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**IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON
KING COUNTY**

STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY,

Plaintiff,

v.

GATX TERMINALS CORPORATION
Defendant.

No.

CONSENT DECREE

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- Exhibit B: Draft Cleanup Action Plan
- Exhibit C: Site Access and Operating Procedures
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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 GATX Terminals Corporation (GATX) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Decree requires GATX to undertake the following remedial action(s):

1. Implement the Cleanup Action Plan (CAP)
2. Provide for public participation
3. Provide Remedial Design (RD)
4. Implement the Groundwater Compliance Monitoring that includes:
 - a. Protection monitoring
 - b. Performance monitoring
 - c. Confirmational monitoring

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, GATX agrees to its entry and agrees to be bound by its terms.

D. By entering into this Decree, the parties do not intend to discharge any other party from any liability it may have with respect to matters alleged in the Complaint. The parties retain the right to seek contribution, indemnity, reimbursement or other recovery, in whole or in part, from any other persons for sums expended under this Decree.

E. This Decree is not an admission of and shall not be construed as proof of liability or responsibility for any releases of hazardous substances or cost for remedial action nor an

1 admission of any facts; provided, however, that GATX shall not challenge the jurisdiction of
2 Ecology in any proceeding to enforce this Decree. GATX had assumed the obligations of
3 Shell Oil Company under Agreed Order No. DE 92 TC-N159 (Agreed Order), and GATX has
4 fully satisfied all requirements of the Agreed Order. This Decree supercedes Agreed Order
5 No. DE-92 TC-N 159F. The Court is fully advised of the reasons for entry of this
6 Decree, and good cause having been shown: IT IS HEREBY ORDERED, ADJUDGED, AND
7 DECREED AS FOLLOWS:

8 **II. JURISDICTION**

9 A. This Court has jurisdiction over the subject matter and over the parties pursuant to
10 Chapter 70.105D RCW, the Model Toxics Control Act (MTCA), and venue is proper in King County.

11 B. Authority is conferred upon the Washington State Attorney General by RCW
12 70.105D.040(4)(a) to agree to a settlement with any potentially liable person if, after public notice and
13 hearing, Ecology finds the proposed settlement would lead to a more expeditious cleanup of hazardous
14 substances. RCW 70.105D.040(4)(b) requires that such a settlement be entered as a consent decree
15 issued by a court of competent jurisdiction.

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

18 D. Ecology has given notice to GATX, as set forth in RCW 70.105D.020(15), of
19 Ecology's determination that GATX is a potentially liable person for the Site and that there has been a
20 release or threatened release of hazardous substances at the Site.

21 E. The actions to be taken pursuant to this Decree are necessary to protect public health,
22 welfare, and the environment, AND TO COMPLY WITH MTCA AND CERCLA.

23 F. GATX has agreed to undertake the actions specified in this Decree and consents to the
24 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. GATX agrees to undertake all actions required by the terms and conditions of this Decree and not to contest state jurisdiction to enforce this Decree. No change in ownership or corporate status shall alter the responsibility of GATX under this Decree. GATX shall provide a copy of this Decree to all agents, contractors and subcontractors retained to perform work required by this Decree and shall ensure that any contract for such work will be in compliance with this Decree.

IV. DEFINITIONS

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

A. Site: The Site, owned and operated by GATX, is located at 2720 13th Avenue SW, Seattle, Washington, 98124 and is divided into five distinct areas known as A, B, C, D and E Yards on Harbor Island (Site). The Site is part of the Tank Farm Operable Unit One (OU1) for the Harbor Island Superfund Site. The Site is more particularly described in Exhibit A to this Decree which is a detailed site diagram.

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

C. GATX: Refers to GATX Terminals Corporation.

D. Consent Decree or Decree: Refers to this Consent Decree and each of the exhibits to the Decree. All exhibits are by this reference incorporated herein, and are integral and enforceable parts of this Consent Decree. The terms "Consent Decree" or "Decree" shall include all exhibits to the Consent Decree.

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V. STATEMENT OF FACTS

Ecology makes the following finding of facts without any express or implied admissions by GATX.

A. Shell Oil Company owned the Site and operated a petroleum storage and distribution facility there from 1944 until 1994. In 1994, GATX acquired the Site and began to operate the Terminal located there. The Site is divided into five distinct areas known as the A, B, C, D, and E Yards. Two fuel tanker truck loading racks and an administrative office and maintenance building are located in the A Yard. The B and C Yards are used as bulk fuel storage areas. Fifteen above-ground storage tanks are located on the B Yard and six are located in the C Yard. The D Yard is situated between the B and C Yards. Also, the D Yard contains several maintenance buildings and material handling areas. The E Yard once served as a fuel loading rack facility but is currently leased to Chevron Oil Company. B. Ecology files contain the following report: Remedial Investigation, Shell Oil Company Harbor Island Terminal, Seattle, Washington, PACIFIC Environmental Group, Inc., Final 1994 RI Report. Based on the RI Report, Ecology finds as follows:

1. Free-phase hydrocarbons are confirmed to be present on the Site situated at the top of the water table in portions of the A Yard, B Yard and C Yard.
2. Residual hydrocarbons exceeding MTCA methods A and B matrix concentrations are confirmed to be present in the soil at the Site beneath southern portions of the B Yard, the northern portions of the A Yard, and the southern half of the C Yard.
3. Dissolved petroleum hydrocarbons exceeding the Surface Water Quality Standards are confirmed to be present in the groundwater at the Site beneath portions of the, A Yard, B Yard, and C Yard. Dissolved lead and arsenic exceeding the Surface Water Quality Standards are confirmed to be present in the groundwater at the Site beneath portions of the B Yard and C Yard.

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4. Lead and arsenic above Method A concentrations are confirmed to be present in the surface soil at the B and C Yards.

C. Ecology files contain the following report: Final Focused Feasibility Study Report; GATX Terminal Corporation Harbor Island Terminal, Seattle, Washington, PACIFIC Environmental Group, Inc., April 9, 1997 (FFS Report). Based on the FFS Report, Ecology finds as follows:

1. GATX identified a preferred remedy after evaluating other alternative remedies to address the hazardous substances located on site. Ecology concurs that the remedy preferred by GATX is appropriate. The preferred remedy consists of:

a. Active and passive point-source extraction of floating product, partial-penetrating down-gradient vertical barrier to stop product migration, or combinations of both;

b. Dual phase product extraction and air sparging;

c. Excavate to the extent technically practicable, accessible TPH hot spots using the action levels of 10,000 mg/kg in the C Yard subsurface soils affected by a December 1996 spill without undermining the integrity of the tanks next to the excavation areas. The location of the seven TPH hot spots designated for excavation to the extent technically practicable in the C Yard subsurface soils are the following, 1) MW-4, SS-17, SS-18, which is southeast of tank 44, 2) SS-2, which is northwest of tank 44, 3) S-6, which is northwest of tank 37, 4) SS-2 and SS-13, which is between tanks 42 and 39, 5) S-5 and S-8, which is between tanks 35 and 37, 6) S-10, which is north of tank 35, 7) S-12, which is southwest of tank 35. This will improve groundwater quality, enhance biodegradation of residual TPH and provide a more timely restoration of the inland portions of the site. The 10,000mg/kg action level is the EPA TPH Hot Spot Action Level for Harbor Island;

d. Excavate to the extent technically practicable, accessible TPH hot spots using the action levels of 20,000 mg/kg in the B Yard subsurface soils affected by historical spills

1 without undermining the integrity of the tanks next to the excavation areas. The two TPH hot spots
2 designated for excavation to the extent technically practicable in the B Yard subsurface soil are
3 identified in the following locations, 1) SS-28, which is located between tanks 18 and 21, 2) SS-9,
4 which is located southwest of tank 22. This will improve groundwater quality, enhance
5 biodegradation of residual TPH and provide a more timely restoration of the inland portions of the site.
6 The 20,000mg/kg, action level is the EPA Guideline for Corrective Action Plan and Monitored Natural
7 Attenuation Documents.

8 e. Upon completion of the free product removal from the Yard A,
9 conduct subsurface TPH soil confirmation analytical sampling north of A-29 and northwest of A-22,
10 which is northwest and southwest of the Garage Building in the A Yard. TPH hot spots up to 20,000
11 mg/kg are detected to be present at these locations. If the analytical results of the TPH subsurface soil
12 confirmation sampling confirm TPH hot spots to be present at these location, excavate to the extent
13 technically practicable, accessible TPH hot spots using the 20,000 mg/kg action levels in the, A Yard
14 subsurface soils. This will improve groundwater quality, enhance biodegradation of residual TPH and
15 provide a more timely restoration of the inland portions of the site.

16 f. Cap, fixate or excavate surface soils in B and C Yards where metal
17 concentrations exceed 1,000 mg/kg for lead and 32.6 mg/kg for arsenic (EPA ROD for Surface Soils
18 on Harbor Island). This is to prevent direct contact, prevent infiltration to the groundwater, and prevent
19 surface runoff to the bay through storm drains; and

20 g. Implement monitoring program for groundwater quality, institutional
21 controls, and, contingency plans.

22 D. In August, 1995, the United States District Court for Western District of Washington
23 (Civil Action No. 95-01495-Z) entered a Consent Decree (Federal Consent Decree) in *U.S. v. The Port*
24 *of Seattle et al.* relating to claims under the Comprehensive Environmental Response, Compensation
25 and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq., involving the Harbor Island Superfund Site.
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1 Article I, Paragraph 8 of the Federal Consent Decree identifies operable units within the Harbor Island
2 Superfund Site and recites that the Petroleum Tank Farm Operable Unit is under the management of
3 the Department of Ecology. The Environmental Protection Agency and Ecology have entered into
4 Memorandums of Understanding, dated February 5, 1991 and March 3, 1994, setting forth the duties
5 and responsibilities of each agency with regard to site management and enforcement activities at the
6 Harbor Island Superfund Site.

7 **VI. WORK TO BE PERFORMED**

8 This Decree contains a program designed to protect public health, welfare and the environment
9 from the known release, or threatened release, of hazardous substances at, on, or from the Site. GATX
10 agrees to take the following remedial actions and to conduct all work in accordance with Ch. 173-340
11 WAC, unless otherwise specifically provided herein. These actions are more specifically described in
12 the Cleanup Action Plan attached as Exhibit B.

13 A. Task 1: Implement the Cleanup Action Plan (CAP):

- 14 1. Implement active and passive point-source extraction of floating product,
15 partial-penetrating down-gradient vertical barrier to stop product migration; Remove
16 free product from the groundwater throughout the Site;
- 17 2. Implement dual-phase extraction of product and air sparging;
- 18 3. Excavate to the extent technically practicable, accessible TPH hot spots
19 using the action levels of 10,000 mg/kg in the C Yard subsurface soils affected by the December
20 1996 spill without undermining the integrity of the tanks next to the excavation areas. The
21 location of the seven TPH hot spots designated for excavation to the extent technically practicable
22 in the C Yard subsurface soils are the following, 1) MW-4, SS-17, SS-18, which is southeast of
23 tank 44, 2) SS-2, which is northwest of tank 44, 3) S-6, which is northwest of tank 37, 4) SS-2
24 and SS-13, which is between tanks 42 and 39, 5) S-5 and S-8, which is between tanks 35 and 37,
25 6) S-10, which is north of tank 35, 7) S-12, which is southwest of tank 35. Excavate to the extent
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1 technically practicable, accessible TPH hot spots using the action levels of 20,000 mg/kg in the B Yard
2 subsurface soils affected by historical spills without undermining the integrity of the tanks next to the
3 excavation areas. The location of the two TPH hot spots designated for excavation to the extent
4 technically practicable in the B Yard subsurface soil are the following, 1) SS-28, which is located
5 between tanks 18 and 21, 2) SS-9, which is located southwest of tank 22. Upon completion of
6 the free product removal from the Yard A, conduct subsurface TPH soil confirmation analytical
7 sampling north of A-29 and northwest of A-22, which is northwest and southwest of the Garage
8 Building in the A Yard. TPH hot spots up to 20,000 mg/kg are detected to be present at these
9 locations. If the analytical results of the TPH subsurface soil confirmation sampling confirm TPH hot
10 spots to be present at these location, excavate to the extent technically practicable, accessible TPH hot
11 spots using the 20,000 mg/kg action levels in the, A Yard subsurface soils. These actions required for
12 the A, B, and C Yards will improve groundwater quality, enhance biodegradation of the residual TPH
13 and provide a timely restoration of the affected areas;

14 4. Cap, fixate or excavate surface soils in B and C Yards where lead and arsenic
15 concentrations exceed 1000 mg/kg and 32.6 mg/kg, respectively (EPA ROD for Harbor Island Surface
16 Soils);

17 5. Implement monitoring program for groundwater quality;

18 6. Implement institutional controls and Restrictive Covenant attached hereto as
19 Exhibit D; and

20 7. Implement contingency plans, if necessary.

21 B. Task 2: Provide for public participation.

22 C. Task 3: Provide Remedial Design (RD).

23 D. Task 4: Implement the Compliance Groundwater Monitoring Program attached hereto
24 as Exhibit F, which includes:

25 1. Protection monitoring;

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- 2. Performance monitoring;
- 3. Confirmational monitoring.

E. Task 5: Implement Schedule attached hereto as Exhibit E.

F. GATX agrees not to perform any remedial actions on the Site that are inconsistent with the remedial actions required under this Consent Decree.

VII. DESIGNATED PROJECT COORDINATORS

The project coordinator for Ecology is:

Nnamdi Madakor, Senior Hydrogeologist
 Washington State Department of Ecology
 Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008-5452
 (425) 649-7112

The project coordinator for GATX is:

Eric J. Conard, REA
 GATX Terminals Corporation
 1363 N. Gaffey St.
 San Pedro, CA 90731-1323
 (310) 518-7746

Each project coordinator shall be responsible for overseeing the implementation of this Decree. The Ecology project coordinator will be Ecology's designated representative at the Site. To the maximum extent possible, communications between Ecology and GATX and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Decree, 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 remedial work required by this Decree. The project coordinators may agree to minor modifications to the work to be performed without formal amendments to this Decree. Minor modifications will be documented in writing by Ecology.

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

3 **VIII. PERFORMANCE**

4 All work performed pursuant to this Decree shall be under the direction and supervision, as
5 necessary, of a professional engineer or hydrogeologist, or equivalent, with experience and expertise in
6 hazardous waste site investigation and cleanup. Any construction work must be under the supervision
7 of a professional engineer. GATX shall notify Ecology in writing as to the identity of such engineer(s)
8 or hydrogeologist(s), or others and of any contractors and subcontractors to be used in carrying out the
9 terms of this Decree, in advance of their involvement at the Site. GATX may replace its selected
10 project coordinator upon written notice to Ecology.

11 **IX. ACCESS**

12 Ecology or any Ecology-authorized representatives shall have the authority to enter and freely
13 move about all property at the Site at all reasonable times for the purposes of, inter alia: inspecting
14 records, operation logs, and contracts related to the work being performed pursuant to this Decree;
15 reviewing GATX's progress in carrying out the terms of this Decree; conducting such tests or
16 collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other
17 documentary type equipment to record work done pursuant to this Decree; and verifying the data
18 submitted to Ecology by GATX. Without limitation on Ecology's rights under this section, Ecology
19 will provide GATX advance notice of its entry onto the Site when feasible. All parties with access to
20 the Site pursuant to this paragraph shall comply with Site Access and Operating Procedures, attached
21 hereto as Exhibit C. Ecology shall make available to GATX the results of all sampling, laboratory
22 reports, videos and other test results generated by Ecology or on its behalf.

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X. SAMPLING, DATA REPORTING, AND AVAILABILITY

GATX shall make available to Ecology the results of all sampling, laboratory reports, and/or test results generated by GATX, or on its behalf, in the implementation of this Decree and shall submit these results in accordance with Section XI of this Decree.

In accordance with WAC 173-340-840(5), ground water sampling data shall be submitted according to the requirements that will be established in the Groundwater Compliance Monitoring Program, Exhibit F.

Each party shall allow split or replicate samples to be taken by the other and shall provide 5 working days notice before conducting any sampling activities.

XI. PROGRESS REPORTS

GATX shall submit to Ecology written progress reports that describe the actions taken to implement the requirements of this Decree. The progress report shall be prepared no more frequently than set forth in the following schedule:

- Quarterly during remedial design activities;
- Monthly during construction phase activities;
- Monthly for the first quarter after remedial system startup.

The frequency of progress reports to be submitted following the first quarter after remedial system startup shall be established in the Groundwater Compliance Monitoring Program. Progress reports shall include the following:

- A. A list of on-site activities that have taken place during the reporting period;
- B. Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests;
- C. Description of all deviations from the schedule (Section VI, Work To Be Performed: Task 5) during the current reporting period and any planned deviations in the upcoming reporting period;

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 GATX during the past month
4 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 All progress reports shall be submitted by the fifteenth day of the reporting period in which
7 they are due after the effective date of this Decree. Unless otherwise specified, progress reports and
8 any other documents submitted pursuant to this Decree shall be sent to Ecology's project coordinator.

9 **XII. RETENTION OF RECORDS**

10 GATX shall preserve, during the pendency of this Decree and for ten (10) years from the date
11 this Decree is no longer in effect as provided in Section XXV, all records, reports, documents, and
12 underlying data in its possession relevant to the implementation of this Decree and shall insert in
13 contracts with project contractors and subcontractors a similar record retention requirement. Upon
14 request of Ecology, GATX shall make all non-archived, non-privileged records available to Ecology
15 and allow access for review. All archived non-privileged records shall be made available to Ecology
16 within a reasonable period of time.

17 **XIII. TRANSFER OF INTEREST IN PROPERTY**

18 Prior to any voluntary or involuntary conveyance or relinquishment of any legal or equitable
19 interest in all or any portion of the Site, GATX shall provide for continued operation and maintenance
20 of any containment system, treatment system, and monitoring system installed or implemented
21 pursuant to this Decree.

22 Prior to transfer of any legal or equitable interest in all or any portion of the property, and
23 during the effective period of this Decree, GATX shall serve a copy of this Decree upon any
24 prospective purchaser, lessee, transferee, assignee, or other successor in interest of the property; and, at
25 least thirty (30) days prior to any transfer, GATX shall notify Ecology of said contemplated transfer.
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XIV. RESOLUTION OF DISPUTES

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

1. Upon receipt of the Ecology project coordinator's decision, GATX has fourteen (14) days within which to notify Ecology's project coordinator of its objection to the decision.

2. 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.

