that doing so does not interfere

with Ecology sampling. Without limitation on Ecology's rights under Section VIII.F. (Access), Ecology shall notify the Port prior to any sample collection activity unless an emergency prevents such notice.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under Chapter 173-50 WAC for the specific analyses to be conducted, unless otherwise approved by Ecology.

#### **H. Public Participation**

A Public Participation Plan is required for this Site. Ecology shall develop a Public Participation Plan alone or in conjunction with the Port.

Ecology shall maintain the responsibility for public participation at the Site. However, the Port shall cooperate with Ecology, and shall:

1. If agreed to by Ecology, develop appropriate mailing list, prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering design reports. As appropriate, Ecology will edit, finalize, and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings.

2. Notify Ecology's project coordinator prior to the preparation of all press releases and fact sheets, and before major meetings with the interested public and local governments. Likewise, Ecology shall notify the Port prior to the issuance of all press releases and fact sheets, and before major meetings with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by the Port that do not receive prior Ecology approval, the Port shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

3. When requested by Ecology, participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions or as a presenter.

4. When requested by Ecology, arrange and/or continue information repositories to be located at the following locations:

- a. Tacoma Public Library  
1102 Tacoma Ave.  
Tacoma, WA 98402  
(253) 591-5666
- b. Citizens for a Healthy Bay  
917 Pacific Ave. Suite 100  
Tacoma, WA 98402  
(253) 383-2429
- c. WA Department of Ecology  
SWRO Toxics Cleanup Program  
300 Desmond Drive  
PO Box 47775  
Olympia, WA 98504-7775  
(360) 407-6365  
[dene461@ecy.wa.gov](mailto:dene461@ecy.wa.gov)

At a minimum, copies of all public notices, fact sheets, and press releases; all quality assured monitoring data; remedial action plans and reports, supplemental remedial planning documents, and all other similar documents relating to performance of the remedial action required by this Order shall be promptly placed in these repositories.

#### **I. Retention of Records**

During the pendency of this Order, and for ten (10) years from the date of completion of work performed pursuant to this Order, the Port shall preserve all records, reports, documents, and underlying data in its possession relevant to the implementation of this Order and shall insert a similar record retention requirement into all contracts with project contractors and subcontractors. Upon request of Ecology, the Port shall make all records available to Ecology



and allow access for review within a reasonable time. Nothing in this Order is intended by the Port to waive any right it may have under applicable law to limit disclosure of documents protected by the attorney work-product and/or attorney-client privilege. If the Port withholds any requested records based on an assertion of privilege, it shall provide Ecology with a privilege log specifying the records withheld and the applicable privilege. No actual data collected on the Site pursuant to this Order shall be considered privileged.

**J. Resolution of Disputes**

1. In the event a dispute arises as to an approval, disapproval, proposed change, or other decision or action by Ecology's project coordinator, or an itemized billing statement under Section VIII.B. (Remedial Action Costs), the Parties shall utilize the dispute resolution procedure set forth below.

a. Upon receipt of Ecology's project coordinator's written decision or the itemized billing statement, the Port has fourteen (14) days within which to notify Ecology's project coordinator in writing of its objection to the decision or itemized statement.

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

c. The Port may then request regional management review of the decision. This request shall be submitted in writing to the Southwest Region Toxics Cleanup Section Manager within seven (7) days of receipt of Ecology's project coordinator's written decision.

d. The Section Manager shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute within thirty (30) days of the

Port's request for review. The Section Manager's decision shall be Ecology's final decision on the disputed matter.

2. The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

3. Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order, unless Ecology agrees in writing to a schedule extension.

#### **K. Extension of Schedule**

1. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension.

All extensions shall be requested in writing. The request shall specify:

- a. The deadline that is sought to be extended;
- b. The length of the extension sought;
- c. The reason(s) for the extension; and
- d. Any related deadline or schedule that would be affected if the extension were granted.

2. The burden shall be on the Port to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause may include, but may not be limited to:

- a. Circumstances beyond the reasonable control and despite the due diligence of the Port including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by the Port;

b. Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

c. Endangerment as described in Section VIII.M. (Endangerment).

However, neither increased costs of performance of the terms of this Order nor changed economic circumstances shall be considered circumstances beyond the reasonable control of the Port.

3. Ecology shall act upon any written request for extension in a timely fashion. Ecology shall give the Port written notification of any extensions granted pursuant to this Order. A requested extension shall not be effective until approved by Ecology. Unless the extension is a substantial change, it shall not be necessary to amend this Order pursuant to Section VIII.L. (Amendment of Order) when a schedule extension is granted.

4. An extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of:

a. Delays in the issuance of a necessary permit which was applied for in a timely manner;

b. Other circumstances deemed exceptional or extraordinary by Ecology; or

c. Endangerment as described in Section VIII.M. (Endangerment).

#### **L. Amendment of Order**

The project coordinators may verbally agree to minor changes to the work to be performed without formally amending this Order. Minor changes will be documented in writing by Ecology within seven (7) days of verbal agreement.

Except as provided in Section VIII.N. (Reservation of Rights), substantial changes to the work to be performed shall require formal amendment of this Order. This Order may only be formally amended by the written consent of both Ecology and the Port. The Port shall submit a

written request for amendment to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request for amendment is received. If the amendment to this Order represents a substantial change, Ecology will provide public notice and opportunity to comment. Reasons for the disapproval of a proposed amendment to this Order shall be stated in writing. If Ecology does not agree to a proposed amendment, the disagreement may be addressed through the dispute resolution procedures described in Section VIII.N. (Resolution of Disputes).

**M. Endangerment**

In the event Ecology determines that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment on or surrounding the Site, Ecology may direct the Port to cease such activities for such period of time as it deems necessary to abate the danger. The Port shall immediately comply with such direction.

In the event the Port determines that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment, the Port may cease such activities. The Port shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction the Port shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with the Port's cessation of activities, it may direct the Port to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to Section VIII.M (Endangerment), the Port's obligations with respect to the ceased activities shall be suspended until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other work dependent upon such activities, shall be extended in accordance with Section VIII.K. (Extension of Schedule) for such period of time as Ecology determines is reasonable under the circumstances.

Nothing in this Order shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

**N. Reservation of Rights**

This Order is not a settlement under Chapter 70.105D RCW. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any of Ecology's rights or authority. Ecology will not, however, bring an action against the Port to recover remedial action costs paid to and received by Ecology under this Order. In addition, Ecology will not take additional enforcement actions against the Port regarding remedial actions required by this Order, provided the Port complies with this Order.

Ecology nevertheless reserves its rights under Chapter 70.105D RCW, including the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health and the environment, and to issue orders requiring such remedial actions. Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

**O. Transfer of Interest in Property**

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by the Port without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to the Port's transfer of any interest in all or any portion of the Site, and during the effective period of this Order, the Port shall provide a copy of this Order to any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and, at least thirty (30) days prior to any transfer, the Port shall notify Ecology of said transfer. Upon transfer of any

interest, the Port shall restrict uses and activities to those consistent with this Order and notify all transferees of the restrictions on the use of the property.

**P. Compliance with Applicable Laws**

1. All actions carried out by the Port pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in RCW 70.105D.090. The permits or specific federal, state or local requirements that the agency has determined are applicable and are known at the time of entry of this order have been identified in Exhibit D.

2. Pursuant to RCW 70.105D.090(1), the Port is exempt from the procedural requirements of Chapters 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals. However, the Port shall comply with the substantive requirements of such permits or approvals. The exempt permits or approvals and the applicable substantive requirements of those permits, as they are known at the time of entry of this order, have been identified in Exhibit D.

The Port has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order. In the event either Ecology or the Port determines that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify the other party of its determination. Ecology shall determine whether Ecology or the Port shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, the Port shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by the Port and on how the Port must meet those requirements.

Ecology shall inform the Port in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Order. The Port shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

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

**Q. Indemnification**

The Port agrees to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action for death or injuries to persons or for loss or damage to property to the extent arising from or on account of acts or omissions of the Port, its officers, employees, agents, or contractors in entering into and implementing this Order. However, the Port shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action to the extent arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in entering into or implementing this Order.

**IX. SATISFACTION OF ORDER**

The provisions of this Order shall be deemed satisfied upon the Port's receipt of written notification from Ecology that the Port has completed the remedial activity required by this Order, as amended by any modifications, and that the Port has complied with all other provisions of this Agreed Order.

**X. ENFORCEMENT**

Pursuant to RCW 70.105D.050, this Order may be enforced as follows:

A. The Attorney General may bring an action to enforce this Order in a state or federal court.

B. The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the Site.

C. In the event the Port refuses, without sufficient cause, to comply with any term of this Order, the Port will be liable for:


a. Up to three (3) times the amount of any costs incurred by the State of Washington as a result of its refusal to comply; and

b. Civil penalties of up to twenty-five thousand dollars (\$25,000) per day for each day it refuses to comply.

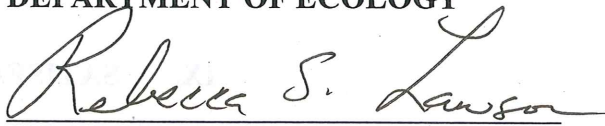
D. This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under RCW 70.105D.060.

Effective date of this Order: July 25, 2011

**PORT OF TACOMA**

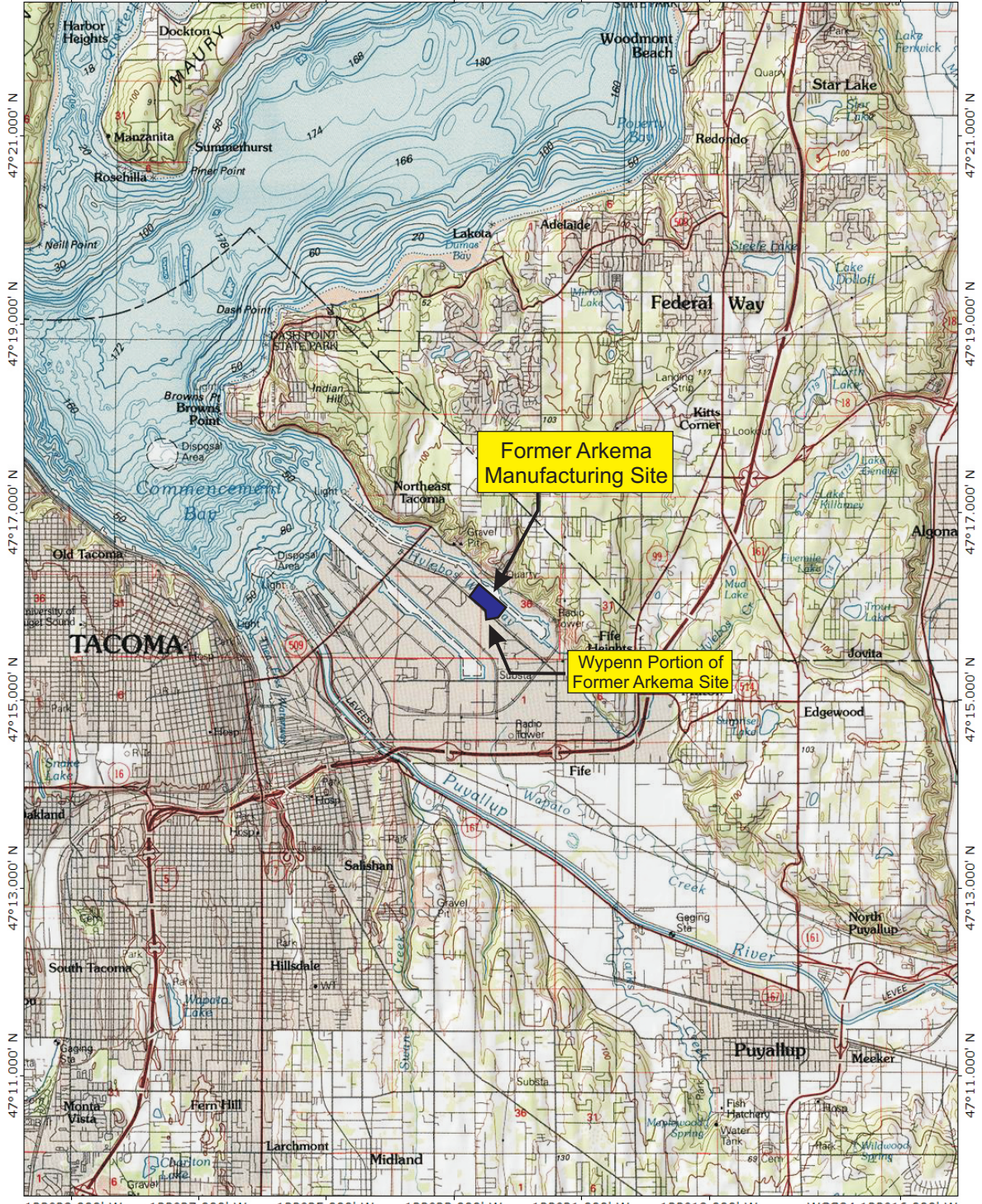
  
\_\_\_\_\_  
**John Wolfe**  
Executive Director  
Port of Tacoma  
Tel: 253-383-9410