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

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

B. If Ecology's final written decision is unacceptable to GATX, the parties may, by mutual agreement, submit the dispute to a neutral mediator. If the parties reach agreement as a result of the mediation, they shall jointly prepare a written resolution of the dispute immediately following the mediation session. If the parties fail to reach agreement as a result of the mediation, then Ecology shall, within thirty (30) days after the conclusion of the mediation, issue a written statement either reaffirming its original decision or setting forth a new decision. GATX has the right to submit the dispute to the Court for resolution within thirty (30) days after any of the following: (i) GATX receives written notice that Ecology does not agree to submit the dispute to mediation; (ii) after mediation, GATX receives a written statement from Ecology that is unacceptable to GATX; or (iii) Ecology fails to issue the final

1 decision described earlier in this paragraph. The parties agree that one judge should retain jurisdiction
2 over this case and shall, as necessary, resolve any dispute arising under this Decree.

3 C. For disputes that involve Ecology's investigative and remedial decisions, and others
4 covered by RCW 70.105D.060, the standard of review shall be arbitrary and capricious. For all other
5 disputes, the court shall decide the standard of review.

6 D. The parties agree to only utilize the dispute resolution process in good faith and agree
7 to expedite, to the extent possible, the dispute resolution process whenever it is used. Where either
8 party utilizes the dispute resolution process in bad faith or for purposes of delay, the other party may
9 seek sanctions.

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

13 **XV. AMENDMENT OF CONSENT DECREE**

14 Except for an extension granted pursuant to Section XVI below or technical revisions to
15 Section VI or Exhibit B affecting the nature or scope of remedial work, this Decree may only be
16 amended by a written stipulation among the parties to this Decree that is entered by the Court or by
17 order of the Court. Such amendment shall become effective upon entry by the Court. Agreement to
18 amend shall not be unreasonably withheld by any party to the Decree.

19 GATX shall submit any request for an amendment to Ecology for approval. Ecology shall
20 indicate its approval or disapproval in a timely manner after the request for amendment is received. If
21 the amendment to the Decree is substantial, Ecology will provide public notice and opportunity for
22 comment. Reasons for the disapproval shall be stated in writing. If Ecology does not agree to any
23 proposed amendment, the disagreement may be addressed through the dispute resolution procedures
24 described in Section XIV of this Decree. Technical revisions to Section VI or Exhibit B, affecting the
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1 nature or scope of remedial work, may be made by mutual written agreement of the parties without
2 approval of the court.

3 **XVI. EXTENSION OF SCHEDULE**

4 A. An extension of schedule shall be granted only when a request for an extension is
5 submitted in a timely fashion, generally at least 15 days prior to expiration of the deadline for which the
6 extension is requested, and good cause exists for granting the extension. All extensions shall be
7 requested in writing. The request shall specify the reason(s) the extension is needed.

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

12 B. The burden shall be on GATX to demonstrate that the request for such extension has
13 been submitted in a timely fashion and that good cause exists for granting the extension. Good cause
14 includes, but is not limited to, the following.

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

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

20 3. Endangerment as described in Section XVII; or

21 4. Other circumstances deemed by Ecology to be exceptional, extraordinary, or
22 otherwise necessary to protect the environment or public interest.

23 However, neither increased costs of performance of the terms of the Decree nor changed
24 economic circumstances shall be considered circumstances beyond the reasonable control of GATX.

1 C. Ecology may extend the schedule for a period not to exceed ninety (90) days, except
2 where an extension is needed as a result of:

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

5 2. Other circumstances deemed exceptional or extraordinary by Ecology; or
6 otherwise necessary to protect public health or the environment; or

7 3. Endangerment as described in Section XVII.

8 Ecology shall give GATX written notification in a timely fashion of any extensions granted
9 pursuant to this Decree. Ecology shall not unreasonably withhold approval of requested extensions.

10 **XVII. ENDANGERMENT**

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

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

10 **XVIII. COVENANT NOT TO SUE**

11 A. In consideration of GATX's compliance with the terms and conditions of this Decree,
12 Ecology covenants that compliance with this Decree shall stand in lieu of any and all administrative,
13 legal, and equitable remedies and enforcement actions available to Ecology against GATX for the
14 release or threatened release of hazardous substances covered by the terms of this Decree.

15 B. This covenant is strictly limited in its application to the Site specifically described in
16 Exhibit A and to those hazardous substances that Ecology knows to be located at the Site as of the date
17 of entry of this Decree. This covenant is not applicable to any other hazardous substance or area, and
18 Ecology retains all of its authority relative to such substances and areas.

19 C. In the following circumstances Ecology may exercise its full legal authority to address
20 releases of hazardous substances at the Site notwithstanding the Covenant Not to Sue set forth above:

21 1. If GATX fails to comply with the terms and conditions of this Decree,
22 including all exhibits, and, after written notice of noncompliance and reasonable opportunity for
23 compliance, fails to do it; or

24 2. If factors not known at the time of entry of this Decree, including factors listed
25 in WAC 173-340-420(2), are discovered and Ecology determines, in light of these factors, that further
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1 remedial action is necessary at the Site to protect human health or the environment, provided that, if
2 this paragraph becomes operative, Ecology will allow GATX to propose the further action where such
3 proposal can be made promptly and without endangering human health or the environment; or

4 3. If Ecology determines that conditions at the Site cause an endangerment to
5 human health or the environment, and that actions beyond those required under this Decree are
6 necessary.

7 D. The Covenant Not to Sue set forth above shall have no applicability whatsoever to

8 1. Criminal liability;

9 2. Any liability for damages to natural resources;

10 3. Any Ecology action against potentially liable persons not a party to this Decree.

11 **XIX. INDEMNIFICATION**

12 GATX agrees to indemnify and save and hold the State of Washington, its employees,
13 and agents harmless from any and all claims or causes of action for death or injuries to persons or for
14 loss or damage to property arising from or on account of negligent acts or omissions of GATX, its
15 officers, employees, agents, or contractors in entering into and implementing this Decree. However,
16 GATX shall not indemnify the State of Washington nor save nor hold its employees and agents
17 harmless from any claims or causes of action arising out of the intentional misconduct or negligent acts
18 or omissions of the State of Washington, or the employees or agents of the State, in implementing the
19 activities pursuant to this Decree.

20 **XX. COMPLIANCE WITH APPLICABLE LAWS**

21 A. All actions carried out by GATX pursuant to this Decree shall be done in accordance
22 with all applicable federal, state, and local requirements, including requirements to obtain necessary
23 permits, except as provided in Paragraph B. of this section.
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1 B. Exhibit B, the Cleanup Action Plan, will include the substantive requirements of
2 chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW and of any laws requiring or authorizing
3 local government permits or approvals for the remedial action under this Decree.

4 GATX has a continuing obligation to determine whether additional permits or approvals
5 addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this
6 Decree. In the event either GATX or Ecology determines that additional permits or approvals
7 addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this
8 Decree, it shall promptly notify the other party of this determination. Ecology shall determine whether
9 Ecology or GATX shall be responsible to contact the appropriate state and/or local agencies. If
10 Ecology so requires, GATX shall promptly consult with the appropriate state and/or local agencies and
11 provide Ecology with written documentation from those agencies of the substantive requirements those
12 agencies believe are applicable to the remedial action. Ecology shall make the final determination on
13 the additional substantive requirements that must be met by GATX and on how GATX must meet
14 those requirements. Ecology shall inform GATX in writing of these requirements. Once established
15 by Ecology, the additional requirements shall be enforceable requirements of this Decree. GATX shall
16 not begin or continue the remedial action potentially subject to the additional requirements until
17 Ecology makes its final determination.

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

20 C. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption
21 from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1)
22 would result in the loss of approval from a federal agency which is necessary for the State to administer
23 any federal law, the exemption shall not apply and GATX shall comply with both the procedural and
24 substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements
25 to obtain permits.
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1 D. In implementing this Decree for purposes such as sampling, it is contemplated that
2 GATX may remove limited quantities of soil, groundwater, and other materials (collectively,
3 “Materials”) from real property within or adjacent to the Site. Any removal shall be done in
4 compliance with all applicable laws as required by this Section XX. It is agreed that any disposition of
5 the Materials by GATX, including documents generated pursuant to such disposition, shall not be
6 deemed to be an admission by such party of liability for purposes of the Model Toxics Control Act.

7 **XXI. REMEDIAL AND INVESTIGATIVE COSTS**

8 A. GATX agrees to pay costs incurred by Ecology pursuant to this Decree which have not
9 been previously paid. These costs shall include work performed by Ecology or its contractors for, or
10 on, the Site under Ch. 70.105D RCW, both prior to and subsequent to the issuance of this Decree, for
11 investigations, remedial actions, Cleanup Action Plan and Decree preparation, negotiations, oversight
12 and administration. Ecology costs shall include costs of direct activities and support costs of direct
13 activities as defined in WAC 173-340-550(2). GATX agrees to pay the required amount within ninety
14 (90) days of receiving from Ecology an itemized statement of costs that includes a summary of costs
15 incurred, an identification of involved staff, and the amount of time spent by involved staff members on
16 the project. A general statement of work performed will be provided upon request and GATX has
17 submitted such a request to Ecology. Itemized statements and costs shall be prepared quarterly.
18 Failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement will result in
19 interest charges as allowed by law. GATX reserves the right to review and approve any charges prior
20 to payment. Any dispute regarding remedial and investigation costs for the Site shall be subject to
21 dispute resolution pursuant to Section XIV. GATX reserves the right to pay the undisputed portion of
22 an invoice and not pay the disputed portion.

23 **XXII. IMPLEMENTATION OF REMEDIAL ACTION**

24 If Ecology determines that GATX has failed without good cause to implement the
25 remedial action, Ecology may, after notice and reasonable opportunity to GATX to cure the
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1 failure, perform any or all portions of the remedial action that remain incomplete. If Ecology
2 performs all or portions of the remedial action because of GATX's failure to comply with its
3 obligations under this Decree, GATX shall reimburse Ecology for the costs of doing such work in
4 accordance with Section XXI, provided that GATX is not obligated under this section to
5 reimburse Ecology for costs incurred for work inconsistent with or beyond the scope of
6 this Decree.

7 **XXIII. FIVE YEAR REVIEW**

8 As remedial action, including ground water monitoring, continues at the Site, the parties agree
9 to review the progress of remedial action at the Site, and to review the data accumulated as a result of
10 site monitoring as often as is necessary and appropriate under the circumstances or as agreed upon in
11 the Compliance Groundwater Monitoring Program for the Site. The parties agree to meet to discuss
12 the Site status every five years upon request from Ecology, or at GATX's request. Ecology reserves
13 the right to require further remedial action at the Site under appropriate circumstances. This provision
14 shall remain in effect for the duration of the Decree.

15 **XXIV. PUBLIC PARTICIPATION**

16 Ecology shall maintain the responsibility for public participation at the Site. However, GATX
17 shall cooperate with Ecology and, if agreed to by Ecology, shall:

18 A. Prepare drafts of public notices and fact sheets at important stages of the remedial
19 action, such as the submission of engineering design reports. Ecology will finalize (including editing if
20 necessary) and, after receiving and considering comments from GATX, distribute such fact sheets and
21 prepare and distribute public notices of Ecology's presentations and meetings;

22 B. Notify Ecology's project coordinator prior to the preparation of all press releases and
23 fact sheets, and before major meetings with the interested public and local governments. Likewise,
24 Ecology shall notify and consult with GATX prior to the issuance of all press releases and fact sheets,
25 and before major meetings with the interested public and local governments;

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

4 D. Provide Ecology with copies of documents to be placed in information repositories to
5 be located at the Seattle Public Library, Downtown Branch, Magazines, Newspapers and Government
6 Publications Dept., 1000 4th Ave., Seattle, Washington 98104 and Ecology's Northwest Regional
7 Office at 3190 160th Avenue SE, Bellevue, Washington 98008-5452. Copies of all public notices, fact
8 sheets, and press releases; all quality assured ground water, surface water, soil sediment, and air
9 monitoring data; remedial actions plans, supplemental remedial planning documents, and all other
10 similar documents relating to performance of the remedial action required by this Decree shall be
11 promptly placed in these repositories.

12 **XXV. DURATION OF DECREE**

13 A. This Decree shall remain in effect and the remedial program described in the Decree
14 shall be maintained and continued until GATX has received written notification from Ecology that the
15 requirements of this Decree have been satisfactorily completed. Ecology shall issue such notification
16 within sixty (60) days after the requirements of this Decree have been satisfactorily completed.
17 Thereafter the parties within thirty (30) days shall jointly request that the Court vacate this Consent
18 Decree.

19 B. Upon completion of each action specified in the Final CAP, Ecology shall issue a
20 Certificate of Completion within sixty (60) days after such action has been completed.

21 **XXVI. CLAIMS AGAINST THE STATE**

22 GATX hereby agrees that it will not seek to recover any costs incurred in implementing the
23 remedial action required by this Decree from the Washington Department of Ecology; State of
24 Washington or any of its agencies, with the exception of the Department of Natural Resources; and
25 further, that GATX will make no claim against the State Toxics Control Account or any Local Toxics
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1 Control Account for any costs incurred in implementing this Decree. Except as provided above,
2 however, GATX expressly reserves its right to seek to recover any costs incurred in implementing this
3 Decree from any other potentially liable person. GATX further reserves its right to make a claim
4 against the State or Local Toxics Control Account for the costs incurred in remediating hazardous
5 substances released as a result of third-party offsite activities, but only if future amendments to MTCA
6 or applicable regulations or guidelines allow for such claims, and operate retroactively. No
7 determination has been made whether such a claim, if filed, would be valid, and both parties agree that
8 any claim would have to be evaluated under the law in effect at the time the claim was made.

9 **XXVII. EFFECTIVE DATE**

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

11 **XXVIII. PUBLIC NOTICE AND WITHDRAWAL OF CONSENT**

12 This Decree has been the subject of public notice and comment under RCW
13 70.105D.040(4)(a). As a result of this process, Ecology has found that this Decree will lead to a more
14 expeditious cleanup of hazardous substances at the Site.

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

18 **XXIX. LAND USE RESTRICTIONS**

19 GATX agrees that the Restrictive Covenant, Exhibit D, shall be recorded with the office
20 of the King County Auditor within 10 days of the entry of this Decree and shall restrict future
21 uses of the Site. With Ecology's prior written approval, and after completion of the remedial
22 action required by this Decree, GATX, or its successor(s), may record an instrument that provides
23 that the Restrictive Covenant provided in Exhibit D shall no longer limit uses of the Site or be of
24 any further force or effect.

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XXX. CONTRIBUTION PROTECTION

A. With regard to actions, claims, counterclaims, or cross-claims for contribution against GATX for Matters Addressed in this Consent Decree, the parties hereto agree that GATX is entitled to contribution protection from any actions, claims, or cross-claims pursuant to MTCA, RCW 70.105D.080, or any other federal or state claim or cross-claim seeking, under other theories, substantially similar relief, to the fullest extent allowed by MTCA, RCW 70.105D.080. The contribution protection conferred in this section shall not be frustrated by the use of non-MTCA theories to seek relief in the nature of contribution or indemnification. For the purpose of this paragraph, "Matters Addressed" shall include all past and future investigation and remedial measures taken at the Site by GATX or Shell Oil Company pursuant to this Consent Decree or under Ecology oversight.

B. The response costs paid by GATX under this Decree shall not in any way constitute an admission as to an appropriate allocation of liability, if any, at the Site. This Section XXX shall apply to, but is not limited to, successors in interest who assume obligations under this Decree.

XXXI. RESERVATION OF RIGHTS

By agreeing to this Decree, GATX and Ecology agree to abide by its terms. The execution and performance of the Decree is not, however, an admission by GATX of any fact or liability for any purpose other than as a foundation for the entry of this Decree. GATX's performance under the Decree is undertaken without waiver of or prejudice to any claims or defenses whatsoever that may be asserted in the event of further administrative proceedings or litigation not associated with, or related to, this Decree.

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

**STATE OF WASHINGTON
ATTORNEY GENERAL'S OFFICE**

By: _____
JAMES PENDOWSKI
Program Manager

By: _____
KEN LEDERMAN
WSBA #

Toxics Cleanup Program

Assistant Attorney General

GATX TERMINALS CORPORATION

By: _____

Dated this _____ day of _____, 1999.

JUDGE
King County Superior Court

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EXHIBIT B

CLEANUP ACTION PLAN (CAP)

GATX TERMINAL CORPORATION HARBOR ISLAND

Seattle, Washington

November 2, 1999

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EXHIBIT B
CLEANUP ACTION PLAN (CAP)

GATX TERMINAL CORPORATION HARBOR ISLAND
Seattle, Washington

1.0 INTRODUCTION

This Cleanup Action Plan (CAP) is provided to describe the proposed remediation at the GATX Harbor Island Terminal (Terminal) located in Seattle, Washington. It has been prepared to satisfy the requirements of the Model Toxics Control Act (MTCA) Agreed Order No. DE 92 TC-N159, cooperatively entered into between the former owner, SHELL Oil and the Washington State Department of Ecology (Ecology) and to implement the Consent Decree between Ecology and GATX Terminals Corporation (GATX). GATX acquired the site from SHELL Oil in 1994.

The purposes of this CAP are to: 1) describe the site, including a summary of its history and extent of contamination; 2) identify the site-specific cleanup standards, 3) summarize the remedial cleanup action alternatives presented in the Focused Feasibility Studies (FFS), 4) identify and describe the selected remedial action alternative for the site and 5) discuss the implementation schedule. Detailed information regarding site history, characterization, and the evaluation of alternative cleanup actions is contained in the final RI and final FFS reports [Pacific Environmental Group, Inc., 1994, 1997].

The remedial actions selected for the site are to occur under the legal framework of a Consent Decree between GATX and Ecology.

2.0 SUMMARY OF SITE CONDITIONS & INTERIM REMEDIATION SYSTEM

This section provides a summary of site conditions, including the nature and extent of impacts and a description of interim remediation system conducted on the site. In addition, the exposure pathways identified for the site are briefly described.

2.1 Site

The GATX Harbor Island Terminal is located at 2720 13th Avenue Southwest in Seattle, Washington (Figure 1) and is part of a U.S. EPA Superfund Site, the Terminal Operable Unit. The facility, approximately 14 acres in size, is located in the highly industrialized north-central

section of Harbor Island and was owned and operated by Shell since 1944. In December 1994, GATX purchased the Terminal from Shell and currently manages all facility operations. The Terminal is situated on relatively level property, with surface elevations ranging between 6 to 11 feet above sea level. There are no surface water bodies on the Terminal property boundaries. The site is situated approximately 1,400 feet from the West Waterway and over 1000 feet from the East Waterway. The site is zoned industrial and meets the industrial criteria established under WAC 173-340-745. It is likely that the site will remain an industrial facility and a Superfund Site in the foreseeable future. Ecology and EPA have determined that there is no current or planned future use of groundwater beneath Harbor Island for drinking water purposes.

The Terminal is presently divided into five distinct areas (Figure 2). These areas include the A, B, C, D, and E Yards. The A Yard contains two fuel tanker truck-loading racks. The administrative office and maintenance building is also situated in the A Yard. The A Yard is entirely paved with asphalt or concrete. The A Yard is bounded by a containment dike for the B Yard on the north and by chain-link fencing on the south, east, and west.