**STATE OF WASHINGTON,  
DEPARTMENT OF ECOLOGY**

  
\_\_\_\_\_  
**Rebecca S. Lawson, P.E., L.H.G.**  
Section Manager  
Toxics Cleanup Program  
Southwest Regional Office  
Tel: 360-407-6241



TOPO! map printed on 09/24/10 from "Washington.tpo" and "Untitled.tpg"  
 122°29.000' W 122°27.000' W 122°25.000' W 122°23.000' W 122°21.000' W 122°19.000' W WGS84 122°16.000' W



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 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 miles  
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 Printed from TOPO! ©2000 National Geographic Holdings (www.topo.com)

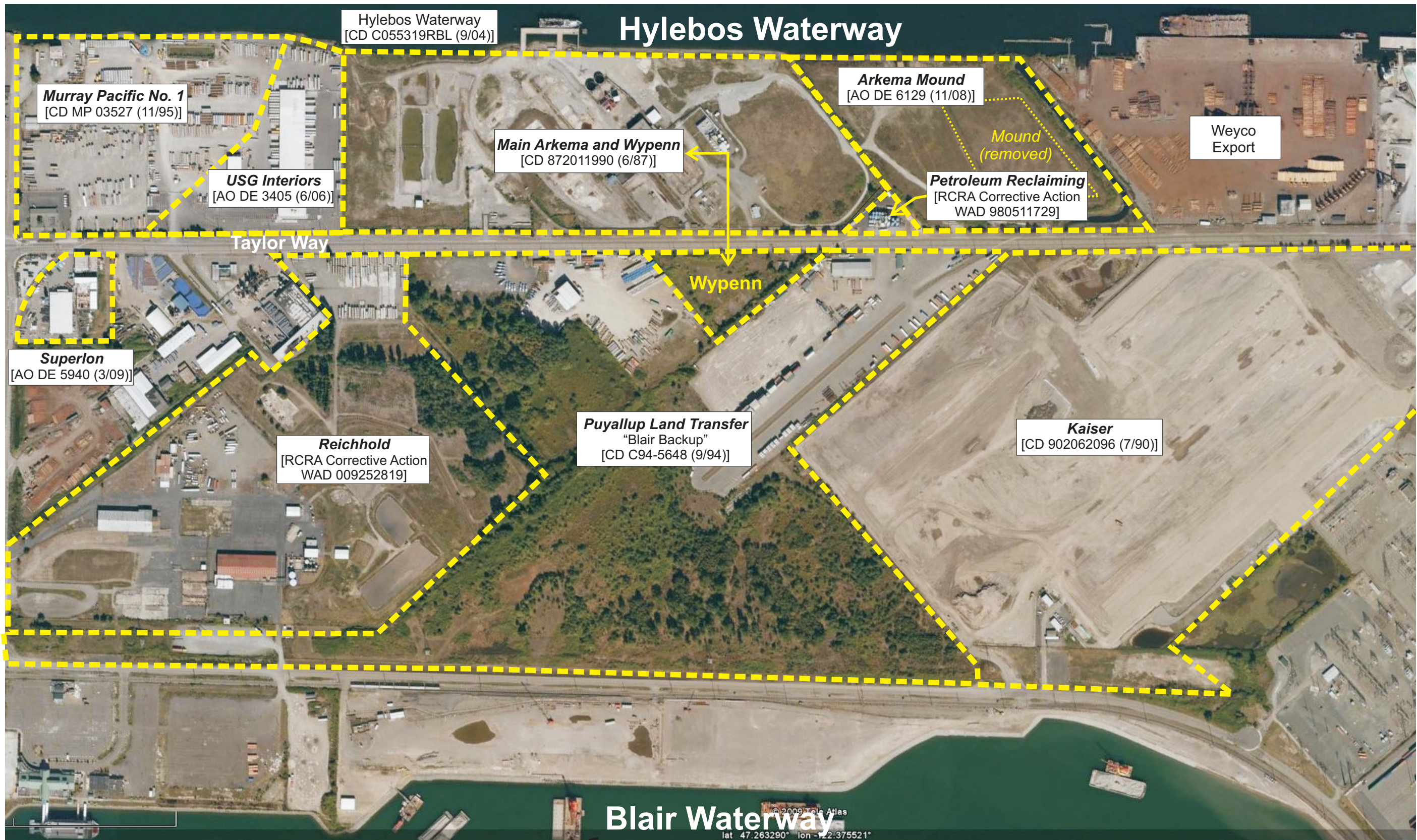
Ref: Vicinity Map Ex A 1 of 4.cdr



<b>Former Arkema Site</b>	
<b>Vicinity Map</b>	
POT-001-00	Sept. 2010
<i>Dalton, Olmsted &amp; Fuglevand, Inc.</i>	

**EXHIBIT  
 A  
 (1 of 4)**





**Hylebos Waterway**

**Blair Waterway**

Hylebos Waterway  
[CD C055319RBL (9/04)]

**Murray Pacific No. 1**  
[CD MP 03527 (11/95)]

**USG Interiors**  
[AO DE 3405 (6/06)]

**Main Arkema and Wypenn**  
[CD 872011990 (6/87)]

**Arkema Mound**  
[AO DE 6129 (11/08)]

**Petroleum Reclaiming**  
[RCRA Corrective Action  
WAD 980511729]

Weyco  
Export

Mound  
(removed)

Taylor Way

Wypenn

**Superlon**  
[AO DE 5940 (3/09)]

**Reichhold**  
[RCRA Corrective Action  
WAD 009252819]

**Puyallup Land Transfer**  
"Blair Backup"  
[CD C94-5648 (9/94)]

**Kaiser**  
[CD 902062096 (7/90)]

**DRAFT**  
10-5-10

**Cleanup Orders/Decrees**  
AO - Agreed Order  
CD - Consent Decree  
(6/87) - Effective Date

0 400  
Scale in Feet  
(approximate)

Air photograph  
November 9, 2007

Former Arkema Site	
<b>Vicinity Properties</b>	
POT-001	Oct. 2010
Dalton, Olmsted & Fuglevand, Inc.	