The B and C Yards are used as bulk fuel storage areas. Fifteen above ground storage tanks are located within the B Yard and six are situated within the C Yard. Both yards are mostly unpaved and are surrounded by concrete containment dikes.

The D Yard is situated between the B and C Yards and has been used to route product and utility lines. Several maintenance buildings and material handling areas are also situated within the D Yard. The partially paved yard is enclosed to the north and south by concrete dikes from the B and C Yards and is fenced on the east and west sides.

The E Yard once served as a fuel loading rack facility. This yard is currently leased to Chevron Oil Company and is partially paved. Terminal operations commenced in 1944 when tanks in the B Yard were installed. Tanks in the C Yard were subsequently constructed in 1951. A loading rack was once situated in the E Yard. This rack and associated piping were removed in 1992. Shell leased the A Yard from the Port of Seattle (Port) in 1979 and constructed two fuel tanker truck loading racks. The loading racks remain in use by GATX today.

The Terminal is situated on the southeast portion of a groundwater mound that is centered on the northern half of Harbor Island. Groundwater migration is south, southeast and southwest across the site. The predominant groundwater flow direction is toward the southeast. The primary groundwater discharge point is the Duwamish River, East and West Waterways. Due to the dampening effect of the bulkhead structures along the East and West Waterways of the Duwamish River, and the inland location of the site which is at the center of the Island, water table fluctuations in response to tidal influence and seasonal fluctuations is less than 1 feet at the site.

2.1.1 Nature and Extent

The following section summarizes the nature and extent of contamination at the site based on the results of the RI and FFS. A general discussion of the contaminants detected at the site is presented first. A summary of the floating product or product (defined as a separate phase, mobile petroleum hydrocarbon compounds) plume beneath the A and C Yards is presented next since this and the surface soils impacts of lead and arsenic are the primary areas of concerns at the site. Sections on total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylene compounds (BTEX) follow.

The primary constituents of concern encountered in the subsurface soil beneath the Terminal are TPH-G, TPH-D, and TPH-O. Elevated TPH concentrations exist in four general areas: (1) the southern portion of the B Yard, (2) the northern portion of the A Yard, (3) the southern half of the C Yard, and (4) the area between Tanks 39 and 42 in the C Yard.

The inorganic metals, arsenic and lead are present throughout the C and B Yards on the surface soils and in the groundwater and are likely due to historical air stack emissions from an offsite smelter.

Within the C Yard, TPH-gasoline and benzene are also primary contaminants of concern in the surface soil. GATX conducted an aggressive interim action in 1996 and early 1997 to contain and remove the floating product and dissolved petroleum hydrocarbons from beneath the site resulting from the December 1996 release. Approximately, 7,200 gallons of product, and 142,497 gallons of contaminated groundwater were recovered from the subsurface, recycled (for the product), and treated (the dissolved petroleum hydrocarbons), before disposal.

The results of the site characterization activities conducted during the RI indicate that contaminants present in soil and groundwater at the site are primarily freshly spilled gasoline (estimated 48,000 gallons, December 1996). The spill is mixed with highly weathered total petroleum hydrocarbons as diesel (TPH-D) with lesser amounts of weathered gasoline (TPH-G) and heavier oil (TPH-O), and inorganic metals (arsenic and lead). The weathered TPH is most likely the result of historic spills at the site.

Floating Product. The presence of floating product is limited to seven areas in the A Yard, one area in the B Yard. In January 1997, the thickness of floating product present in the A yard, ranged from 0.01 to 0.48 feet. Product observed in the B Yard ranged in thickness from 0.14 to 1.60 feet (Wells 12 and 15) during this period. The thickness of measurable product in the C Yard ranged from 0.11 to 1.20 feet in December 1996. In February 1997, measurable amounts of product in the C Yard had decreased since the implementation of the

interim action and it ranged, in thickness from 0.01 to 0.23 feet. The interim action was discontinued in April 1997. In May 1998, no free product was observed in the C Yard.

The result of the Supplemental Investigation of the C Yard Fuel Spill indicate that approximately 7,200 gallons of gasoline was initially recovered from the ground surface, and about 4,900 gallons was recovered from the water table. The remainder of the spill probably volatilized directly into the atmosphere or adsorbed in soil. The proposed remedial action alternatives presented in this CAP is intended to address this and other petroleum hydrocarbon contamination at the site.

Arsenic and Lead. Arsenic and Lead were found in surface soils throughout B and C Yards, and portions of D, and E, Yards of the tank farms above Harbor Island action levels (lead 1000- mg/kg, arsenic - 32.6 mg/kg) set in the EPA ROD for the surface soils. These action levels are based on a risk assessment conducted by EPA. EPA conducted surface soil investigations for the island including the GATX site. Ecology and EPA in a memorandum of agreement (MOA) agreed not to duplicate investigation efforts on the island except where data gaps exist. In 1994, Ecology concurred with the EPA ROD on Harbor Island.

The lateral distribution of lead appears to be relatively uniform across the B and C Yards. Lead concentrations decrease rapidly at depth to less than 100 parts per million (ppm) at 1.5 feet below grade. At depths below 1.5 feet, total lead concentrations in soil were below 51 ppm. The occurrence of lead is most likely associated with stack emissions from an offsite former lead smelter located south of the GATX site.

Total lead in the groundwater was detected in 18 of the 24 groundwater samples analyzed (75%), while dissolved lead was detected in 2 of the 11 groundwater samples analyzed (18%). Arsenic was detected in 4 of the 10 groundwater samples analyzed (40%). Arsenic and lead are the only metals detected in groundwater above cleanup levels during the RI monitoring. Dissolved copper, arsenic and lead were also detected across much of the northern portion of Harbor Island during the USEPA RI, indicating elevated background concentrations. These inorganic metals are associated with the former lead smelter and marine paints used at shipbuilding and repair facilities adjacent to the Texaco Terminal (Tetra Tech 1988).

TPH and BTEX. RI data also indicate that elevated concentrations of TPH are present in the subsurface soils. The primary constituents of concern encountered in the subsurface soil beneath the Terminal are TPH-G, TPH-D, and TPH-O. Of the soil samples analyzed for the site, distribution of detected total TPH are: 19% contained TPH-G, 42% contained TPH-D, and 39% contained TPH-O. Elevated TPH concentrations exist in four general areas: (1) the south portion of the B Yard, (2) the northern portion of the A Yard, (3) the area adjacent to Tank 44 situated in the southeast portion of the C Yard, and (4) the area between Tank 39 and 42 in the C Yard. These findings tend to correlate with documented releases from above-ground tanks in the B and C Yards (Hart Crowser, 1992).

It is suspected that the primary potential source areas for TPH observed within the A, Yard include a former oil-water separator, a former loading rack, a former UST that previously stored diesel, and a portion of an old vapor recovery system. All of these facilities have ceased operation and have been removed or decommissioned. The vertical migration of TPH in soil is limited because of the shallow depth to groundwater. In most cases, TPH concentrations are highest at the groundwater table interface. However, the Supplemental RI data show that a resulting “smear” zone of product in soil beneath the product plume has been detected up to 4 feet below the water table.

The primary dissolved contaminants observed in groundwater include TPH-G, TPH-D, TPH-O, and benzene. The extent of dissolved TPH-G in groundwater is generally limited to the northern, western and southern portions of the A Yard, the southwest portion of the B Yard, and the southern and southeastern portions of the C Yard. This observation concurs with past gasoline usage and storage practices at the Terminal.

Of the groundwater samples analyzed for the site, distribution of detected dissolved total petroleum hydrocarbons are: 30% contained TPH-G, 52% contained TPH-D, and 18% contained TPH-O. Relatively uniform concentrations of TPH-D were observed in groundwater from wells in the C, D, and E Yards, slightly elevated concentrations of TPH-D (2 to 13 ppm) were detected in the B Yard and are likely due to the presence of separate phase hydrocarbons in this area. Benzene was detected in 10 of the 22 groundwater samples analyzed (45%).

Fate and transport groundwater modeling conducted for the tank farms show that constituents of the dissolved petroleum hydrocarbons (e.g., benzene) do not pose a threat at the shorelines of the East and West Waterways of the Duwamish River. Therefore the primary concern at the site are potential surface runoffs from surface soils to surface water, infiltration, and potential airborne particulate exposure to day workers. Offsite migration of these contaminants in the subsurface is a secondary concern at the site.

Marine Sediments. GATX site is situated at the middle of the island and has no direct marine sediment or shorelines next to its property boundaries.

2.1.2 Exposure Pathways

The following pathways were evaluated at the site as part of the FFS (Pacific Environmental Group, Inc. 1997):

- Product to Groundwater and Surface Water
- Soil to Groundwater
- In-land Groundwater to Surface Water
- Soil Particulate to Air
- Soil Direct Contact

- Groundwater to Marine Sediments

As described in the following sections, the primary exposure pathways of concern identified for the site are associated with the product plume (Section 2.1.2.1), lead and arsenic particulate in surface soil (Section 2.1.2.4.). Secondary exposure pathways identified for the site are associated with the subsurface soil in the A, B, and C Yards (Section 2.1.2.2).

2.1.2.1 Product to Groundwater and Surface Water Pathway

The two potential transport pathways associated with product plume beneath the site include; (1) migration of vapors to nearby structures and offices, (2) and partitioning of hydrocarbons from the product or adjacent soil to the groundwater, and then subsequent transport in dissolved phase to the surface water through groundwater discharges. These pathways associated with the product plume are the primary and secondary pathways of concern because they pose a potential threat to the surface water and its ecosystem. The proposed cleanup action will interrupt these pathways, which will focus on removal of the product, dissolved petroleum hydrocarbons, and vapors as discussed in Section 4. These actions will be effective in meeting cleanup levels in groundwater at the point of compliance, providing protection to day workers or nearby offices from fumes and vapors, and preventing potential migration of product sheen and dissolved petroleum hydrocarbon plumes into the surface water at the island edges.

2.1.2.2 Soil to Groundwater Pathway

The results of groundwater monitoring data and interim remediation conducted during the RI and FFS indicate that gasoline constituents are adsorbed in the soil from the recent spill. Groundwater monitoring data indicate that the dissolved plumes associated with these sources have not reached apparent equilibrium with the soils. However, the results of the fate and transport modeling of the petroleum hydrocarbon constituent, benzene, partitioned in the groundwater shows that the groundwater pathway at the GATX site does not pose a threat to the surface water at the shorelines. However, groundwater monitoring shows that offsite migration to adjacent properties is viable and it is a secondary concern at the site.

The soil to groundwater pathway from the inland portions of Harbor Island where the site is located does not pose a threat to the surface water at the shorelines based on the results of the fate and transport modeling and groundwater monitoring for the site. Therefore, offsite migration to adjacent properties is considered a secondary concern. Accessible TPH contaminated soil hot spots that are ongoing sources of groundwater contamination will be excavated to the extent practicable. This excavation will be based on the action levels of 10,000 mg/kg for the C Yard where the recent spill of 1996 occurred and 20,000 mg/kg for the rest of the site. The 10,000 mg/kg action level was selected in the U.S. EPA ROD for TPH hot spots on Harbor Island. The 20,000 mg/kg action level is the EPA (A Guide to

Corrective Action, EPA, May 1995) recommended lower threshold criteria to enable natural attenuation to successfully reduce total petroleum hydrocarbons concentrations in soils to acceptable levels within a reasonable restoration time period.

Excavation of accessible TPH soil hot spots that are ongoing sources of groundwater contamination will be performed so that the dissolved petroleum hydrocarbon in groundwater does not adversely impact off-site properties. This hot-spot remediation is being performed to improve groundwater general conditions at the source and to enhance the timely restoration of the impacted area through natural degradation. Monitoring wells will be sampled along the property boundaries as part of the Groundwater Compliance Monitoring Program to provide early warning of any potential off property migration. A detailed contingency plan is outlined in the compliance groundwater monitoring program for the site as a 'backup' remediation technology in case the Preferred Corrective Option proves ineffective.

2.1.2.3 Inland Groundwater to Surface Water Pathway

The results of groundwater analytical modeling conducted during the FFS indicate that the dissolved-phase hydrocarbon plumes originating inland within the site will not reach Elliott Bay or the Duwamish River at concentrations above surface water cleanup levels. Continued groundwater monitoring will be conducted as part of the cleanup action to verify protection of Elliott Bay and the Duwamish River.

The selected remedy for groundwater combines several remedial elements to meet the remedial action objectives of removing petroleum vapors, product and the dissolved petroleum hydrocarbons including residual hydrocarbons below the water table within and along the property boundaries. These elements are discussed in detail in Section 4.1.

The selected remedial technologies will enhance and expedite the natural biodegradation of the residual TPH. The effectiveness of these actions to interrupt groundwater to surface water pathway for the protection of human health and the surface water will be verified through the groundwater compliance monitoring program, Exhibit F, for the site. If groundwater contaminant concentrations attributed to the Terminal are confirmed above appropriate state and federal standards, the contingency plan outlined in this CAP will be implemented. The final remedial design for the implementation of these technologies will be conducted under the legal framework of the Consent Decree.

2.1.2.4 Soil Particulate to Air Pathway

This pathway is of concern for TPH because TPH-impacted soil is located at or near ground surface comprising mostly of fresh gasoline associated with the 1996 release. The surface areas of impact in this location are limited to the C Yard. During the remedial design phase,

additional surface soil data will be collected for TPH-G to evaluate if soil particulate to air pathway is still a concern at the C Yard.

EPA ROD for surface soils on Harbor Island requires 3 inches of asphalt cap on areas of Harbor Island that exceed 32.6 mg/kg, arsenic and 1000.0 mg/kg, lead based on a risk assessment conducted during the EPA RI.

The results of the EPA RI surface soil lead and arsenic analyses for the GATX site indicate that the soil particulate to air pathway is of primary concern for the B and C Yards, and portions of the D and E Yards, where lead and arsenic levels exceed Harbor Island action levels. Ecology concurs with EPA that this is a concern because the gravel cover may not provide adequate protection from groundwater infiltration, air particulate exposure to day workers, leaching, and some surface runoff discharges.

The proposed cleanup action for this pathway includes excavation or capping of accessible areas of the site that exceed lead and arsenic action levels. If capping is selected, 3 inches of asphalt or its equivalent of Portland Cement fixation will be implemented, followed with a TCLP test to ensure that the fixation is complete. This will effectively eliminate the soil to air pathway, surface soil to groundwater infiltration, and subsequent runoffs as discussed in Section 4.

2.1.2.5 Soil Direct Contact Pathway

The capping or excavation of the affected surface soil areas of the C and B Yards will effectively address the soil direct contact pathway for areas impacted by the recent spill, arsenic and lead. Additional protection will be provided through the restrictive and deed covenant on the property and institutional controls.

2.1.2.6 Groundwater to Marine Sediments Pathway

This pathway is not of concern based on the results of the fate and transport modeling conducted at site. However, groundwater-monitoring wells will be sampled along the property boundaries as described in the Groundwater Compliance Monitoring Program, Exhibit F, developed for the site. This is to ensure continued protection of the surface water and monitor plume concentrations dissolved in groundwater within property boundaries.

2.2 INTERIM REMEDIATION

Interim actions were recently (December 1996 through April 1997), implemented at the site due to the estimated 48,000 spill of gasoline in the C, Yard. The result of the Supplemental Investigation of the C Yard Fuel Spill indicate that approximately 7,200 gallons of gasoline

were initially recovered from the ground surface and about 4,900 gallons was recovered from the water table. The remainder of the spill probably volatilized directly into the atmosphere or is adsorbed in soil. This means that part of the fuel spill may remain in the soil and could be released through volatilization, in a dissolved phase, and as separate phase hydrocarbon. Three groundwater sampling events were completed during the interim actions. Detected concentrations of TPH-gasoline dissolved in the groundwater ranged from non-detect to 79,600 ppb (79.6 mg/l), while benzene ranged from non-detect to 11,800 ppb (11.8 mg/l). Cut-off trenches and dual phase extraction wells for remote and active extraction of product and groundwater were used on site to contain the spill to manageable conditions pending final remedies in the CAP. Additional remediation for the GATX site is proposed in this CAP.

3.0 SUMMARY OF CLEANUP STANDARDS

The Model Toxics Control Act (MTCA) cleanup regulations provide that a cleanup action must comply with cleanup levels for selected hazardous substances, points of compliance (POCs), and applicable or relevant and appropriate state and federal laws (ARARs) [Washington Administrative Code (WAC) 173-340-710]. The final indicator hazardous substances identified for the site, the associated cleanup levels, and ARARs are briefly summarized in the following sections. POCs are outlined in the Groundwater Compliance Monitoring Plan.

3.1 Indicator Hazardous Substances

Indicator hazardous substances (IHSs) were identified for the GATX Harbor Island Terminal site as part of the FFS using the criteria outlined in WAC 173-340-708(2). The final list of IHSs for groundwater and soil are a subset of the contaminants detected at the site. The final soil IHSs are TPH compounds, arsenic and lead for surface soil; and benzene, ethylbenzene, toluene, xylenes, TPH-gasoline, TPH-diesel, and TPH-oil for subsurface soil. The final groundwater IHSs are benzene, toluene, ethylbenzene, xylenes, TPH-gasoline, TPH-diesel, TPH-oil, arsenic, lead, and free product.

3.2 Cleanup Levels

Soil and groundwater cleanup levels for the final IHSs were developed based on the industrial zoning of the site and the determination by Ecology that there is no current or planned future use of the groundwater for drinking water purposes. The beneficial use of the site groundwater is the protection of the adjacent surface waters and its ecosystems and to prevent dissolved petroleum hydrocarbon elevated plume concentrations in groundwater from migrating off site and adversely impacting adjacent properties.

Surface soil (0 – 6 “) cleanup levels were determined based on the EPA ROD for Harbor Island. Ecology concurred with EPA’s ROD in 1994. These criteria are:

Arsenic	32.6 mg/kg
Lead	1,000 mg/kg

Surface soil cleanup levels for BTEX and TPH were not developed because the capping or excavation of the affected surface soil areas of the C and B Yards, will effectively address the soil direct contact pathway for areas impacted by the recent petroleum hydrocarbon spill.

The fate and transport modeling of the dissolved petroleum constituents (benzene) associated with the in-land subsurface TPH soils show that the dissolved petroleum constituents do not pose a threat to the surface water at the shorelines.

The subsurface soil action level for TPH is therefore a secondary concern, and it is set to meet the remedial action objective of protecting surface water at the property boundaries by improving general groundwater conditions at the source, and by enhancing restoration of the impacted area through natural biodegradation.

The subsurface soil action level for TPH at the C Yard associated with the spill of 1996 is:

Total TPH	10,000 mg/kg
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This action level set forth in the EPA ROD for TPH on Harbor Island.