**EXHIBIT**  
**A**  
**(2 of 4)**



# DRAFT

Waterway Dredging 2004 to 2006

Former Manufacturing Area  
(as of the late 1980s)

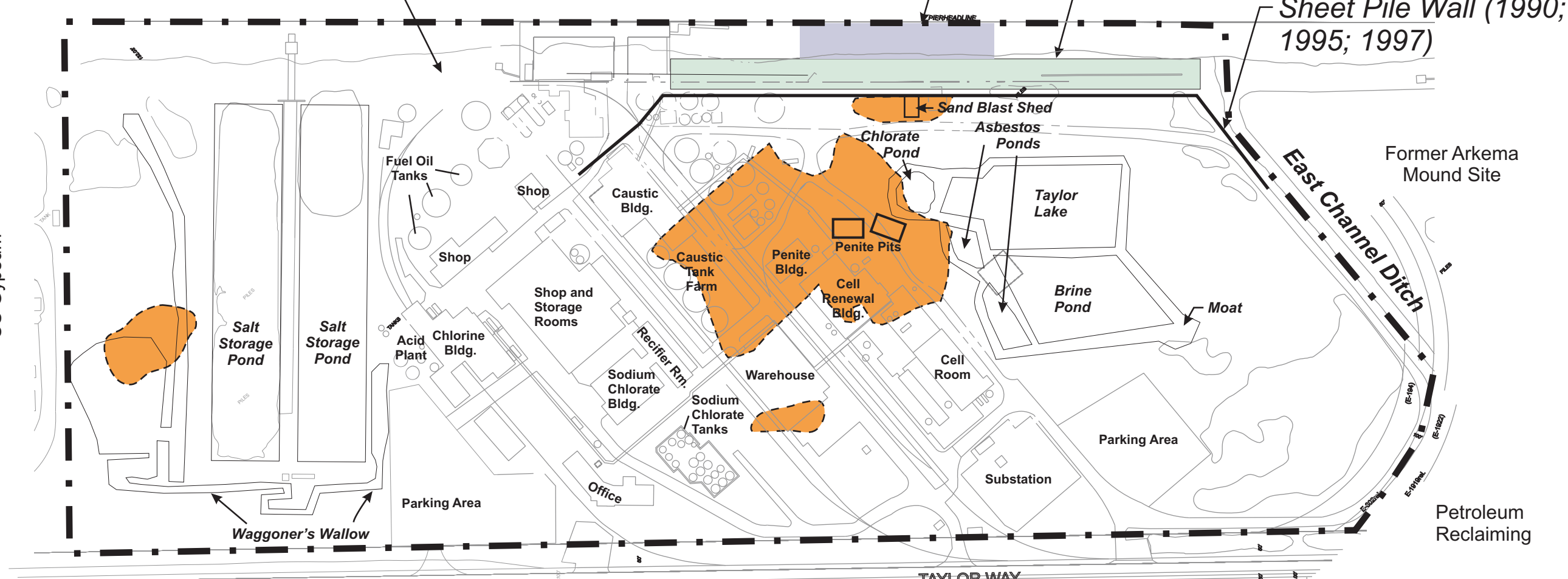
HYLEBOS WATERWAY

Subtidal Cap (February 2006)

Intertidal Cap (July 2004)

Sheet Pile Wall (1990;  
1995; 1997)

US Gypsum




Former Arkema Mound Site

East Channel Ditch

Petroleum Reclaiming

TAYLOR WAY

Former Reichhold Chemical Facility

 Arsenic in Soil > 88 mg/kg (industrial soil contact cleanup level)

Plant North

Scale in Feet (approximate)

0 200

Scale: 1"=200'

Wypenn Area

Former Arkema Site Tacoma, Washington	
<b>Arkema Site Layout</b>	
POT-001	Sept. 2010
Dalton, Olmsted & Fuglevand, Inc.	

EXHIBIT  
A  
(3 of 4)

# DRAFT

10-5-10

**Dissolved As**

- As >1 to 10 mg/l
- As >10 to 100 mg/l
- As >100 mg/l

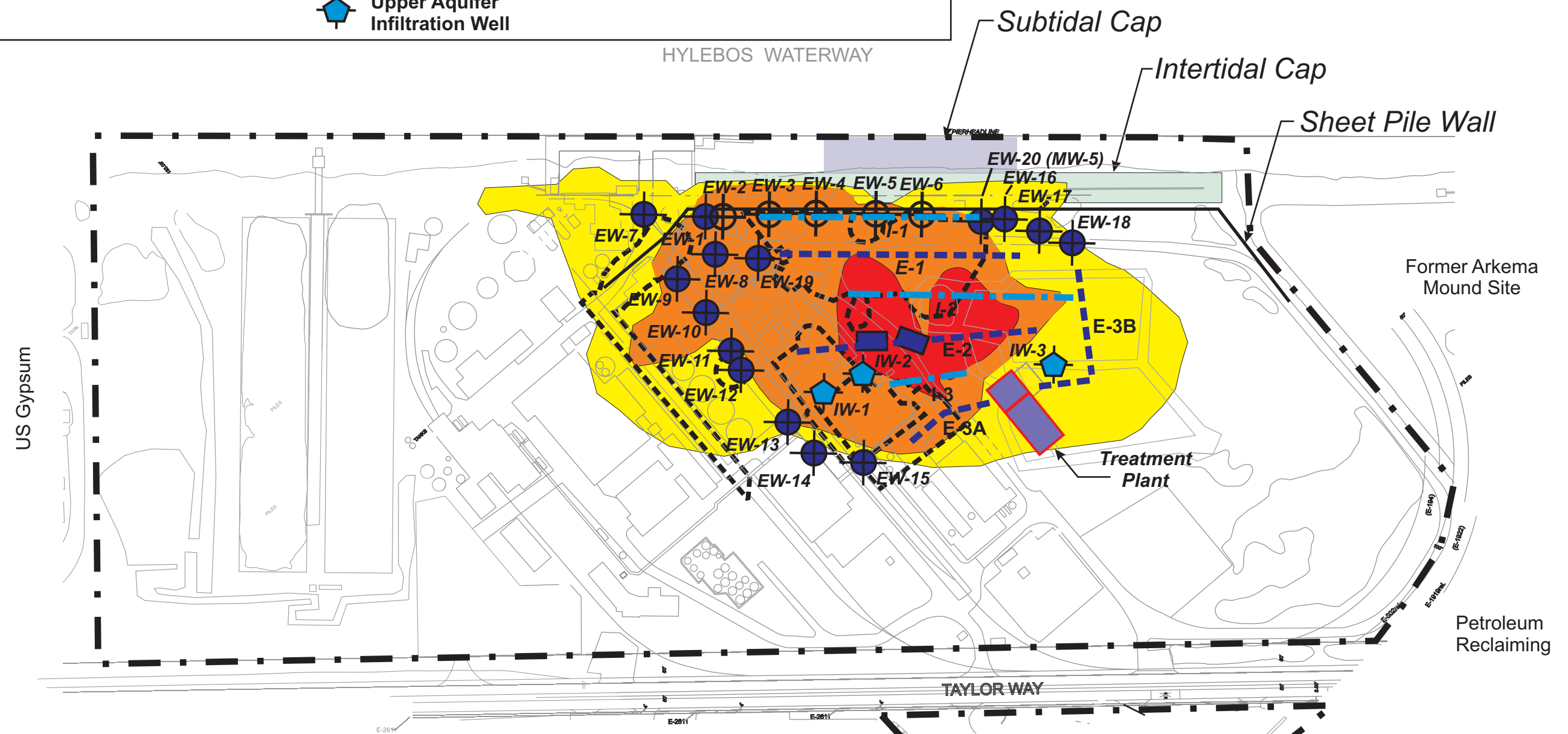
**Penite Area**

- Upper Aquifer Extraction Well
- Interm. Aquifer Extraction Well
- Upper Aquifer Infiltration Well

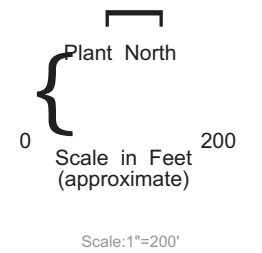
**Extraction Trench** (E-1)

**Infiltration Trench** (I-1)

**In-Situ Treatments**



**Note:** Arkema completed a number of remedial actions consistent with the December 1990 approved Remedial Action Plan (FRAP). These included pump and treatment of contaminated groundwater followed by in-situ arsenic stabilization.



Wypenn Area

Former Arkema Site Tacoma, Washington		<b>EXHIBIT A (4 of 4)</b>
<b>Arkema FRAP Remedial Elements</b>		
POT-001	Oct. 2010	

Dalton, Olmsted & Fuglevand, Inc.

## **Exhibit B – Scope of Work**

The Port shall take the following remedial actions per the Schedule detailed in Exhibit C of this Agreed Order:

### **Deliverable 1 – Site Characterization Data Report**

The Port shall prepare and provide to Ecology a report summarizing all data in the Port's possession, as of the effective date of this Agreed Order, that is relevant to characterizing the Site for the purpose of developing and evaluating cleanup action alternatives. The Port shall summarize recent and newly acquired data and present a refined conceptual model of the Site conditions. The report shall include the following:

- **Wedge Data:** All recent soil, groundwater, and sediment contaminant concentration data for the wedge area of the Site, defined vertically as extending downward from the land surface through the deep aquifer. The "wedge area" shall be defined laterally as all soils and sediments seaward of the sheet pile wall, where the sheet pile wall parallels the shoreline, that exceed cleanup levels caused by releases from the Site. For portions of the Site shoreline where the sheet pile wall does not parallel the shore, the wedge shall be defined laterally as the soils and sediments seaward of the plane of the sheet pile wall paralleling the shore extended in both directions to the Site's north and south boundaries. Please refer to the Site Diagram, Exhibit A, to this Agreed Order.
- **Upland Data:** All recent upland soil and groundwater contaminant concentration data, extending downward from the land surface through the deep aquifer. This data shall be comprehensive of the Property, and include sampling data for Property perimeter areas. This data should also include groundwater flow and contaminant transport modeling results and other hydrogeologic information pertinent to the understanding of groundwater and contaminant transport through and from the Site, including the Upland and Wedge areas. Please refer to the Site Diagram, Exhibit A, to this Agreed Order.
- **Contaminants of Potential Concern (COPC) Analysis:** Analysis of the above data and information, and a conceptual Site model to present a clarification of contaminant sources, identification of Site COPCs, description of contaminant pathways to the environment, and potential receptors. COPCs shall include all hazardous substances that potentially exist in Site soils or groundwater and pose a risk to human health or the environment.
- **Terrestrial Ecological Evaluation (TEE) Analysis:** Any existing information that may be relevant to addressing the TEE requirements in WAC 173-340-7490.
- **Data Gap Listing:** The Port shall provide an analysis of whether there are any data gaps that should be filled to finalize an RI Report for the Site. The Port shall provide a listing and description of any remaining data gaps.

## **Exhibit B – Scope of Work**

### **Former Arkema Manufacturing Plant – 2901 Taylor Way**

#### **Page 2**

- **Site Data Tables and Mapping:** The report shall provide data in tabular form, as well as mapped to show sample locations and depths/aquifers sampled for COPCs. Cross-sectional view diagram(s) of the Site and subsurface aquifer systems, including the wedge and sediment zones beyond the wedge, shall be included. The diagram(s) shall include a mapping of the measured concentrations of Site COPCs, and also indicate areas where little or no data exists. A plan-view map shall be included, showing groundwater COPC concentrations, potentiometric surfaces, and flow directions for each aquifer. Cross-sectional and plan view maps of the Site shall be included showing the distribution of COPCs in soils throughout the three aquifer system for the uplands and off-shore parts of the Site. These maps should identify areas where soil data gaps are thought to exist.

#### **Deliverable 2 – Draft Data Gap Work Plan and Sampling and Analysis Plan (SAP)**

The Port shall prepare a work plan describing the investigation work necessary to fill the data gaps identified in the Site Characterization Data Report and any additional gaps and COPCs identified in Ecology's comments to that report. The work plan is intended to provide sufficient data to prepare the Draft RI Report (Deliverable 9, detailed below). The work plan shall include the following data gap analyses:

- **Wedge Area RI Characterization:** Based on Ecology comments to the Site Characterization Data Report, the Port shall propose additional soil, groundwater, and sediment sampling locations, such that the new sample data, when combined with existing data, shall form a three dimensional characterization of the wedge area. This characterization shall be sufficient in sample density and extent to adequately define the extent of contamination, as far into the Hylebos Waterway as it may extend, for COPCs so that a Feasibility Study (FS) can be prepared. This characterization must locate any concentrated contaminant source areas to facilitate selection and preliminary design of remedial measures. This characterization should include sufficient sampling so that the distribution and rate of release of arsenic via groundwater to surface sediments and to the Hylebos Waterway may be determined.
- **Upland and Perimeter Remedial Investigation Characterization:** Based on Ecology comments to the Site Characterization Data Report, the Port shall propose additional soil, groundwater, and sediment sampling locations, such that the new sample data, when combined with recent existing data, shall form a three dimensional characterization of the Site upland and perimeter, including the Arkema/Thermafiber boundary, the Wypenn Area, and the entire Property perimeter. This characterization shall be sufficient in sample density and extent (when combined with the Wedge Area Remedial Investigation Characterization) to (i) define the full lateral and vertical extent of contamination for all COPCs emanating from the Property or resulting from releases from the former Arkema