The subsurface soil action level for TPH for the rest of the site is:

Total TPH	20,000 mg/kg
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This action level is the EPA (A Guide to Corrective Action, EPA, May 1995) recommended lower threshold criteria to enable natural attenuation to successfully reduce total petroleum hydrocarbons concentrations in soils to acceptable levels within a reasonable restoration time period. These TPH action levels are also protective for other chemical constituents in petroleum product (i.e., BTEX).

Groundwater cleanup levels were determined by Ecology to be surface water standards that are protective of aquatic organisms in Elliott Bay. These surface water standards are the adopted ambient water quality criteria (WAC 173-201A and Section 304 of the federal Clean Water Act). The category of ambient water quality standards selected as relevant and

appropriate for the site are the chronic criteria for protection of aquatic organisms (WAC 173-201A-040). Surface water standards are not established for TPH; therefore, the groundwater cleanup levels for TPH-G, TPH-D, and TPH-O were selected as protective cleanup goals at this time and they are:

Product	No Sheen
Benzene	0.071 mg/L
Ethylbenzene	29.0 mg/L
Lead	0.0058 mg/L
Toluene	200.0 mg/L
TPH-G	1.0 mg/L
TPH-D	10 mg/L
TPH-O	10 mg/L

Dissolved lead in groundwater beneath Harbor Island is attributed to offsite sources (former lead smelter).

3.3 ARARS

The selected cleanup action will comply with federal, state and local ARARs. Applicable requirements are federal and state laws or regulations that legally apply to a hazardous substance, cleanup action, location, or other circumstance at the site. Relevant and appropriate requirements are those federal and state regulations that do not legally apply but address situations sufficiently similar that they may warrant application to the cleanup action. Potential ARARs pertinent to remediation alternatives include substantive requirements of chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW. Others are identified and defined in the FFS (Pacific Environmental Group, Inc. 1997) and they include the Model Toxics Control Act (WAC 173-340), the Washington State Dangerous Waste Regulations (WAC 173-303, Washington State Water Quality Standards for Surface Water (WAC 173-201A), and laws requiring or authorizing local government permits or approvals for the remedial action implementation.

4.0 SUMMARY OF SELECTED CLEANUP ACTION ALTERNATIVES

Site-specific cleanup action alternatives were developed and analyzed for soil and groundwater in the final FFS (Pacific Environmental Group, Inc. 1997) to ensure the protection of human health and the environment at the site. Based on this initial screening and evaluation of supplemental data collected during the FFS, the following alternatives were selected for further evaluation. Part of the remedy selection included the development of estimated costs for each cleanup action alternative. These cost estimates have been reviewed by Ecology as part of the remedy selection process.

- **Alternative 1 - No Further Action.** This alternative includes cleanup actions performed at the Terminal to date, groundwater monitoring as part of the island-wide operable unit, passive product recovery, and completed interim actions.
- **Alternative 2 - In-situ Treatment of Soils that may include:**
 - **2A** Soil Vapor Extraction (SVE)
 - **2B** Soil Flushing
 - **2C** Air Sparging
 - **2D** Natural Attenuation/Intrinsic Biodegradation
- **Alternative 3 - Soil Excavation and Treatment or Disposal**
- **Alternative 4 - Surface Soil Capping with Asphalt or Membrane Fixation**
- **Alternative 5 - Active and Passive Product Recovery**
- **Alternative 6 - Groundwater Monitoring**

4.1 Proposed Cleanup Alternatives

The proposed cleanup action for the site was selected based on a comparison of each cleanup action alternative with the following criteria (WAC 173-340-360(2) and (3)) and consideration of the MTCA remedy selection requirements:

- Overall Protection of Human Health and the Environment
- Compliance with Cleanup Standards
- Use of Permanent Solutions to the Maximum Extent Practicable
- Compliance with ARARs
- Provision for Compliance Monitoring
- Provision for Reasonable Restoration Time Frame

THE PROPOSED CLEANUP ALTERNATIVES ARE: 2A, 2C, 2D, 3, 4, 5, & 6.

Detailed descriptions of each alternative with engineering drawings, specifications and justifications will be presented in the Remedial Design phase for the site. A conceptual description of each element and how it will be implemented at the site is presented below:

Surface Soil

- 3 inches Asphalt Capping or its Equivalent of Portland Cement Soil Fixation followed with TCLP testing to ensure that fixation is complete.
- Soil excavation and disposal

Subsurface Soil

- Excavation of Accessible TPH hot spots to the extent practicable and disposal/treatment
- Natural/Intrinsic Biodegradation of residual contaminated soils
- Soil vapor extraction

Groundwater

- Dual-phase extraction of groundwater and product or extraction of product and groundwater separately
- Air Sparging

Floating Product

- Active and passive point-source extraction
- Partially-penetrating down-gradient vertical barrier to stop product migration
- Combinations of the above options

This group of proven technologies will be implemented at the GATX site as necessary to meet all site cleanup criteria. Detailed descriptions and evaluations with engineering drawings, specifications and justifications will be presented in the Remedial Design document that GATX will prepare for the site. The following is a detailed conceptual discussion of the preferred remedial action alternatives proposed for the site.

Surface Soil:

Asphalt Cap/Soil Fixation. The preferred remedial alternative for addressing lead and arsenic impacted surface soils may include placing a cap of asphalt (3 inches) or its equivalent of on-site fixation by incorporating the soils into Portland-cement concrete (Figure 2). This will be accomplished by excavating those areas that exceed surface soils action levels to a

depth of 6 inches. The excavated soils which are primarily fine sands, will then be fixated and placed on site with an imported Portland-cement concrete which will utilize the sandy soils matrix to form a binding aggregate.

The existing data indicates that approximately 70% of the surface soils in the C Yard, and 40% of the surface soils in the B Yard, may need to be remediated. Before excavation or capping/fixation is begun, additional soil sampling (Supplemental Studies), will be performed to refine the boundaries between soils which are above and below action levels for lead and arsenic. Once precise boundaries are identified, surface soils will be excavated, capped, or incorporated into concrete using standard concrete-mixing equipment. Samples of the resulting concrete will be tested by the TCLP method to confirm that immobilization of the contaminants of concern are complete. This proposed alternative will effectively address the surface to groundwater infiltration, and leaching pathways, direct contact for site workers and surface runoffs.

Subsurface Soil:

Soil Vapor Extraction (SVE) and Natural Biodegradation. Remedial Alternative 2D, 3 and 6, (SVE, excavation of accessible TPH hot spots to the extent technically practicable, institutional controls and degradation of organic contaminants by intrinsic bioremediation/natural attenuation) has been selected for the subsurface site soils to ensure continued protection for the future. To ensure and document that the primary and the secondary concerns for the site are met (continued protection of the surface water and its ecosystem, and containment of plumes within property boundaries), groundwater monitoring will be implemented to monitor the ongoing intrinsic degradation/natural attenuation of TPH in soils as part of the selected cleanup action. A deed restriction will also be implemented to prevent inappropriate future use of the site (Exhibit D).

The proposed cleanup action is conceptually designed to remove volatile hydrocarbons from the vadose zone beneath the site to prevent vapor migrations to offices and secondary structures. This technology will be used as needed when appropriate to ensure that the soil vapor to air pathway is interrupted in areas where a hazard exists. The SVE system will also maintain elevated oxygen concentrations within the vadose zone. Operation of the SVE and other technology based applications and systems in this proposed CAP will be discontinued through performance, cleanup and technology standards evaluations as part of the Compliance Monitoring Program to be developed for the site. Details of the criteria and frequency for such evaluations for discontinuing the SVE and other technology based applications and systems for the site will be developed as part of the compliance-monitoring program for the GATX site.

Excavation & Location of Accessible Impacted Soils and Volumes.

A Yard:

Upon successful completion of the free product removal from the Yard A, a subsurface TPH soil confirmation analytical sampling will be conducted north of A-29 and northwest of A-22, which is northwest and southwest of the Garage Building in the A Yard. TPH hot spots up to 20,000 mg/kg are detected to be present at these locations. If the analytical results of the TPH subsurface soil confirmation sampling confirm TPH hot spots are present at these locations, excavation of the accessible TPH hot spots using the 20,000 mg/kg action levels in the, A Yard subsurface soils will be implemented to the extent technically practicable (Figure 3).

B Yard:

Excavate to the extent technically practicable, accessible TPH hot spots using the action levels of 20,000 mg/kg in the B Yard subsurface soils affected by historical spills without undermining the integrity of the tanks next to the excavation areas. The two TPH hot spots designated for excavation to the extent technically practicable in the B Yard subsurface soil are, 1) SS-28, which is located between tanks 18 and 21, 2) SS-9, which is located southwest of tank 22. (Figure 3). The total volume of the accessible TPH subsurface soil hot spots subject to excavation to the extent practicable in Yard B is approximately, 380 cubic yards.

C Yard:

Excavate to the extent technically practicable, accessible TPH hot spots using the action levels of 10,000 mg/kg in the C Yard subsurface soils affected by the recent spill without undermining the integrity of the tanks next to the excavation areas. The seven TPH hot spots designated for excavation to the extent technically practicable in the C Yard subsurface soils are identified in the following locations, 1) MW-4, SS-17, SS-18, which is southeast of tank 44, 2) SS-2, which is northwest of tank 44, 3) S-6, which is northwest of tank 37, 4) SS-2 and SS-13, which is between tanks 42 and 39, 5) S-5 and S-8, which is between tanks 35 and 37, 6) S-10, which is north of tank 35, 7) S-12, which is southwest of tank 35. (Figure 3). The total volume of the accessible TPH subsurface soil hot spots subject to excavation to the extent technically practicable in the Yard C is approximately 930 cubic yards.

Soil Excavation and Off-Site Disposal or Capping

Excavated TPH subsurface soil hot spots will be treated on/off site, and/or disposed at an approved disposal facility. Backfilling of subsurface soils will be comprised of clean fill material or treated material which will be tested before reuse on the site to ensure that it meets minimum requirements under the regulation for TPH. Excavation, disposal and back filling will be accomplished through the legal framework of the Consent Decree.

Excavation of the accessible TPH subsurface soil hot spots that are ongoing source to groundwater contamination will improve general groundwater conditions at the source,

enhance restoration time for the impacted areas and enhance biodegradation of the residual TPH in the subsurface. In addition, the groundwater-monitoring program will be implemented to monitor the ongoing intrinsic degradation/natural attenuation of the residual TPH in soils as part of the selected cleanup action. A deed restriction will also be implemented to prevent inappropriate future use of the site (Exhibit D).

Groundwater:

A Yard: Floating product was historically detected in groundwater sampling results at the following monitoring wells in the A Yard; A-3, A-10, A-14, A-15, A-19, A-20, A-21, A-26, A-27, and A-28.

Based on the groundwater sampling results of 1997 and 1998, floating product is detected in the following monitoring wells in the A Yard: A-4, A-6, A- 9, A-13, A-16, A-22 and A-29.

Based on the current groundwater sampling results of 1998, dissolved TPH-G above the State Surface Water Standards and protective cleanup goals was detected at A-23 and A-28 in the, A Yard.

B Yard: Floating product was historically detected in groundwater sampling results at monitoring Well-9 in the B Yard. Based on the current groundwater sampling results of 1997 or 1998, floating product is detected at monitoring Wells 12 and 15 in the B Yard, while dissolved TPH-G above the State Surface Water Standards and protective cleanup goals was detected in only one well, MW-7, in the B Yard.

C Yard: Floating product was historically detected in groundwater sampling results at the following monitoring wells in the C Yard; Well-11, MW-4, Well-25, and T-10. Based on the current groundwater sampling results of 1997 (these wells were not sampled in 1998 sampling protocol), floating product is detected in the following monitoring wells in the, C Yard: Well 20, 21, 22, 25, and 27. Based on the current groundwater sampling results of 1998, dissolved TPH-G above the State Surface Water Standards and protective cleanup goals was detected at MW-3, Well-24, Well-25, T-5, T-18, and T-19 in the C Yard.

D Yard: Floating product was historically detected in groundwater sampling results at monitoring Well-17 in the D Yard. Based on the current groundwater sampling results of 1998, dissolved TPH-G above the State Surface Water Standards and protective cleanup goals was detected at MW-14, Well-17, T-13, T-15 and T-17 in the D Yard.

Floating Product Recovery

A pilot study may be necessary to define effective cone of influence, final design configuration, specifications, and justifications to remove floating product from Yards A, B, and C. If one is determined to be necessary, the data will be presented in the Remedial Design phase for the GATX site.

Partially-Penetrating Vertical Barriers. The preferred remedial alternative for addressing separate-phase hydrocarbons identified in selected areas of the A Yard (Figure 1), is the use of partially penetrating down-gradient migration barriers coupled with extraction of the product as it collects against the barrier. This alternative provides positive control and capture of product, yet does not create new problems in dealing with the extraction, treatment, and disposal of groundwater. The partially penetrating barrier will be used to intercept product along dominant groundwater flow paths of the property boundary. In areas with localized product, point-source removal will be implemented with oil skimming alternatives.

By partially penetrating the upper aquifer on the down-gradient side of the free-product plume, the migration of free product will be stopped at the barrier. The particular construction technique(s) used to create the barrier will be selected based on site constraints in each location (depth to water, below-grade utilities, pipeline and tank locations, buildings, etc.).

In areas of shallower groundwater, a subsurface concrete wall or an impermeable membrane (e.g. high-density polyethylene) will be installed within a temporary trench. Product extraction piping will also be installed within the trench and then the trench will be backfilled. In areas of deeper groundwater, driven plastic or bentonite panels is more attractive as are several proprietary single-pass trenching/membrane placement/backfilling systems. With either of these construction techniques, product extraction piping will take the form of individual wells placed immediately upgradient of the barrier. Throughout the site, free product shall be removed from the water table to the maximum extent practicable when ever present. The final design configuration, specifications, and justifications for this partial penetrating barrier technology to address the separate-phase hydrocarbons identified in selected areas of the A and C Yards will be presented in the Remedial Design phase for the GATX site.

Active Point Source Product Extraction. In areas of the A, B, C and D Yards where product is localized, it will be removed through point-source extraction (Figure 1). An active product skimming technique will be selected for each particular location. In areas with low-density, low-viscosity product, a density-float will be used as the intake of an above-grade pneumatic pump for product extraction. For more viscous, higher density (closer to 1.0) product, or for product whose thickness has already been greatly reduced, a belt-based skimming system would be utilized. Such systems are able to reduce product thickness to less than 0.01 feet and are able to handle viscous product which would foul the intake of a density float system. The final design configuration, specifications, and justifications for the wells located in A, B, C, and D Yards to be used for the active point-source extraction technology to address the localized separate-phase hydrocarbons will be presented in the Remedial Design phase for the GATX site.

Passive Product Recovery. Passive product recovery will be performed at selected locations of the A, B, C, and D Yards where necessary until there is no evidence of measurable petroleum hydrocarbon sheen. Passive product recovery is intended to supplement the active product recovery system as needed. Throughout the site, free product shall be recovered from the water table whenever present to the maximum extent practicable.

Extraction & Treatment of Groundwater. Groundwater extraction may be evaluated as part of the product skimming system to depress the water table and accelerate product movement toward the extraction wells. During this active product recovery, or the point source extraction alternative selected for the A, B, C, and D Yards, petroleum hydrocarbons dissolved in groundwater are usually recovered during this process. If groundwater is generated, the recovered petroleum hydrocarbons in groundwater will be separated from the product through gravity separation and the water discharged to the King County sewer system under a King County discharge permit or disposed of at an approved facility. Additional treatment (carbon adsorption) will only be used if needed to meet discharge limits.

Air Sparging of Groundwater & Natural Biodegradation of Residual TPH in the Saturated Soil. Air Sparging is a proven technology for removing product from below the water table. The injection of air below the water level and into hydrocarbon-impacted soils accelerates the mobilization and recovery of the residual hydrocarbons. Therefore, the injection of air will elevate the oxygen levels (in this instance, dissolved oxygen) and will improve conditions for aerobic hydrocarbon degradation within the saturated zone. Additionally, the air sparging reduces dissolved-phase hydrocarbon concentrations as the volatile constituents are stripped from the groundwater and captured by the SVE system described above. A final design of a full-scale for this technology, coupled with dual-phase extraction technology systems, will meet the remedial objectives outlined in this proposed CAP for the site groundwater. A pilot study at the A, and C Yards may be necessary to define effective cone of influence, final design configuration, specifications, and justifications will be presented in the Remedial Design phase for the GATX site.

4.2 Other Controls.

Access Restrictions. The site is an active operating facility and has restricted access (fences, signs, work permit requirements) as part of standard operations. These restrictions are in place 24 hour/day and 7 days/week. The Access and Operating Procedures for the GATX site is contained in Exhibit C, of the Consent Decree.

Institutional Controls. Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances at the site. Such measures are required to assure continued protection of human health and the environment when a cleanup action results in residual concentrations of IHS that exceed MTCA Methods A or B cleanup levels and where conditional points of compliance are established. These institutional controls include placement of a deed restriction on the property use to industrial purposes or interfering with remedial actions implemented in this proposed CAP. A copy of a proposed Restrictive Covenant for the GATX site is contained in Exhibit D, of the Consent Decree.

Work Construction. Schedule to begin work under this proposed CAP and other construction activities for the Remedial Design are contained in Exhibit E, of the Consent Decree. Work construction at the GATX site will be conducted under a Health and Safety Plan prepared under WAC 173-340-810.

4.3 Contingency Plans.

A contingency plan serves as a “backup” remediation plan in the event that the Preferred Option fails or proves ineffective in a timely manner (5 years). A Contingency plan that contains conceptual engineering plan and design will be initiated and implemented within 30 days of meeting any of the following criteria;

- If the results of the groundwater monitoring program after implementing the Preferred Corrective Options indicate elevated IHS concentration above cleanup levels beyond the specified restoration time frame of 5 years,
- or contaminants attributed to the Terminal are identified in point of compliance wells located outside of the original plume boundary, indicating renewed contaminant migration,
- or the elevated plume concentrations are not decreasing at a sufficient rate to ensure that the cleanup levels for the site will be met in the time authorized in this CAP.

Inland Groundwater Contingency Plan for Property Boundary Shall Include:

- Use of extraction well points, source identification and removal (supplemented by treatment) to prevent adverse impacts to offsite properties.
- Expand hydraulic control to ensure removal of free product from the water table

This contingency plan shall be outlined in detail in the Groundwater Monitoring Program, Exhibit F, developed for the site.

4.4 Groundwater Compliance Monitoring.

The attached groundwater-monitoring plan, Exhibit F, is consistent with WAC 173-340-410 and includes protection monitoring, performance and confirmational monitoring. The overall objective of the compliance monitoring and sentry wells downgradient of the product and dissolved plumes and on the property boundaries is to provide both Ecology and GATX with early warning of potential contamination migration and basis for additional remedy through implementation of contingency plans, if necessary. The types of compliance monitoring to be conducted include the following:

Protection Monitoring to confirm that human health and the environment are adequately protected during construction and the operation and maintenance period of the cleanup action.

Performance Monitoring to confirm that the cleanup action has attained cleanup standards and other performance standards.

Confirmational Monitoring to confirm the long-term effectiveness of the cleanup action once cleanup actions and other performance standards has been attained.

Product Monitoring. Selected wells will be evaluated in the compliance groundwater-monitoring program to monitor for product thickness as part of the performance standard evaluation for the preferred remedial alternatives for the site. Throughout the site, free product shall be removed from the water table when ever present.

Points of Compliance:

Soil. The determination of adequate soil treatment will be based on the remedial action's ability to comply with the groundwater cleanup standards for the site, to meet performance standards designed to minimize human health or environmental exposure to soils above cleanup levels, and to provide practicable treatment of contaminated soils. Performance standards designed to minimize human and environmental exposure to soils above the cleanup levels set for the site shall include: a covenant on the property which limits the site to industrial use only and prohibits any activity which may interfere with the protectiveness of the remedial action.

Groundwater. The achievement of cleanup levels in groundwater shall be measured at points of performance and compliance located within the product plume area and at the downgradient edge of the property boundary. The wells at the downgradient edge of the site are considered conditional points of compliance wells. These points of compliance and performance shall consist of a network of monitoring wells located in the product plume area and on the downgradient property boundary. Other wells (sentry wells) situated off-site will also be used to document plume migration, performance standards, and to warn of any unanticipated change in off-site groundwater conditions. Exact location of these wells are identified in the Groundwater Compliance Monitoring Program, Exhibit F, for the site.

5.0 JUSTIFICATION FOR THE SELECTED REMEDIAL ACTION

The cleanup action, as proposed, is designed to accomplish the following requirements: protect human health and the environment; comply with cleanup standards per WAC 173-340-700; comply with applicable state and federal laws per WAC 173-340-710; provide compliance monitoring per WAC 173-340-410; use permanent solutions to the maximum extent practicable per WAC 173-340-360 (2), (3), (4), (5), (7), and (8); provide a reasonable time restoration per WAC 173-340-360 (6) and consider public concerns per WAC 173-340-600. The following sections discuss how the proposed cleanup action will meet these requirements.

Protection of Human Health and the Environment.

Removal of accessible TPH-impacted soil hot spots in the subsurface will protect the environment by expediting site restoration as groundwater is improved at the hot spot source. Removal or capping of lead and arsenic surface soils will protect the environment and human health by effectively eliminating the soil to air particulate pathway. Recovering product associated vapor and dissolved petroleum hydrocarbons in groundwater will protect human health and the environment by preventing migration to the surface water and adverse impacts to adjacent properties, protecting day workers from vapors, and expediting site restoration. The Compliance Monitoring Plan, Exhibit F, is an added protection to monitor if remedial action objectives are being met. If not, then Contingency Plans for the site will be triggered appropriately.

Comply with Cleanup Standards per WAC 173-340-700 through 760.

The overall goal of cleaning up groundwater for the protection of surface water quality will be met. Fate and transport modeling shows the inland in-situ bioremediation will act to destroy soil contaminants, which may act as an ongoing source of groundwater contamination. The goal of soil cleanup standards for petroleum hydrocarbons is to protect groundwater resources (surface water quality and associated ecosystem). While the numerical soil cleanup standards developed through the Matrix may not be reached throughout the site, the preferred alternative that include excavation of accessible TPH-impacted soil hot spots in the subsurface, active vapor extraction to address residual hydrocarbon in the saturated zone, and active and passive product recovery from the smear zone, will result in substantive compliance with the soil cleanup standards by reducing concentrations of contaminants in soils to levels that will support and maintain the attainment of groundwater quality standards.

Compliance with Applicable State and Federal Laws per WAC 173-340-710.

The preferred alternative meets all state and federal laws. All activities carried out to implement the preferred alternative will meet any laws requiring or authorizing local government permits or approval for the remedial action on the site.

Provide Compliance Monitoring per WAC 173-340-410.

The preferred alternative includes the provision for long-term monitoring to ensure that groundwater continues to meet cleanup standards after remedial actions have been completed. During the remedial actions, performance monitoring will be conducted to confirm that cleanup actions have attained cleanup standards and treatment goals. After remedial actions, performance monitoring will be conducted to confirm and ensure that cleanup actions have attained cleanup standards and performance standards. Protection monitoring will be used to ensure that human health and the environment are being adequately protected during construction and operation of the cleanup actions. The specifics and details of these monitoring activities, locations, number and type of analyses, frequency, duration, and contingency plans are described in the Compliance Groundwater Monitoring Plan for the site. Schedule for this activity is contained in Exhibit E, of the Consent Decree.

Use of Permanent Solutions to the Maximum Extent Practicable per WAC 173-340-360 (4), (5), (7), and (8).

The permanent solutions (excavation of accessible TPH soil hot spots in the subsurface to the extent technically practicable; capping of the lead and arsenic with 3 inches of asphalt or its equivalent of soil fixation with Portland-cement in the surface soil) will permanently and effectively remove the pathways of soil to air, infiltration and leaching into the groundwater and surface runoffs. Product recovery, groundwater treatment and reuse are permanent treatment technologies that will effectively improve groundwater quality.

Provide for a Reasonable Restoration Time Frame per WAC 173-340-360 (6).

In view of the TPH subsurface soil hot spots that generate dissolved petroleum hydrocarbons in the groundwater above cleanup standards, Ecology believes that natural attenuation alone will not be sufficient to provide a reasonable restoration time frame for the site.

The following alternatives will provide for a reasonable restoration time frame of 5 years for the site: natural attenuation with active excavation of accessible TPH subsurface soil hot spots (e.g., source control), excavation or capping of lead and arsenic in the surface soils and free

product removal. This 5 year restoration time frame for the site groundwater is protective of the surface water and its ecosystem (primary concern) and adjacent properties (secondary concerns). The projected 5 year restoration time frame is reasonable, and will allow for a meaningful statistical evaluation of compliance monitoring data.

For areas of the site that have free product, restoration time begins after free product is removed from the water table and excavation of accessible TPH soil hot spots has been performed.

If implementation of the Contingency Plan for the site is deemed necessary based on the results of the groundwater compliance monitoring and other performance standards, the restoration time clock for the site begins 30 days after implementation of the contingency plan. Where contingency plan implementation is not necessary, restoration time for the site is 5 years and the restoration clock begins 30 days after implementation of the Preferred Cleanup Action for the site. This is the time required to reduce residual TPH in the subsurface to reasonable levels and groundwater quality below state and federal standards and to collect meaningful statistical data to evaluate groundwater compliance with remedial objectives.

Other specific time lines are outline in the Schedule, Exhibit E, and is further detailed in the Compliance Groundwater Monitoring Program, Exhibit F, for the GATX Site.

Consider Public Concerns per WAC 173-340-600.

The public is given the opportunity to comment on this CAP during a 30-day public comment period. upon completion of remedial milestones in the cleanup process. This review will include the following additional documents: the Consent Decree, Covenants and Restrictions, Compliance Monitoring Plan, and Project Schedule. The Remedial Design may be subject to a separate public comment period in the future. Ecology will consider all comments received. At the end of the comment period, Ecology will prepare a responsiveness summary listing each comment received and Ecology's response to the comment.

6.0 IMPLEMENTATION SCHEDULE

Exhibit E, of the Consent Decree contains an outline of the schedule for the cleanup activities. The Consent Decree will become effective once signed by the Court. As outlined in the schedule, specifics on detailed analysis may be needed to complete the remedial design. Ecology has review and approval authority for these documents and the public will have an opportunity to participate in each milestone requiring public comment through the 30-day public period.

7.0

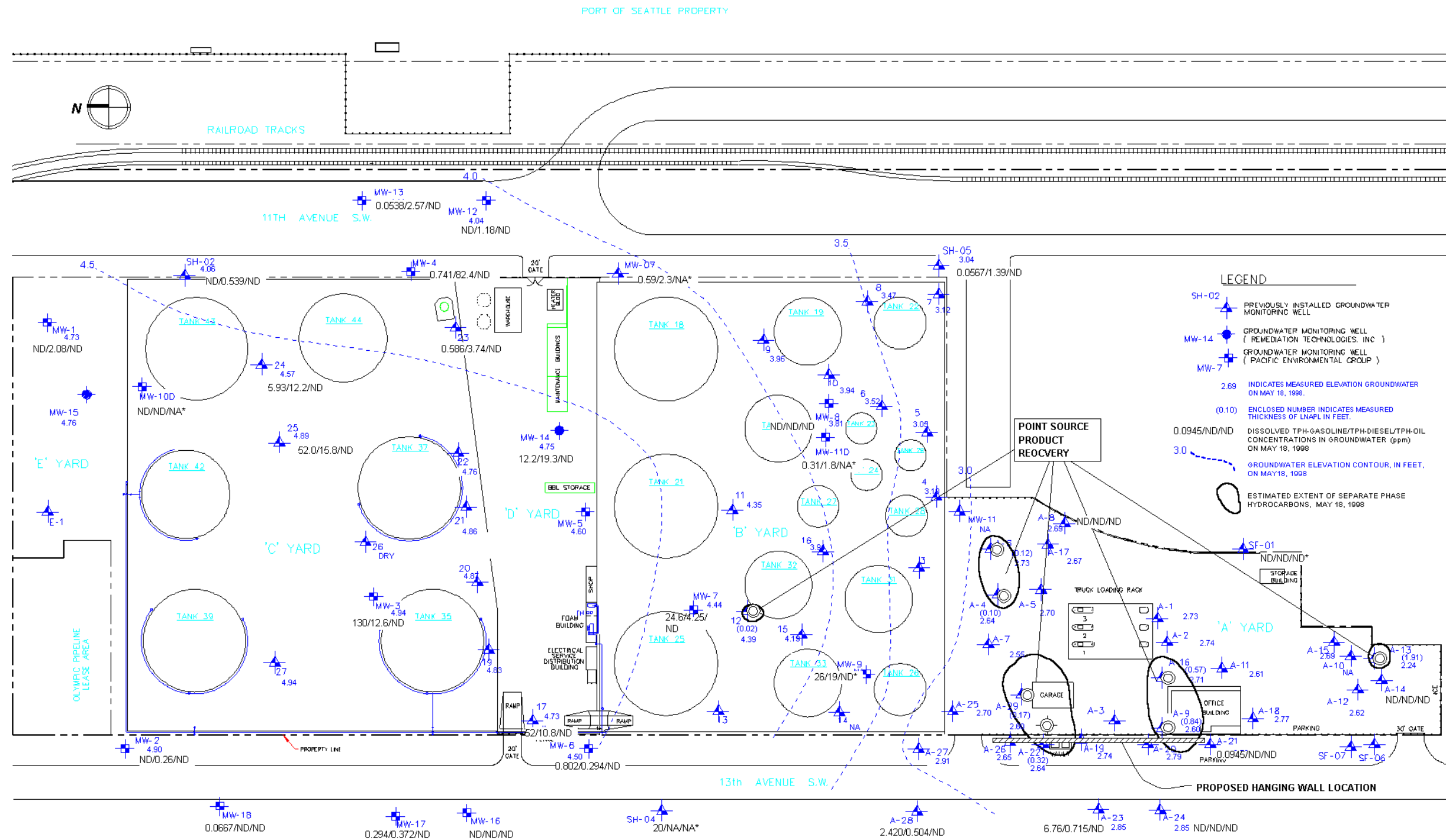
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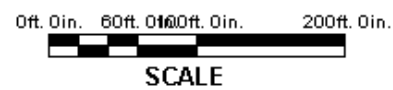
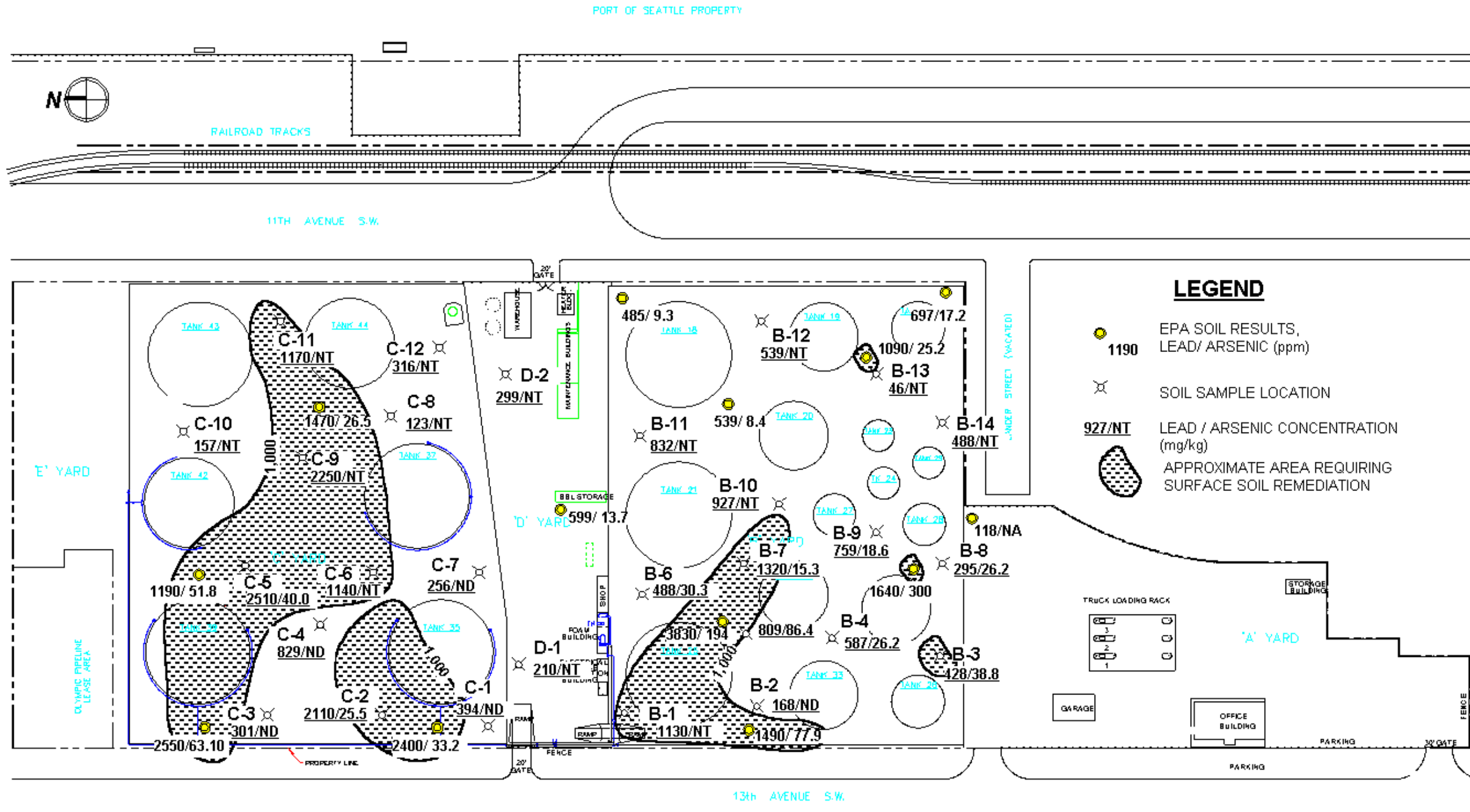
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FIGURES

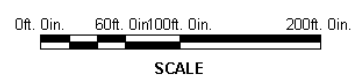
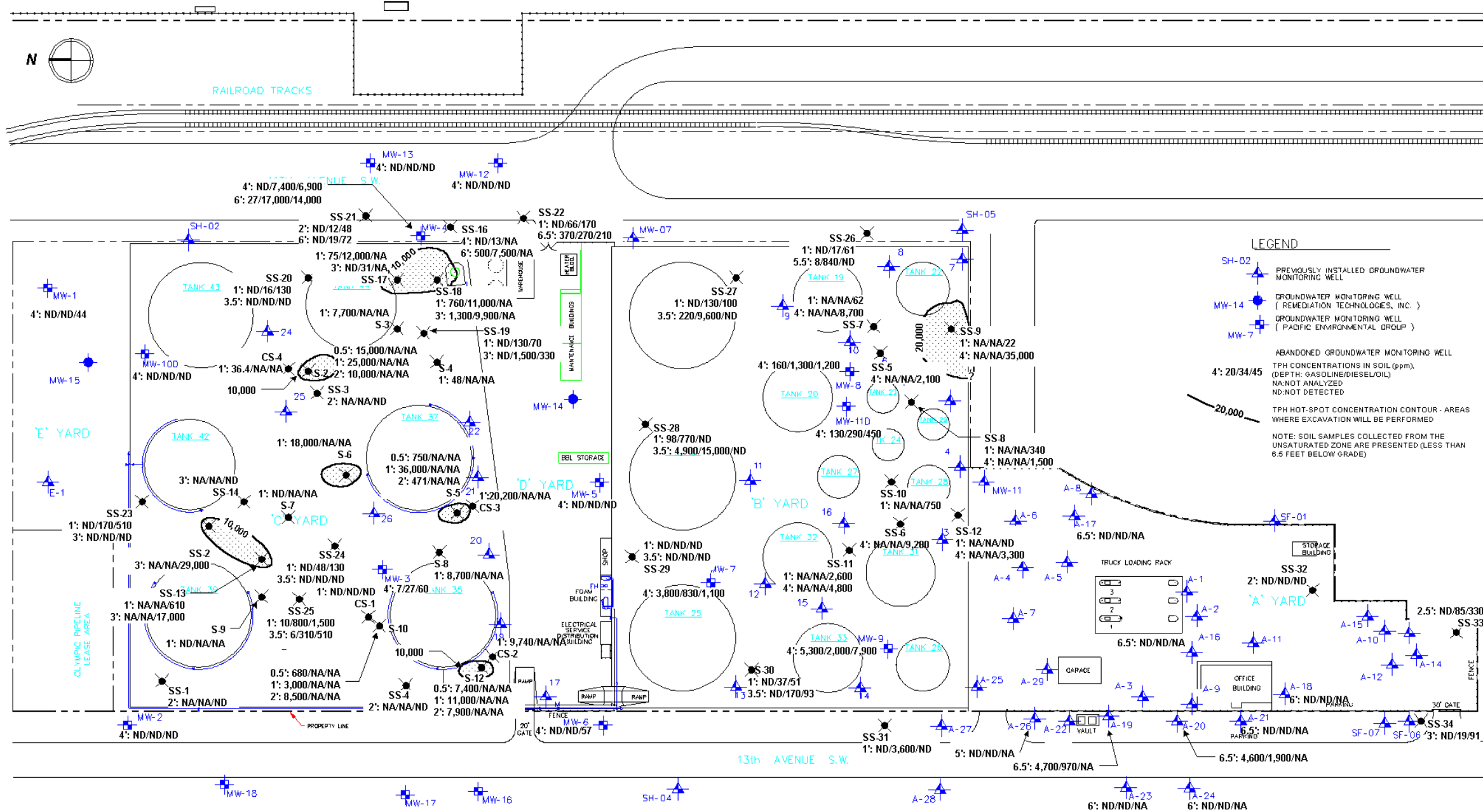