## Exhibit B – Scope of Work

### Former Arkema Manufacturing Plant – 2901 Taylor Way

#### Page 3

facility, (ii) locate any concentrated contaminant source areas, (iii) provide sufficient information so that an FS can be prepared, and (iv) facilitate remedial measures selection and preliminary design. Ecology understands that off-Property perimeter contamination may also be due in part to adjacent property contaminant releases or area-wide contamination. Nonetheless, this work plan shall endeavor to produce data that allow the Port and Ecology to understand the nature and extent of the various contaminant releases from the Site that may extend to contiguous properties. If the Port intends to propose a Site boundary that encompasses those areas where hazardous materials released on the Arkema property have come to be located, but which excludes surrounding areas of contamination that the Port believes are solely from off-Site sources, then the Port shall collect sufficient data to prove the accuracy of its proposed boundary. For any areas where hazardous materials released on the Arkema property have become commingled with contaminants from off-Site sources, sufficient data shall be collected to allow an analysis of the source of the COPCs through methods such as Site COPC “fingerprinting,” analysis of Site contaminant indicators such as pH, and analysis of hydrogeologic conditions. Sufficient data shall be gathered so that the areas outside of the proposed Site boundary may also be characterized, the distribution of COPCs in these areas mapped, and an understanding of the potential for recontamination of the Site from sources outside of the Site boundary assessed.

- **SAP:** The Port shall prepare a SAP in accordance with the requirements of WAC 173-340-820 for approval by Ecology. The SAP shall be comprehensive of all environmental sampling and analyses described in the Wedge Area and Upland and Perimeter Characterization sections above. The SAP shall include maps of proposed sampling locations and depths for all Site groundwater and sediment sampling. The Draft Data Gap Work Plan and SAP shall include a proposed list of contaminants of concern (COCs), selected from a list of COPCs, for Ecology approval. The COCs shall include all COPCs released on or from the Property that potentially exceed applicable MTCA cleanup levels at some location within the Site. Indicator compounds may also be proposed at this time, along with a rationale for their selection from among the COCs. The Draft Data Gap Work Plan shall assume that MTCA Method A or B, as appropriate, shall apply for each COC. The SAP shall include a listing of analytes (proposed COCs or indicator compounds) for each sample location, along with their respective sampling and analytical methods and detection limits. The SAP testing program shall be based, at a minimum, on the list of data gaps identified in the Site Characterization Data Report and Ecology’s comments to that report.
- **Health and Safety Plan (HASP):** The Port shall prepare, for this investigation work, and for any other additional investigation or cleanup work done pursuant to this Agreed Order, a HASP in accordance with the requirements of WAC 173-340-810 for Ecology’s review.

**Deliverable 3 – Final Data Gap Work Plan and SAP**

The Port shall amend the Draft Data Gap Work Plan and SAP to comply with Ecology comments to that document, to form a Final Data Gap Work Plan and SAP.

**Deliverable (Action) 4 – Data Gap Work Plan and SAP Implementation**

The Port shall implement the Final Data Gap Work Plan and SAP.

**Deliverable 5 – Draft Data Gap Technical Memorandum**

The Port shall prepare and submit to Ecology a Draft Data Gap Technical Memorandum to document the sampling outlined in Deliverable 3 (Final Data Gap Work Plan). In addition to a presentation of the data gathered in implementation of the Final Data Gap Work Plan, this memorandum shall include the following technical presentations, based on the new and existing data:

- The Port shall provide a calculation of the current rate of release of arsenic via groundwater to surface sediments and to the Hylebos Waterway, along with a mapping of the groundwater flow routes or zones through the wedge area.
- If the Port intends to propose a Site boundary that encompasses those areas where hazardous materials released on the Arkema Property have come to be located, but which excludes surrounding areas of contamination that the Port believes are solely from off-Site sources, then the Port shall present a scientifically justified determination of the upland and in-water Site boundary. If there are perimeter areas where contaminants emanating from the Arkema Property have commingled with contaminants from other sources, and the commingled contaminants exceed cleanup levels, the memorandum must demonstrate the full geographic extent of Arkema contaminants in such areas through the use of “fingerprinting,” Site contamination indicators such as pH, hydrogeologic conditions, or other convincing analysis. The analysis must be supported by sampling, inside and outside of the proposed Site boundary, that is sufficiently dense to credibly establish the Site boundary at all boundary areas.
- The Port shall provide a mapping of COPC concentrations outside of the proposed Site boundary to adequately demonstrate the Site boundary.
- The Port shall provide a detailed three dimensional mapping of the arsenic concentrations in soil in the uplands and wedge. Analysis for this mapping may include X ray fluorescence (XRF) testing corroborated by standard wet-chemistry arsenic analysis.



**Exhibit B – Scope of Work**

**Former Arkema Manufacturing Plant – 2901 Taylor Way**

**Page 5**

This memorandum shall be submitted to Ecology for review and comment.

**Deliverable 6 – Final Data Gap Technical Memorandum**

The Port shall amend the Draft Data Gap Technical Memorandum to comply with Ecology comments to that document, to form a Final Data Gap Technical Memorandum.

**Deliverable 7 – Draft Wypenn Area Interim Action Work Plan**

The Port shall prepare and submit to Ecology a Draft Wypenn Area Interim Action Work Plan addressing each of the elements listed in WAC 173-340-430(7). This remedial action is considered an Interim Action due to the need for implementation prior to the redevelopment of the Wypenn property. However, it should be designed to function as part of a final remedy and meet the minimum requirements found in WAC 173-340-360(2). As a part of this evaluation, any potential negative effects of the interim action upon the cleanup actions for the Site must be fully evaluated to ensure that this interim action will not foreclose reasonable alternatives for the ultimate cleanup action for the Site as a whole.

**Deliverable 8 – Final Wypenn Area Interim Action Work Plan**

The Port shall amend the Draft Wypenn Area Interim Action Work Plan to comply with Ecology comments to that document, to form a Final Wypenn Area Interim Action Work Plan.