	TITLE Proposed Groundwater Remediation Technology Map		
	GATX Terminals Corporation Harbor Island Terminal 2720 13th Avenue Southwest Seattle, Washington		
DATE: 10/26/99	PROJECT: A30-01A	FIGURE: 1	



KHM Environmental Management Inc.	TITLE Proposed Shallow Soil Excavation Map		
	GATX Terminals Corporation Harbor Island Terminal 2720 13th Avenue Southwest Seattle, Washington		
	DATE	10/26/99	PROJECT
		FIGURE	2

PORT OF SEATTLE PROPERTY



	TITLE Proposed TPH Hot-Spot Soil Excavation Map		
	GATX Terminals Corporation Harbor Island Terminal 2720 13th Avenue Southwest Seattle, Washington		
DATE 10/26/99	PROJECT A30-01A	FIGURE 3	

EXHIBIT C
CONSENT DECREE
ACCESS AND OPERATING PROCEDURES
GATX TERMINALS CORPORATION
HARBOR ISLAND TERMINAL

1. All personnel who enter the Site pursuant to the Consent Decree (hereinafter “personnel”) shall notify the Terminal Manager or the designated representative prior to entering and upon leaving the Site. Upon the first visit, all personnel shall read and agree to the GATX Visitor’s Safety Policy.
2. Automobiles of all personnel shall be operated and parked in areas designated by the Terminal Manager or the designated representative. Driveways or plant roads shall be kept clear to eliminate interference with normal operations and provide access for emergency equipment.
3. Smoking by personnel is absolutely prohibited on GATX property, except in certain locations that have been approved for this purpose. Personnel entering the Site shall not bring upon GATX property “strike anywhere” matches or cigarette lighters of any kind.
4. The possession, sale, or consumption of alcoholic beverages and/or drugs on GATX property is prohibited.
5. Personnel shall immediately advise the Terminal Manager or the designated representative of all accidents involving personnel occurring on GATX property.
6. Personnel shall comply with all instructions from the Terminal Manager or the designated representative pertaining to safety apparel and equipment, such as hard hats, goggles, gloves and breathing apparatus.
7. Personnel shall comply with all instructions provided by the Terminal Manager or the designated representative regarding health and safety risks or conditions, and with all conditions on Work Permits.
8. In lieu of requiring the Washington State Department of Ecology to provide home telephone numbers for Ecology personnel to GATX, Ecology shall maintain a list of such telephone numbers and shall notify the next of kin of such personnel in the event of any incident requiring such notification.

EXHIBIT D RESTRICTIVE COVENANT

GATX Terminals Corporation
2720 13th Avenue Southwest, Seattle, Washington

This Declaration of Restrictive Covenant is made pursuant to RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440 by GATX Terminals Corporation. ("GATX"), its successors and assigns.

Remedial action (hereafter "Remedial Action") will be undertaken at the property that is the subject of this Restrictive Covenant. The Remedial Action is described in the Final Cleanup Action Plan, GATX Harbor Island Terminal "CAP". The CAP is attached as Exhibit B to the Consent Decree entered in State of Washington, Department of Ecology vs. GATX Terminals Corporation, King County, Case No..... ("Consent Decree").

This Restrictive Covenant is undertaken pursuant to RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440 because after fixation of materials, it is expected that: 1) residual concentrations of lead and arsenic will remain beneath fixated material for the surface soil, 2) separate phase, mobile petroleum hydrocarbon compounds ("floating product") and residual concentrations of dissolved total petroleum hydrocarbons and its constituents (e.g. benzene) will exceed the Surface Water Quality standards for groundwater established under WAC 173-340-720, and 3) total petroleum hydrocarbon contaminated soils will be left in the subsurface at the Site.

The undersigned, GATX, is the fee owner of real property (hereafter "Property") in the County of King, State of Washington, that is subject to this Restrictive Covenant. The Property is legally described in Attachment A of this Restrictive Covenant and made a part hereof by reference.

GATX makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that, unless the subject limitations and restrictions are removed as provided herein, such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1.

a. The Property shall be used only for industrial uses, as described in RCW 70.105D.020(23) or as allowed under the City of Seattle's zoning regulations codified in the City of Seattle as of the date of this Restrictive Covenant or as such statute or regulations may be modified after the date of this Restrictive Covenant.

- b. No groundwater may be taken for any use from the Property that is inconsistent with the Remedial Action implementation.

Section 2.

- a. As of the date the Consent Decree was entered (hereinafter “Effective Date”), a portion of the Property contains total petroleum hydrocarbons in the soil, dissolved total petroleum hydrocarbons in the groundwater, floating product on the water table, vapors in the subsurface, lead and arsenic on the surface soils.
- b. Specifically, elevated soil concentrations of residual petroleum hydrocarbons and dissolved residual of petroleum hydrocarbons and its constituents are present in Yards A, B, C, and D of the above storage tank areas, next to tanks no. 43, 44, 42, 37, 39, and 35 of the C Yard, and west of the D Yard, for the B Yard, next to tanks 19, 21, 27, 32, 31, 26, 33, and 25, and for the A Yard, between the Light Oil Rack and the Office. These locations are shown in the enclosed figures. Also, it is expected that, after fixation, concentrations of lead and arsenic above Harbor Island action levels of 1000 mg/kg and 32.6 mg/kg respectively will be present beneath the fixated materials portions of the tank farm of the B, and C, Yards, of the site as shown in the enclosed maps.

The Owner shall not alter, modify, or remove the existing structure(s) in any manner that may result in the release or exposure to the environment of contaminated soils, groundwater, or vapors existing at the site as of the Effective Date of the Consent Decree in a manner inconsistent with the Remedial Action implementation or create a new exposure pathway that endangers the public health and the environment without prior written approval from Ecology, which approval will not be unreasonably withheld under RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440. Site workers conducting construction activities within the protective zone of contamination will be instructed on precautionary actions to avoid direct contacts with contaminated soils, groundwater or exposure to vapor and fumes and on appropriate methods for handling such wastes.

- c. Consistent with RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440, any activity on the property that may interfere with the viability of the Remedial Action, and any activity that may result in the release of a hazardous substance that was contained as part of the Remedial Action are prohibited without written approval from Ecology, which approval shall not be unreasonably withheld. Site workers conducting construction activities within these areas will follow the Health and Safety Plans pursuant to WAC 173-340-810. Also they will be instructed on

precautionary actions to avoid direct contact with contaminated soils, vapors and groundwater to ensure protection of site workers.

Section 3. Only to the extent required by RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440, the Owner of the Property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any interest in the Property or to enter into a lease for all or any part of the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 4. Only to the extent required by RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440, the Owner must restrict leases of all or any part of the Property to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions on the use of the Property.

Section 5. Only to the extent required by RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440, the Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment. Approval by Ecology pursuant to Section 5 shall not be unreasonably withheld. The Restrictive Covenant shall be amended to reflect any changes approved by Ecology.

Section 6. Only to the extent required by RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440, the Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples, to inspect the Remedial Actions conducted at the Property, and to inspect records that concern the Remedial Action. Ecology will provide GATX advance notice of its entry onto the Site when feasible. Ecology shall adhere to Access and Operating Procedures attached as Exhibit C, and applicable Health and Safety Plans to be developed for the Cleanup Action implementation.

Section 7. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Restrictive Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only if Ecology, after public notice and opportunity for comment, concurs, which concurrence shall not be unreasonably withheld.

DATED. _____

GATX TERMINALS CORPORATION

By _____
Its _____

STATE OF WASHINGTON)
) ss:
COUNTY OF KING)

On this _____ day of _____, before me personally appeared _____, to me known to be the _____ of _____, the corporation that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said corporation as required by law, for the uses and purposes therein mentioned, and on oath stated that ___ was authorized to execute the said instrument, and that the seal affixed, if any, is the corporate seal of said corporation.

IN WITNESS THEREOF I have hereunto set my hand and affixed my official seal the day and year first above written.

(Signature)

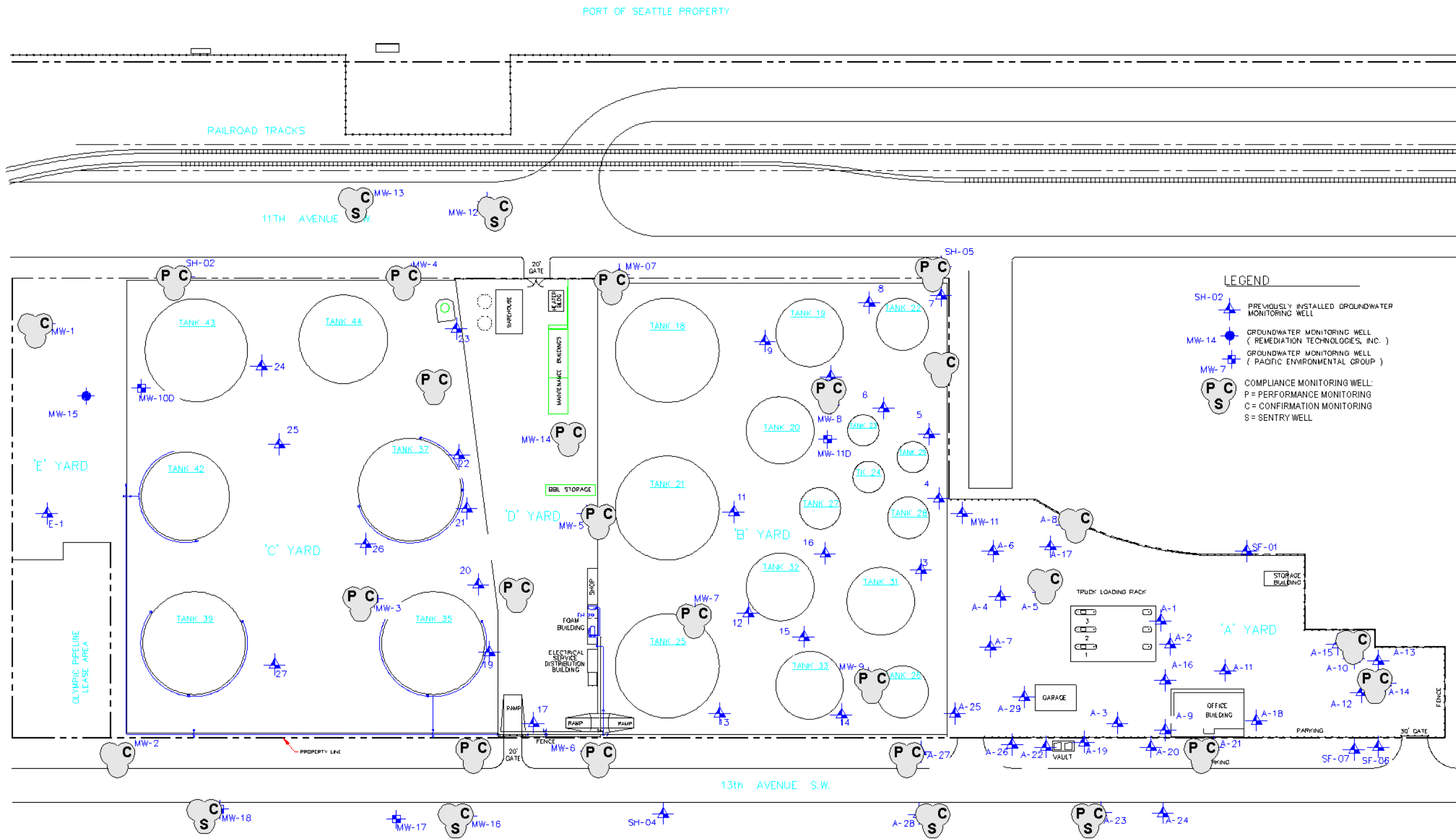
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NOTARY PUBLIC in and for the State of Washington,
residing at _____ My Commission Expires: _____

EXHIBIT E
GATX HARBOR ISLAND REMEDIAL DESIGN (RD)
CONSENT DECREE SCHEDULE

November 2, 1999

Written Notification to Ecology with name and qualifications of RD/RA coordinating contractor	Within 10 days after signing of this Consent Decree (CD) by the Court
Draft Supplemental Studies Work Plan	Within 30 days after entry of this CD
Draft Remedial Design (RD) Work Plan	Within 60 days of Ecology's written approval of Draft Work Plan for the Suppl. Studies.
Final Supplemental Studies Work Plan	Within 30 days of Ecology's written approval of Final Draft Work Plan.
Draft Supplemental Studies Technical Memorandum	Within 90 days of receipt of Ecology's written approval of Final Supplemental Studies Work Plan
Final Supplemental Studies Technical Memorandum	Within 30 days of receipt of Ecology's written comments on Draft Technical Memo
Final RD Work Plan Incorporating Supplemental or Pilot Studies Recommendations	Within 45 days of receipt of Ecology's written comments on the Final Supplemental Studies Technical Memorandum
Implement Remedial Design	Within 60 days of receipt of Ecology's written approval of the Final RD Work Plan
Begin remediation of accessible inland TPH hot spots	Within 90 days after receipt of Ecology's written approval of the Final RD Work Plan
Complete free product removal from the site	Within 2 years after receipt of Ecology's written approval of the Final RD Work Plan
Begin confirmation, performance and compliance monitoring of the site	Within 45 days of completing Preferred Corrective Option at the inland accessible areas of the site
Implement contingency plans	Within 30 days of making contingency plan determination.
Ecology will recommend to EPA for GATX to be de-listed from the Federal NPL lists	After completion of the first year of groundwater compliance monitoring
Ecology will review removing GATX from the Confirm and Suspected Contaminated Site Database	After 5 years of completing groundwater compliance requirement
Complete restoration of site groundwater	Within 5 years of implementing Preferred Cleanup Plan/ Contingency Plan Actions on site.



LEGEND

- SH-02 PREVIOUSLY INSTALLED GROUNDWATER MONITORING WELL
- MW-14 GROUNDWATER MONITORING WELL (REMEDIATION TECHNOLOGIES, INC.)
- MW-7 GROUNDWATER MONITORING WELL (PACIFIC ENVIRONMENTAL GROUP)
- PC COMPLIANCE MONITORING WELL: P = PERFORMANCE MONITORING
- S COMPLIANCE MONITORING WELL: S = SENTRY WELL

	TITLE Compliance Well Location Map		
	GATX Terminals Corporation Harbor Island Terminal 2720 13th Avenue Southwest Seattle, Washington		
DATE 10/26/99	PROJECT A30-01A	FIGURE 1	

EXHIBIT F

COMPLIANCE MONITORING PLAN
GATX TERMINALS CORPORATION
HARBOR ISLAND TERMINAL
SEATTLE, WASHINGTON

ISSUED TO:

WASHINGTON STATE DEPARTMENT OF ECOLOGY

SUBMITTED BY:

GATX TERMINALS CORPORATION

October 27, 1999

PREPARED BY:

KHM ENVIRONMENTAL MANAGEMENT, INC.
16771 NE 80th Street, Suite 203
REDMOND, WASHINGTON 98052

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Figure 1 – Compliance Well Location Map

Table 1 – Compliance Monitoring Wells

Table 2 – Groundwater Cleanup Levels

Table 3 – Natural Attenuation Parameters

Appendices

Appendix A – Compliance Sampling and Analysis Plan

10 Introduction

This Compliance Monitoring Plan has been prepared to describe the protocol and procedures that will be used to confirm that cleanup requirements have been achieved at the GATX Harbor Island Terminal (Terminal) located in Seattle, Washington. The monitoring plan has been prepared to satisfy the requirements of the Model Toxics Control Act (MTCA) regulations WAC 173-340-410, -720, and -820. This plan was also prepared in accordance with requirements of the Consent Decree, cooperatively entered into between GATX Terminals Corporation (GATX) and the Washington State Department of Ecology (Ecology).

A variety of components included in this compliance monitoring plan address the requirements of WAC 173-340-410. These components include:

- 1) Introduction: Discuss site overview, hydrogeology, cleanup action summary, monitoring objectives and rationale, types of monitoring, monitoring locations, and schedule;
- 2) Protection Monitoring: Describe the criteria for protection monitoring under WAC 173-340-400;
- 3) Performance Monitoring: Describe the criteria and methodology for performance monitoring of free product recovery, natural attenuation, and other selected remedial technologies to document that the cleanup action is performing as anticipated;
- 4) Confirmation Monitoring: Describe the confirmation criteria which monitors the long-term effectiveness of the cleanup action once cleanup and performance standards have been attained;
- 5) Data Evaluation and Reporting: Discuss free product monitoring, groundwater sampling and analytical procedures, data validation, evaluation procedures, reporting, and monitoring schedules;
- 6) Criteria for Meeting Performance and Compliance Standards: Discuss criteria to be used to determine if performance and compliance standards have been met; and
- 7) Contingency Plans: Discuss the steps that will be implemented in the event the proposed cleanup actions are not effective.

11 SITE DESCRIPTION

The GATX Harbor Island Terminal is located at 2720 13th Avenue Southwest in Seattle, Washington and is part of a U.S. EPA Superfund Site, the Terminal Operable Unit. The facility, approximately 14 acres in size, is located in the highly industrialized north-central section of Harbor Island. The Terminal is situated on relatively level property, with surface elevations ranging between 6 to 11 feet above sea level. There are no surface water bodies within the Terminal property boundaries. The site is situated approximately 1,400 feet from the West Waterway and over 1,000 feet from the East Waterway. The site is zoned industrial and meets the industrial criteria established under WAC 173-340-745. It is likely that the site will remain an industrial facility in the foreseeable future because of the site zoning, and, perhaps more importantly, because of the substantial industrial improvements to Harbor Island (e.g., construction of cargo handling facilities and construction of major petroleum distribution pipelines for the island). Ecology and EPA have determined that there is no current or planned future use of groundwater beneath Harbor Island for drinking water purposes.

The Terminal is presently divided into five distinct areas. These areas include the A, B, C, D, and E Yards. The A Yard contains two fuel tanker truck-loading racks. The administrative office and maintenance building is also situated in the A Yard. The A Yard is entirely paved with asphalt or concrete. The A Yard is bounded by a containment dike for the B Yard on the north, and by chain-link fencing on the south, east, and west.

The B and C Yards are used as bulk fuel storage areas. Fifteen above ground storage tanks are located within the B Yard and six are situated within the C Yard. Both yards are mostly unpaved and are surrounded by concrete containment dikes. The D Yard is situated between the B and C Yards and has been used to route product and utility lines. Several maintenance buildings and material handling areas are also situated within the D Yard.