**Deliverable 9 – Draft Remedial Investigation (RI) Report**

The Port shall develop a Draft RI Report that fully complies with WAC 173-340-350 and is comprehensive of data and information presented in the Site Characterization Data Report, data and information gathered in implementation of the Final Data Gap Work Plan, and any additional Ecology-approved Site investigation work completed for the Site. Any additional sampling work shall be described in a SAP in conformance with WAC 173-340-820, and approved by Ecology.

This report shall provide a three dimensional characterization of the Site, including in-water areas that have become part of the Site due to the spread of contamination, the Thermafiber property boundary, the Wypenn Area, and the entire Property perimeter so that a FS can be prepared, a remedy can be selected, and to facilitate preliminary design. The required extent of perimeter characterization must indicate the three dimensional extent of contamination emanating from the Property.

**Exhibit B – Scope of Work**  
**Former Arkema Manufacturing Plant – 2901 Taylor Way**  
**Page 6**

Ecology has developed an Environmental Information Management (EIM) system that is Ecology's main repository for electronic environmental monitoring data. Site monitoring data collected as part of this work scope (including data in the Site Characterization Data Report) must be formatted and uploaded to the EIM system. In accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements), data in the Draft RI Report shall be submitted simultaneously in both a written and electronic format. For additional information regarding electronic format requirements, see the website <http://www.ecy.wa.gov/eim>. If questions arise regarding submittal of EIM, you may contact Mr. Tuan Vu, in Ecology's Toxics Cleanup Program headquarters sediment group, at (360) 407-7449, or at [tuvu461@ecy.wa.gov](mailto:tuvu461@ecy.wa.gov).

**Deliverable 10 – Final RI Report**

The Port shall submit a Final RI Report to Ecology that addresses Ecology's comments regarding the Draft RI Report.

If Ecology determines that the Port has failed to present a convincing proposal for a Site boundary that encompasses all areas where hazardous materials from the Arkema property have come to be located, and where concentrations of hazardous materials (including any commingled materials from other sources) exceed cleanup levels, then Ecology may require the Port to prepare a Draft Feasibility Study (Deliverable 11) that is focused on interim remedial action alternatives to address contamination within the boundaries of the Arkema Property (instead of the full Site). In that event, Ecology will comment that the Final RI Report (Deliverable 10) is considered a Focused RI Report rather than a Final RI Report.

**Deliverable 11 – Draft Feasibility Study (FS) Report**

The Port shall prepare a Draft FS Report, consistent with WAC 173-340-350 through 370, for Ecology's review and comment. The report shall present and evaluate remedial alternatives to address contamination exceeding Site Cleanup Levels in all media including soil, groundwater, sediment, and vapor after implementation of the Interim Action(s).

Using the COCs identified in the Final Data Gap Work Plan, the likely points of compliance, and the conceptual model of Site conditions, the Port shall identify and evaluate possible remedial technologies using criteria in MTCA to address soil contact, soil ingestion, groundwater quality, groundwater migration to surface water, sediment contamination, sediment pore water contamination, and any other applicable environmental media and potential contaminant transport or exposure routes. Protection of water and sediment quality in the Hylebos Waterway must be a primary focus of the Draft FS Report with respect to groundwater migration issues. The evaluation of remedial alternatives shall take into account the potential for Site recontamination by adjacent off-Site contaminant sources. Based on an alternatives analysis, the Port shall

## Exhibit B – Scope of Work

### Former Arkema Manufacturing Plant – 2901 Taylor Way

#### Page 7

propose preferred final remedial action alternatives, consistent with the criteria in WAC 173-340-350 through 390.

At a minimum, the Draft FS Report shall include evaluation of the following remedial action alternatives:

- **Upland Soil Removal:** The Port shall evaluate excavation of contaminated upland soils with proper transportation and disposal per WAC 173-303 (Washington State Hazardous Waste Regulations). Evaluation of this remedial action alternative shall include cost analysis for excavation of all soils with COPC concentrations in excess of Site cleanup levels (CULs) as well as for varying degrees of partial excavation of contaminated soils.
- **Wedge Soil/Sediment Removal:** The Port shall evaluate excavation, with proper transportation and disposal per WAC 173-303 (Washington State Hazardous Waste Regulations), of that portion of the wedge area in which COPCs in soils or sediments exceed Site CULs. This remedial alternative shall include excavation and disposal of soils/sediments in the upper aquifer, first aquitard, intermediate aquifer, and intermediate aquitard portion of the wedge. If the Port proposes to leave soils/sediments in place that exceed Site CULs, then the Port must also provide a proposal for implementation of treatment or alternative remedial technologies such that partial wedge removal or leaving soils/sediments in place with COPC concentrations in excess of CULs will not result in immediate or eventual exceedance of CULs at proposed Points of Compliance (to be approved as part of the Cleanup Action Plan).
- **Upland and Wedge Soil/Sediment/Groundwater Treatment:** The Port shall evaluate various technologies for *in situ* or *ex situ* treatment of COPCs in soils, sediments, and groundwater. Technologies evaluated shall include, but not be limited to, chemical injection, and permeable reactive barrier technologies. These treatment alternatives shall be evaluated for their potential use as stand-alone remedies, and in combination with other remedies, such as excavation and containment.
- **Containment System:** Although a containment remedy is generally the least favored remedial alternative, as compared with more permanent remedies, the Port shall nonetheless evaluate containment remedies for the Site. This shall include analysis of a slurry wall, hydraulic containment system, and/or other containment system, designed to provide containment of any COPCs in the upland portion of the Site that (1) cannot feasibly be excavated and disposed off Site, and (2) cannot readily be remediated with available *in situ* or *ex situ* technologies as part of the final cleanup action for the Site. These plans shall include cost analysis for containment systems designed to provide containment for partial excavation of contaminated soils. The Port shall propose remediation

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levels for all COPCs, per WAC 173-340-355, to delineate soils to be excavated from those that may be contained on Site. The Port shall include a study to demonstrate that the concentrations of arsenic and other contaminants in soil and groundwater outside of the proposed slurry wall or other containment area would be sufficiently low for those contaminants to be readily remediated with available technologies as part of the subsequent final cleanup action.

#### **Deliverable 12 – Final FS Report**

The Port shall submit a Final FS Report to Ecology that addresses Ecology's comments regarding the Draft FS Report.