The Terminal is situated on the southeast portion of a groundwater mound which is centered on the northern half of Harbor Island. Groundwater flow migration is south and southeast across the site. The primary groundwater discharge point is the Duwamish River East and West Waterways. Due to the dampening effect of the bulkhead structures along the East and West Waterways of the Duwamish River, and the inland location of the site, water table fluctuations in response to tidal influence and seasonal fluctuations is less than one foot.

12 SELECTED CLEANUP ACTION SUMMARY

The selected cleanup action is designed to accomplish the following requirements: protect human health and the environment, comply with cleanup standards established in WAC 173-340-700, comply with applicable state and federal laws under WAC 173-340-710, provide compliance monitoring as set forth in WAC 173-340-410, use permanent solutions to the maximum extent practicable as mandated in WAC 173-340-360 (2), (3), (4), (5), (7), and (8), provide a reasonable time restoration in accordance with WAC 173-340-360 (6), and consider public concerns as designated in WAC 173-340-600.

Cleanup actions at the site include source removal in the soil and groundwater and recycling/off-site disposal, monitoring, natural attenuation, and institutional controls.

Soil. The goal of soil cleanup standards for petroleum hydrocarbons is to protect the beneficial use of groundwater (surface water quality and associated ecosystem). The preferred alternative will result in substantive compliance with the soil cleanup standards by reducing concentrations of contaminants in soils to levels that will support and maintain compliance with ground water quality standards.

The specific soil cleanup actions are:

- In-situ treatment of soil that includes soil vapor extraction (SVE), and natural attenuation/intrinsic biodegradation.
- Excavation of accessible total petroleum hydrocarbons (TPH) subsurface soil hot spots with concentrations above 10,000 milligrams per kilogram (mg/kg) to the extent practicable in the C Yard.
- Excavation of accessible TPH subsurface hot spots with concentrations above 20,000 mg/kg to the extent practicable in the A, B, and D Yards.
- In-situ treatment of inaccessible soil hot spots to the extent practicable in all Yards.
- Natural attenuation of the residual TPH in the subsurface soil.

- Excavation or capping of lead- and arsenic-impacted surface soil with concentrations above 1,000 mg/kg and 32.6 mg/kg, respectively, in the B and C Yards.

Groundwater. The achievement of cleanup levels in groundwater shall be measured at points of performance and compliance located within the product plume area and at the downgradient edge of the site. The wells at the downgradient edge of the site are considered conditional points of compliance wells. These points of compliance and performance shall consist of a network of monitoring wells located in the product plume area and on the downgradient property boundary. Other wells (sentry wells) situated off-site will also be used to document plume migration, performance standards, and to warn of any unanticipated change in off-site groundwater conditions. Exact locations of these wells are identified in the Section 2 of this plan.

The specific cleanup actions include:

- Active and passive free product recovery in the A, B, and C Yards,
- Dual-phase extraction of groundwater and product in the A and C Yards,
- Extraction of groundwater and/or free product,
- Active and passive point-source extraction in the A, B, and C Yards,
- Partially-penetrating down-gradient vertical barrier to stop product migration in the A and C Yards,
- Free product monitoring in the A, B, C, and D Yards,
- Groundwater monitoring in point of compliance (confirmation), performance and offsite (sentry) wells for the site, and
- Institutional control in the form of a deed restriction for the site.

13 MONITORING OBJECTIVES AND RATIONALE

The cleanup action incorporates monitoring to determine that cleanup standards are achieved and maintained after remedial actions have been completed. During the remedial actions, performance monitoring will be conducted to confirm that cleanup actions have attained cleanup standards and treatment goals. After remedial actions are performed, performance monitoring will be conducted to confirm and document that cleanup actions have attained cleanup standards and performance standards. Protection monitoring will be used to adequately protect human health and the environment during construction and operation of the cleanup actions.

The achievement of cleanup levels in groundwater shall be measured at points of performance and compliance located within the free product plume area and at the downgradient edge of the site. The overall objective of the compliance monitoring wells downgradient of the free product plumes and on the property boundaries is to provide additional safeguards by providing both Ecology and GATX with early warning of potential contamination migration and basis for Contingency Plan reviews and implementation, if necessary. Sentry wells, situated off property limits and downgradient of dissolved petroleum hydrocarbon plumes, will also be used to monitor migration of dissolved petroleum constituents.

Monitoring methods, monitoring locations, and types of analyses were selected to monitor the effectiveness of the cleanup actions in attaining the soil, free product, and groundwater cleanup standards for the site. The specific details of these monitoring activities are described in subsequent sections of this document.

13.1 SOIL

TPH, arsenic, and lead concentrations were above levels requiring action at the site.

The determination of adequate soil treatment will be based on the ability to comply with the groundwater cleanup standards for the site, to meet performance standards designed to minimize human health or environmental exposure to soils above cleanup levels, and to provide practicable treatment of contaminated soils.

Monitoring objectives are based on the following site observations:

1. **TPH in the A Yard.** Soil TPH concentrations were above the cleanup action levels (20,000 mg/kg) north, northwest and west of the Garage Building Area.
2. **TPH, Arsenic, and Lead in the B Yard.** Soil TPH concentrations were above the cleanup action levels (20,000 mg/kg) between Tanks 18 and 21, and southwest of Tank 22. Concentrations of arsenic and lead in surface soil were above the cleanup levels (32.6 and 1,000 mg/kg, respectively) in unpaved soil covering roughly half of the B Yard.
3. **TPH, Arsenic, and Lead in the C Yard.** Soil TPH concentrations were above the cleanup action levels (10,000 mg/kg) at seven locations in the C Yard as follows: i) MW-4, SS-17, SS-18, which is southeast of Tank 44, ii) SS-2, which is northwest of Tank 44, iii) S-6, which is northwest of Tank 37, iv) SS-2 and SS-13, which is between Tanks 42 and 39, v) S-5 and S-8, which is between Tanks 35 and 37, vi) S-10, which is north of Tank 35, and vii) S-12, which is southwest of Tank 35. Concentrations of arsenic and lead in surface soil were above the cleanup levels (32.6 and 1,000 mg/kg, respectively) in unpaved soil covering roughly half of the C Yard.

13.2 GROUNDWATER

Groundwater will be monitored for benzene, toluene, ethylbenzene, TPH-G, TPH-D, TPH-O, free product, and lead in specific areas of the site

prior, during and after implementation of the cleanup action discussed in Section 1.2. The selected analysis and monitoring locations correspond to the soil cleanup areas identified in Section 1.3.1, areas of product recovery, and the water quality chemistry data for the site.

Wells Not Included in Compliance Monitoring Program.

Monitoring wells not included in the confirmation, performance, or the sentry wells are excluded from this Compliance Groundwater Monitoring Program. After the one-year review of the site groundwater analytical data as discussed in Section 3.4.1, Ecology and GATX will review potential wells for abandonment as appropriate.

Damaged Wells Due To Cleanup Action Implementation.

Monitoring wells designated for confirmation, performance or sentry wells that become disabled as a result of the cleanup action implementation must be replaced. Ecology must approve the new proposed location before replacement of the damaged groundwater monitoring well.

Areas Above Cleanup Levels

BTEX and TPH Areas. Shallow monitoring wells with periodic or consistent detection of BTEX constituents or TPH above the cleanup levels include, Well 24, T-10, T-17, T-11, MW-3, T-15, T-8, T-5, T-19, T-13, T-18, Well 17, MW-14, MW-7, Well 15, MW-9, A-27, A-28, A-26, A-24, A-3, A-21, A-23, A-15, and A-10. These wells are located in or around Yards A, B, C, and D and, due to historic detection of petroleum-hydrocarbon-related IHSs above cleanup levels (Table 2), these monitoring wells will be included in the compliance monitoring program. Monitoring in these wells will be focused on the IHSs for groundwater to provide water quality data for baseline data and trend analysis. Furthermore, a selection of these wells will be monitored for natural attenuation parameters (Table 3).

Lead Areas. Total lead was detected periodically above the cleanup level (0.0058 mg/l) in the following wells: MW-1, MW-2, MW-3, MW-5, MW-6, MW-7, MW-07, MW-8, MW-9, MW-11D, MW-12, MW-13, A-14, A-21, A-23, A-24, A-28, SF-01, SH-02, SH-04, and SH-05. Dissolved lead was detected periodically above the cleanup level (0.0058mg/l) in MW-7. These wells will be included in the compliance monitoring wells and analyzed for total and dissolved lead as part of the performance and confirmation monitoring of the surface cleanup action for the site as described in Section 1.2.

14 COMPLIANCE MONITORING CATEGORIES AND SCHEDULE

Groundwater compliance monitoring will consist of free product monitoring, groundwater elevation monitoring, and groundwater sampling.

- Free product monitoring will consist of measuring free product thickness in areas of the site as part of the performance standard evaluation after implementation of the preferred remedial alternative.
- Groundwater elevation monitoring will be performed during free product monitoring events and during groundwater sampling events.
- Groundwater samples will be collected from designated GATX compliance monitoring wells, performance monitoring wells, and sentry wells.

The monitoring objectives have been categorized as protection, confirmation, and performance monitoring. These three forms of compliance monitoring will be performed in accordance with WAC 173-340-410.

Protection Monitoring to confirm that human health and the environment are adequately protected during construction and the operation and maintenance period of the cleanup action.

Performance Monitoring to confirm that the cleanup action has attained cleanup standards and other performance standards.

Confirmation Monitoring (Confirmation and Sentry Wells) to confirm the long-term effectiveness of the cleanup action once cleanup actions and other performance standards have been attained.

Monitoring Schedule. Groundwater sampling will begin in the quarter that the Consent Decree is approved (December 1999) and will continue for five years (December 2004). Sampling will occur quarterly for the first year. Ecology and GATX will review the data after one year. If trends are declining, the sampling frequency and number of parameters may be reduced.

2.0 Compliance Monitoring

Compliance monitoring will begin within the quarter the Consent Decree is approved and will continue for five years. Figure 1 shows the locations of all wells in which product will be monitored, groundwater levels will be measured, and groundwater samples will be collected as part of the site compliance monitoring program. Table 1 provides a list of compliance monitoring wells, identifying the well location, monitoring objective, and well use. A summary of the analytical parameters to be used in compliance monitoring is presented in Tables 2 and 3. A detailed description of each compliance-monitoring component, including the media type, location, and schedule, is presented this section. Specific schedule details are discussed within Sections 2.2.3 and 2.3.3. and Table 1.

2.1 PROTECTION MONITORING

The objective of protection monitoring is to confirm that human health and the environment are adequately protected during construction, operation and maintenance of the cleanup action [WAC 173-340-410(1)(a)]. Protection monitoring will be addressed in the health and safety plan prepared in conjunction with the engineering design report, construction plans and specifications, and operation and maintenance plan (WAC 173-340-400).

2.2 PERFORMANCE MONITORING

The objective of performance monitoring is to confirm that the cleanup action has attained cleanup standards and other performance standards as appropriate [WAC 173-340-410(1)(b)]. Performance monitoring will consist of free product monitoring during product recovery activities and groundwater sampling to evaluate the effectiveness of soil and groundwater cleanup actions and natural attenuation.

2.2.1 PERFORMANCE MONITORING LOCATIONS

Wells A-14, A-21, A-23, A-27, MW-3 through MW-9, MW-14, MW-07, SH-02, SH-05, and three new wells will be used for performance wells. These wells are located in or around Yards A, B, C, and D within groundwater plume. Due to historic detection of petroleum-hydrocarbon-related IHSs above cleanup levels, these monitoring wells will be included in the compliance monitoring program. Monitoring in these wells will be focused on the IHSs for groundwater to provide water quality data for baseline data

and trend analysis. These wells will also be monitored for natural attenuation parameters (Table 3).

Areas Below Cleanup Levels: IHSs were not detected above the groundwater cleanup levels (Table 2) more than once in shallow monitoring wells MW-1, MW-2, MW-5, MW-07, MW-8, MW-12, MW-13, MW-16, MW-17, MW-18, A-8, A-24, SH-02, SH-05, T-3, T-4, and T-12. Most of these wells are located at the downgradient sides of the C Yard and some are located in the A, B, and D Yards.

Free Product: Shallow wells located in or around a free product plume in the C Yard include Well 20, Well 21, Well 22, MW-4, Well 25 and Well 27. Shallow wells located in or around a free product plume within the A Yard, include, A-6, A-4, A-29, A-22, A-16, A-13, A-14, A-20 and A-19. A shallow well located in or around a free product plume within the B Yard is Well 12.

All monitoring wells where water level measurements are taken will be measured for free product. A measurable thickness of free product is defined as greater than or equal to 0.01 feet. There are presently 76 monitoring wells being used to develop groundwater elevation contours for the site.

A Yard: Shallow wells located in or around a free product plume at the A Yard with current free product detection include A-6, A-4, A-29, A-22, A-16, A-13, A-14, A-20 and A-19.

B Yard: Shallow well located in or around a free product plume at the B Yard with current free product detection is Well 12.

C Yard: Shallow wells located in or around a free product plume at the C Yard with historic and current free product detection include Well 20, Well 21, Well 22, MW-4, Well 25 and Well 27.

Product performance monitoring will be performed in these wells prior, during, and after implementation of the remedial action alternatives discussed in Section 1.2. The product performance standard is a “measurable product thickness”, and the product cleanup standard is “no visible sheen.” Sheen is defined as a visible display of iridescent colors on equipment or water removed from a monitoring well. After the performance standard has been met in these wells, they will be sampled for BTEX, TPH, (Table 2) and natural attenuation parameters (Table 3). Product shall be removed from the water table throughout the site, when ever present, to the extent technically feasible.

Dissolved TPH Constituents: Dissolved TPH constituents of TPH-G, -D, -O, and BTEX performance monitoring will be monitored in these wells prior, during and after implementation of the remedial action alternatives discussed in Section 1.2 for baseline data and trend analysis. Shallow monitoring wells with periodic or consistent detection of BTEX constituents or TPH above the cleanup levels include Wells 15, 17, 24, MW-3, MW-7, MW-9, MW-14, A-3, A-10, A-15, A-21, A-23, A-24, A-26, A-27, and A-28. These wells are located in or around Yards A, B, C, and D. Due to historic detection of petroleum-hydrocarbon-related IHSs above cleanup levels (Table 2), some of these monitoring wells will be included in the compliance monitoring program. Monitoring in these selected wells will be focused on the IHSs for groundwater to provide water quality data for baseline data and trend analysis. Additionally, these selected wells will be monitored for natural attenuation parameters (Table 3).

A Yard: Shallow well located adjacent to a free product plume at the A Yard with dissolved TPH constituents detected above cleanup standards (Table 2) include A-23 and A-28.

B Yard: Shallow well located adjacent to a free product plume at the B Yard with dissolved TPH constituents detected above cleanup standards (Table 2) is MW-7.

C Yard: Shallow wells located in or around a free product plume and soil TPH hot spots at the C Yard with dissolved TPH constituents detected above cleanup standards (Table 2) include MW-3, MW-4, Well 24, Well 25, T-5, T-18, and T-19.

D Yard: Shallow wells located adjacent to a free product plume and soil TPH hot spots at the D Yard with dissolved TPH constituents detected above cleanup standards (Table 2) include Wells MW-14, Well 17, T-13, T-15, and T-17.

Total and Dissolved Lead: Total lead was detected periodically above the cleanup level (Table 2) in Wells MW-6, MW-7, MW-07, MW-8, MW-9, MW-12, MW-13, A-21, A-23, A-24, A-28, SF-01, SH-02, SH-04, and SH-05. Dissolved lead was detected periodically above the cleanup level (Table 2) in MW-7. Performance monitoring will be performed in these wells, prior, during and after implementation of the remedial alternative discussed in Section 1.2 for total lead baseline data and trend analysis.

Off-site Sentry Monitoring wells: Wells A-23, A-28, MW-12, MW-13, MW-16, and MW-18 will serve as sentry wells. These wells will be included in the program due to their location adjacent to areas with soil cleanup

actions, free product plume or to provide off property boundary well network. Monitoring in these wells will be focused on the IHSs for groundwater to provide water quality data for baseline data and trend analysis.

Background wells: Wells MW-1 and MW-2 are located upgradient along a south/southeast groundwater flow direction for the site and will serve as the site background monitoring wells. These wells will be monitored for the IHSs for groundwater and natural attenuation parameters to establish baseline and background groundwater quality data. After one year, these wells will be monitored for the IHSs for groundwater only.

2.2.2 PERFORMANCE CRITERIA

Separate-Phase Hydrocarbons: To monitor the effectiveness of the preferred remedial alternative discussed in Section 1.2 for free product, the performance criterion will be a lack of measurable product thickness in compliance monitoring wells.

Dissolved TPH Constituents and Lead: Groundwater cleanup levels (Table 2) are based on the protection of aquatic organisms and on human ingestion of such organisms. The Conditional Point of Compliance for the site groundwater is the property boundary.

Natural Attenuation: To demonstrate that natural attenuation is occurring to reduce contaminant concentrations, the performance criteria will be periodic monitoring of constituent plume data (i.e., BTEX and TPH) and a variety of other indicators of natural attenuation processes. These processes include physical, chemical, or biological processes in the form of biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization or destruction of contaminants. Following is the rationale for the selection of the natural attenuation monitoring parameters (from USEPA, 1994c).

Constituent Plume Characteristics

In the absence of natural attenuation mechanisms, constituent concentrations would remain relatively constant within the plume and then decrease rapidly at the edge of the plume. If natural attenuation is occurring, constituent concentrations will decrease with distance from the source along the flow path of the plume as a result of dispersion. If other natural attenuation mechanisms are occurring, the rate at which concentrations of constituents are reduced will be accelerated.

Monitoring of constituent concentrations in the groundwater over time will give the best indication of whether natural attenuation is occurring. If natural attenuation is occurring, the contaminant plume will migrate more slowly than expected based on the average groundwater velocity. Receding plumes typically occur when the

source has been eliminated. Natural attenuation may also be occurring in plumes that are expanding, but at a slower than expected rate. For example, in sandy soils [similar to Harbor Island] with relatively low organic carbon content (about 0.1 percent), BTEX constituents are expected to migrate at one-third to two-thirds of the average groundwater speed velocity (McAllister, 1994). Higher organic carbon content would further retard constituent migration. If constituents are migrating more slowly than expected based on groundwater flow rates and retardation factors, then other natural attenuation mechanisms (primarily biodegradation) are likely reducing constituent concentrations. For stable plumes, the rate at which contaminants are being added to the system at the source is equal to the rate of attenuation. A plume may be stable for a long period of time before it begins to recede, and in some cases, if the source is not eliminated, the plume may not recede.