If Ecology determines that the Port has failed to present a convincing proposal for a Site boundary that encompasses all areas where hazardous materials from the Arkema property have come to be located, and where concentrations of hazardous materials (including any commingled materials from other sources) exceed CULs, then Ecology may require the Port to prepare a Draft Interim Action Work Plan (Deliverable 14) to address contamination within the boundaries of the Arkema property instead of proceeding to the First Draft Cleanup Action Plan (Deliverable 13). In that event, Ecology will comment that the Final FS Report (Deliverable 12) is considered a Focused FS Report rather than a Final FS Report.

#### **Deliverable 13 – First Draft Cleanup Action Plan (CAP)**

The Port shall consult with Ecology to prepare the first draft of a Draft CAP that meets the requirements of WAC 173-340-380.

The Port recognizes that post-remedy compliance monitoring will be required along the Hylebos/Commencement Bay shoreline at a number of sites. The Port shall endeavor to include consistent monitoring methods and procedures in the compliance monitoring plans for the affected properties as warranted by similarities in the site conditions.

#### **Deliverable 14 (Contingency) – Draft Interim Action Work Plan**

Ecology may decide that a Draft Interim Action Work Plan must be submitted, which provides detail of proposed interim remedial actions to be taken in the Site uplands and/or in-water areas. Ecology may make such a decision based on one or more of the following factors:

- If the rate of release of arsenic via groundwater to surface sediments or to the Hylebos Waterway, as calculated in the Final Data Gap Technical Memorandum (Deliverable 6), is determined to be great enough to warrant a rapid cleanup response.

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- If the Site boundary has not been adequately defined in the RI/FS process, and rapid cleanup response is necessary to further redevelopment of the Arkema Property or ensure protection of human health and the environment.

If Ecology makes such determination that an Interim Action Work Plan must be prepared and submitted, Ecology shall inform the Port by telephone or e-mail as soon as possible, and, after consultation with the Port, shall follow with a written determination. The scope of the Draft Interim Action Work Plan shall be consistent with the requirements listed under WAC 173-340-380 (1) for a draft cleanup action plan and the Port shall develop remedial alternatives that meet the minimum requirements for cleanup actions found in WAC 173-340-360(2). Any interim action contemplated by Ecology that pertains to in-water remedial activities will be consistent with the Record of Decision and Explanation of Significant Differences issued for the Commencement Bay Nearshore/Tideflats Superfund Site, and in particular, with respect to the Hylebos Waterway problem areas.

**Deliverable 15 (Contingency) – Final Interim Action Work Plan**

The Port shall submit a Final Interim Action Work Plan, which incorporates Ecology's comments to the draft document.



### Exhibit C – Schedule

The Port of Tacoma shall implement the Scope of Work (Exhibit B) according to the following Schedule:

<b>Deliverable/Action</b>	<b>Schedule for Completion</b>
1. Site Characterization Data Report	30 days from the effective date of this Agreed Order.
2. Draft Data Gap Work Plan and SAP	30 days from the effective date of this Agreed Order.
3. Final Data Gap Work Plan and SAP	45 days from Issuance of Ecology comments to the draft document.
4. Data Gap Work Plan and SAP Implementation	Shall be implemented per a schedule included in the Final Data Gap Work Plan and SAP that allows sufficient time to submit a timely Draft RI Report.
5. Draft Data Gap Technical Memorandum	Shall be implemented per a schedule included in the Final Data Gap Work Plan and SAP that allows sufficient time to submit a timely Draft RI Report.
6. Final Data Gap Technical Memorandum	60 days from Issuance of Ecology comments to the draft document.
7. Draft Wypenn Area Interim Action Work Plan	60 days from the effective date of this Agreed Order.
8. Final Wypenn Area Interim Action Work Plan	30 days from Issuance of Ecology comments to the draft document.
9. Draft RI Report	60 days from completion of the Final Data Gap Technical Memorandum.
10. Final RI Report	120 days from the date of issuance of Ecology comments to the draft document.
11. Draft FS Report	6 months from the date of issuance of the Final RI Report.
12. Final FS Report	45 days from Issuance of Ecology comments to the draft document.
13. Draft Cleanup Action Plan (CAP)	45 days from issuance of the Final FS Report.
14. Draft Interim Action Work Plan	60 days from Ecology determination.
15. Final Interim Action Work Plan	30 days from issuance of Ecology comments to draft.





## EXHIBIT D

### Permits and Substantive Requirements

Laws and regulations addressing permits or federal, state, or local requirements that Ecology believes may be applicable at the time of entry of this Order are listed below. This list may not include all pertinent laws and regulations. Work performed shall be in accordance within the substantive requirements of any applicable law or regulation.

#### Substantive Requirements Associated with this Action:

1. Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9601 et. seq.,
  - a. EPA Superfund Record of Decision: Commencement Bay, Near Shore/Tide Flats, EPA ID: WAD980726368, OU 01, 05, Pierce County, WA 09/30/1989
  - b. EPA Superfund Explanation of Significant Differences: Commencement Bay, Near Shore/Tide Flats, EPA ID: WAD980726368, OU 01, Pierce County, WA 08/03/2000
    - i. Sediment cap performance criteria
    - ii. Waterway cleanup criteria
2. Chapter 90.58 RCW (Shoreline Management Act) and Chapter 173-27 WAC (Shoreline Management Act Rules).
  - Do not build any permanent structures.
3. Chapter 70.105D RCW (Model Toxics Control Act), and Chapter 173-340 WAC (MTCA Regulations).
  - Implement this Agreed Order
4. Chapter 70.105 RCW (Washington State Hazardous Waste Management Act), and Chapter 173-303 WAC (State Dangerous Waste Regulations).
  - Tacoma Pierce County Health Department (TPCHD) approval for disposal of soils at their Pierce County Recycling, Disposal, & Composting, dba Land Recovery, Incorporated (LRI) Subtitle D landfill facility.
5. Chapter 173-160 RCW (Minimum Standards for Construction and Maintenance of Wells).
  - Records documenting well destructions and installations will be submitted by a licensed contractor.
6. Chapter 43.21C RCW (State Environmental Policy Act) and Chapter 197-11 WAC (State Environmental Policy Act Rules).

- Determination of non significance made by lead SEPA Agency (Department of Ecology).
7. Washington Industrial Safety and Health Act (WISHA).
- Contractor will develop a written Health and Safety Plan (HASP).

Permits associated with this action:

1. Nationwide Permit (NWP) 6, Survey Activities (Federal Register, March 12, 2007, Vol.72, No. 47)
2. Chapter 90.58 RCW (State Water Pollution Control Act) and Chapter 173-220 WAC (National Pollution Discharge Elimination System (NPDES) Permit Program Regulations - Construction Stormwater permit).
  - Compliance with Construction Stormwater General Permit WAR-010740.