Occurrence of biodegradation might also be deduced by comparison of the relative migration of individual constituents. The relative migration rates of BTEX constituents, based on the chemical properties, are expected to be in the following order:

benzene > toluene, o-xylene > ethylbenzene, m-xylene, p-xylene

If the actual migration rates do not follow this pattern, biodegradation may be responsible.

Dissolved Oxygen Indicators

The rate of biodegradation will depend, in part, on the supply of oxygen to the contaminated area. At levels of dissolved oxygen (D.O.) below 1 to 2 mg/L in the groundwater, aerobic biodegradation rates are very slow. If background D.O. levels (upgradient of the contaminant source) equal or exceed 1 to 2 mg/L, the flow of groundwater from the up-gradient source will supply D.O. to the contaminated area, and aerobic degradation is possible.

Where aerobic biodegradation is occurring, an inverse relationship between D.O. concentration and constituent concentrations can be expected (i.e., D.O. levels increase as constituent levels decrease). Thus, if D.O. is significantly below background within the plume, aerobic biodegradation is probably occurring at the perimeter of the plume.

Geochemical Indicators

Certain geochemical characteristics can also serve as indicators that natural attenuation, particularly biodegradation, is occurring. Aerobic biodegradation of petroleum products produces carbon dioxide and organic acids, both of which tend to cause a region of lower pH and increased alkalinity within the constituent plume.

Anaerobic biodegradation may result in different geochemical changes, such as increased pH. Under anaerobic conditions, biodegradation of aromatic hydrocarbons typically causes reduction of Fe^{3+} (insoluble) to Fe^{2+} (soluble), because iron is commonly used as an electron acceptor under anaerobic conditions. Thus, soluble iron concentrations in the groundwater tend to increase immediately downgradient of a petroleum source as the D.O. is depleted, and conditions change to become anaerobic (i.e., reduced). The concentration of methane increases, another indication that anaerobic biodegradation is occurring.

Oxidation/Reduction Potential

The oxidation/reduction (redox) potential of groundwater is a measure of electron activity and is an indicator of the relative tendency of a solution to accept or transfer electrons. Because redox reactions in groundwater are biologically mediated, the rates of biodegradation both influence and depend on redox potential. Many biological processes operate only within a prescribed range of redox conditions. Redox potential also can be used as an indicator of certain geochemical activities (e.g., reduction of sulfate, nitrate, or iron). The redox potential of groundwater generally ranges from 800 millivolts to about -400 millivolts. The lower the redox potential, the more reducing and anaerobic the environment.

Measurement of redox potential of groundwater also allows for approximate delineation of the extent of the contaminant plume. Redox potential values taken from within the contaminant plume will be lower than background (upgradient) redox values and values from outside the plume. This is due in part to the anaerobic conditions that typically exist within the core of the dissolved hydrocarbon plume.

Methane. Methanogenesis has been determined to be a predominant biodegradation mechanism for fuel spills. During the aerobic biodegradation of petroleum constituents, methane is produced. Methane concentrations above background levels may indicate the occurrence of aerobic biodegradation of petroleum constituents.

Nitrate. After dissolved oxygen has been depleted, nitrate may be used as an electron acceptor for anaerobic biodegradation. Nitrate concentrations below background levels may indicate the occurrence of anaerobic biodegradation of petroleum compounds.

Sulfate. After dissolved oxygen and nitrate have been depleted, sulfate may be used as an electron acceptor for anaerobic biodegradation. Sulfate concentrations below background levels may indicate the occurrence of anaerobic biodegradation of petroleum compounds.

Based on this discussion (USEPA, 1994c), groundwater samples collected for natural attenuation evaluation will be analyzed for plume characterization parameters (BTEX, TPH-G, TPH-D, and TPH-O), dissolved oxygen, geochemical indicators (alkalinity, carbon dioxide, total iron (from which ferric iron [Fe³⁺] can be calculated), ferrous iron (Fe²⁺), hardness, methane, pH, and sulfate), and oxidation/reduction potential (Table 3).

2.2.3 MONITORING SCHEDULE

Free product monitoring will be conducted at periodic intervals to allow product to accumulate in wells but no less frequently than once a month. The frequency of free product monitoring will also depend on the amount

and type of free product removed from the monitoring wells as well as the season and type of free product recovery activity.

Groundwater monitoring conducted to confirm the effectiveness of natural attenuation and to estimate the rate will be conducted quarterly for the first year and annually thereafter (Table 3). Natural attenuation monitoring will be performed in accordance with confirmation groundwater sampling described in Section 2.3.

2.3 CONFIRMATION MONITORING

The objective of confirmation monitoring is to confirm the long-term effectiveness of the cleanup action as discussed in Section 1.2, once performance and cleanup standards have been met [WAC 173-340-410(1)(c)]. Confirmation monitoring will include the sentry wells, and will consist of free product and groundwater monitoring for the IHS indicator parameters (Tables 2 and 3) as appropriate.

2.3.1 CONFIRMATION MONITORING LOCATIONS

All monitoring wells in which water level measurements are taken will be checked for free product. There are presently 76 monitoring wells being used to develop groundwater elevation contours for the site.

A total of 28 monitoring wells designated in Table 1 will be used as confirmation monitoring wells. These wells will be included in the program due to their location adjacent to areas with soil cleanup actions or to provide a property boundary well network. Monitoring in these wells will be focused on the IHSs (BTEX, TPH) to provide water quality data for baseline data and trend analysis. Some of these wells will also be monitored for natural attenuation parameters.

2.3.2 SENTRY MONITORING WELLS

Wells A-23, A-28, MW-12, MW-13, MW-16, and MW-18 will serve as sentry wells. These wells will be included in the program due to their location adjacent to areas with soil cleanup actions, product plume, or to provide off property boundary well network. Monitoring in these wells will be focused on the IHSs (Table 2) for groundwater to provide water quality data for baseline data and trend analysis. Except for A-19, A-23, A-27, and A-28, the rest of these wells will not be monitored for natural attenuation parameters (Table 3) since cleanup levels have been already met in these wells.

Total and Dissolved Lead: Total lead was detected periodically above the cleanup level in the following wells MW-6, MW-7, MW-07, MW-8, MW-9, MW-12, MW-13, A-21, A-23, A-28, SH-02, and SH-05. Dissolved lead was detected periodically above the cleanup level (Table 2) in MW-7. Confirmation monitoring will be performed in these wells, prior, during, and after implementation of the remedial alternative discussed in Section 1.2 for total lead baseline data and trend analysis.

2.33 COMPLIANCE CRITERIA

Separate-Phase Hydrocarbons: To demonstrate that free product removal has been accomplished, the performance criterion will be a lack of sheen in compliance monitoring wells.

Groundwater: Cleanup levels are based on the protection of aquatic organisms and humans ingesting such organisms. The conditional point of compliance where these cleanup levels will be met is at the property boundary of the GATX site. The groundwater cleanup levels are presented in Table 2.

Groundwater compliance criteria will document that cleanup levels have been achieved. Groundwater analytical data will be evaluated using time-trend plots, data comparison to cleanup levels, and statistical analysis, if appropriate. Time-trend plots will be used to evaluate long-term analytical trends in relation to the associated cleanup levels. If statistical analysis is performed, the analysis will be conducted in accordance with WAC 173-340-720(8) and Ecology Guidance (1992, 1993, and 1995).

2.34 MONITORING SCHEDULE

Confirmation free product monitoring will be conducted monthly for a period of one year after cessation of free product recovery activities as discussed in Section 1.2. The schedule will be reevaluated at that time as discussed in Section 3.4.1.

Monitoring of the confirmation, performance, and sentry groundwater monitoring wells will begin within the quarter the Consent Decree is approved. Confirmation monitoring will continue for five years after completion of the cleanup action. Sampling will occur quarterly for the first year. Ecology and GATX will review the data after one year. If monitoring data indicates that trends are declining, the sampling frequency and number of parameters may be reduced as warranted.

30 Data Evaluation

3.1 DATA VALIDATION

Analytical data will be validated according to United States Environmental Protection Agency (USEPA) data validation guidelines. Data validation will include evaluation of holding times, method blank results, surrogate recovery results, field and laboratory duplicate results, completeness, detection limits, laboratory control sample results, and chain-of-custody forms. Data validation procedures are further described in the Sampling and Analysis Plan (Appendix A).

3.2 PRACTICAL QUANTITATION LIMITS

Practical Quantitation Limits (PQLs) will be established for each analyte to determine whether any of the limits are above the corresponding cleanup level. The PQL will be determined by multiplying the lowest method detection limit (MDL) obtained by the laboratory for Terminal groundwater samples by a factor of ten (Ecology, 1993). If the PQL for any constituent is above the corresponding cleanup level, the cleanup level will be considered to be attained if the constituent is detected below the PQL [WAC 173-340-707(2)].

3.3 PRODUCT MONITORING DATA

Product monitoring data will be reviewed as it is generated to determine the need for free product recovery system alterations or to determine changes in free product monitoring frequency. Quality control protocol will be followed to ensure that free product measurements are reliably obtained and consistently measured. Groundwater and product level data will be entered in spreadsheets for trend plots and analysis.

3.4 GROUNDWATER CHEMISTRY DATA REVIEW

Natural Attenuation Monitoring Data. Natural attenuation monitoring data will be reviewed to determine if the data is sufficient to evaluate natural attenuation processes at the site. If data gaps are identified, GATX may propose to add parameters as necessary to adequately evaluate natural attenuation.

Confirmation, Performance, and Sentry Monitoring Data. After each monitoring event, groundwater chemistry data will be reviewed once

it is validated. The data will be compared to groundwater cleanup levels. If a sample result is above a groundwater cleanup level and is also above the historic high concentration in that well, the well will be re-sampled to verify the result. Re-sampling will occur within one month of receiving the laboratory data. Groundwater chemistry and elevation data will be used in the one and five-year review as subsequently described.

3.4.1 ONE YEAR SITE REVIEW

Groundwater elevation and chemistry data will be evaluated after the first year of sampling. Natural attenuation monitoring well data will be evaluated as previously discussed in Section 2.2.2. Spatial and temporal changes in plume characterization parameters, dissolved oxygen, geochemical indicators, and oxidation/reduction potential (Table 3) will be evaluated to determine the effectiveness and rate of natural attenuation at the site.

Groundwater analytical results will be evaluated using time-trend plots and data comparison to cleanup levels. Time-trend plots will be prepared for each constituent detected above the PQL; trends will be identified by visual observation. The time-trend plots will be used to evaluate long-term trends in compliance wells and to compare groundwater conditions with cleanup levels. A groundwater contour map will be prepared to verify that the predominant groundwater flow directions at the Terminal remain relatively consistent.

The data evaluation will be submitted to Ecology for review. After the first year review, if the confirmation (and or sentry) wells exceed cleanup standards, Ecology and GATX (and the potentially affected adjacent property owner) will evaluate groundwater conditions prior to considering contingency plans. If monitoring data indicates that trends are declining, the sampling frequency and number of parameters may be reduced as warranted.

3.4.2 FIVE YEAR SITE REVIEW

Groundwater elevation and chemistry data will be evaluated after five years of monitoring. Groundwater contour maps will be prepared to verify that the groundwater flow directions at the Terminal have not changed significantly.

Natural Attenuation Monitoring Data. Natural attenuation monitoring data will be evaluated as previously described in Section 2.2.2.

The data evaluation will be documented and presented in the five-year review report.

Sentry Well Data: Groundwater analytical data will be evaluated using time-trend plots and data comparison to cleanup levels. Time-trend plots will be prepared for each constituent detected above the PQL and trends will be identified by visual observation.

Confirmation and Performance Well Data: Groundwater analytical data will be evaluated using time-trend plots, data comparison to cleanup levels, and, if appropriate, statistical analysis. Time-trend plots will be prepared for each constituent detected above the PQL and trends will be identified. Time-trend plots will be used to evaluate long-term analytical trends in relation to the associated cleanup levels. If statistical analysis is performed, the analysis will be conducted in accordance with WAC 173-340-720(8) and Ecology Guidance (1992, 1993, and 1995).

4.0 Compliance Evaluation Criteria

4.1 PERFORMANCE MONITORING

Monitoring data will be evaluated to determine the effectiveness of the remedy, whether changes to the free product monitoring schedule and/or monitoring wells are warranted. Changes may be made in the frequency of free product monitoring to optimize free product removal or system efficiency. These changes may depend on the amount and type of free product removed from the monitoring wells, the season, and the type of free product recovery activity. Other changes in performance monitoring will be made as follows:

- Additional free product recovery activities and monitoring will be initiated immediately if free product is observed in wells that previously had not contained free product.
- An additional well or well point will be installed and monitored if free product is observed for the first time in a downgradient or cross-gradient well. The need for additional free product recovery activities will also be reviewed.
- Performance monitoring will continue as long as free product is observed in the area being monitored.
- Performance monitoring will end and confirmation monitoring will begin when free product has not been observed in any well in the area being monitored for a period of six months.

4.2 CONFIRMATIONAL MONITORING

4.2.1 FREE PRODUCT

Free product confirmation monitoring will end and the area will be considered to be free of free product when no sheen is observed in any well in the area being monitored for a period of one year.

Free product recovery activities and performance monitoring will resume if measurable product is found in any well in an area being monitored.

4.2.2 GROUNDWATER

The review of groundwater quality data will be focused on evaluating groundwater quality trends and not on a single event or exceedance in a single well. Changes to the groundwater-monitoring program will be based on groundwater quality data review as described in Section 3.4.

Groundwater quality data will be tabulated and trend plots prepared as part of the one-year site review and five-year site review. If the chemistry results are all below cleanup levels for four consecutive quarters, then GATX will petition Ecology for site de-listing review and if Ecology concurs, the site shall be de-listed.

As part of the five-year site review, statistical analysis of the data will be performed if groundwater analytical results remain above cleanup levels. Alternatively, if the cleanup standards are met in 95 percent of the wells for four consecutive quarters, GATX will petition Ecology for site de-listing review and if Ecology concurs, the site shall be de-listed. In addition to reviewing chemistry data for the indicator hazardous substances (Table 2), natural attenuation parameters (Table 3) will also be evaluated to determine the effectiveness of natural attenuation at the site.

Data will be evaluated as described in Section 3.4.2. The contingency plan (summarized in Section 5.0) will be initiated if the five-year review identifies the following:

- There is an increasing trend in the groundwater quality data and the data trend exceeds the cleanup level in the performance, confirmation and sentry wells.
- An analyte is consistently above the cleanup level or statistically above the cleanup level with an increasing trend and with no evidence of natural attenuation.

5.0 Contingency Plan

A contingency plan sets forth a “backup” remediation technology in the event that a remedial technology within the Cleanup Plan fails or proves ineffective in a timely manner (five years after implementation of the preferred option discussed in Section 1.2). When evaluating the need to implement the contingency plan, all data will be evaluated as described in Section 3.4.2. A contingency plan will be initiated and implemented within 30 days of meeting any of the following criteria:

- If, after implementing the selective remedial action, the results of the groundwater monitoring program indicate elevated contaminant concentration over the specified restoration time frame of 5 years;
- If contaminants are newly identified in point of compliance wells located beyond the original plume boundary, indicating renewed contaminant migration; or
- If contaminant migration is not decreasing at a sufficient rate to ensure that the primary and secondary concerns identified for the site are being met.

The following actions will be initiated if the above criteria are triggered:

- Identification of the source(s) causing the criteria to be triggered. The highest priority in the compliance plan would be to identify and control the source. Accessible sources will be removed to the extent technically practicable without undermining the integrity of the adjacent above storage tanks, if present near the source area(s).
- Review Preferred Options Summary discussed in Section 1.2 and propose a supplemental remedy or combination of remedies, if needed, to prevent adverse impacts to offsite properties. (e.g., evaluation and potential expansion of the free product recovery system to ensure removal of free product from the water table if residual free product is identified beyond the capture zone of the system).

In the event that site conditions trigger a contingency plan implementation due to adverse impacts to offsite properties, Ecology, GATX, and the potential to be affected adjacent property owner will evaluate groundwater conditions prior to implementation of the contingency plan. In the event that site conditions trigger a contingency plan implementation other than considerations due to adverse impacts to offsite properties, Ecology and GATX will evaluate groundwater conditions prior to implementation of the contingency plan.

In the event that the contingency plan should be implemented, GATX will prepare a contingency work plan that contains engineering design criteria to address the remediation technology necessary to address the criteria triggering the contingency plan implementation. The contingency work plan will be approved by Ecology prior to its implementation.

6.0 Reporting

During the compliance-monitoring program, monitoring data will be submitted to Ecology on a periodic basis. Ecology will also be notified if new data indicates that a significant change in site conditions has occurred. Monitoring data and other information will be submitted in the following reports:

- **Quarterly Data Reports.** Laboratory analytical data reports will be submitted to Ecology after each round of monitoring has been completed.
- **Annual Monitoring Reports.** Monitoring reports will be prepared annually. The report will include a data validation memo, updated groundwater chemistry tables (including any well re-sampling results), and free product recovery data. Analytical time-trend plots will also be included in the reports. Analytical time-trends will be discussed when they are observed and other relevant data observations will be described. Any changes in the free product recovery system will also be discussed.
- **Five-year Review Report.** A report will be submitted to Ecology summarizing the five-year review of the compliance monitoring data. The report will include an updated groundwater elevation table, a representative groundwater contour map, time-trend plots for analytes detected above the PQL, and a comparison of the data to cleanup levels. Groundwater elevation and chemistry data will be evaluated. In addition to reviewing chemistry data relative to the indicator hazardous substances, natural attenuation parameters will also be evaluated to determine the effectiveness of natural attenuation and other cleanup action implementation at the site. As part of the five-year site review, statistical analysis of the data will be performed if analytical results remain above cleanup levels.

7.0 References

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Table 1
Compliance Monitoring Wells
GATX Harbor Island Terminal
Seattle, Washington

Monitoring Well	Well Location	Compliance Monitoring Objective
A-5	A Yard	Confirmational
A-8	A Yard	Confirmational
A-10	A Yard	Confirmational
A-14	A Yard	Performance / Confirmational
A-21	A Yard	Performance / Confirmational
A-23	A Yard*	Performance / Confirmational / Sentry
MW-7	B Yard	Performance / Confirmational
MW-8	B Yard	Performance / Confirmational
MW-9	B Yard	Performance / Confirmational
MW-07	B Yard	Performance / Confirmational
A-27	B Yard	Performance / Confirmational
SH-05	B Yard	Performance / Confirmational
A-28	B Yard*	Confirmational / Sentry
New Well #2	B Yard	Confirmational
MW-2	C Yard	Background / Confirmational
MW-3	C Yard	Performance/ Confirmational
MW-4	C Yard	Performance / Confirmational
SH-02	C Yard	Performance / Confirmational
New Well #1	C Yard	Performance / Confirmational
New Well #4	C Yard	Performance / Confirmational
MW-12	D Yard*	Confirmational / Sentry
MW-13	C Yard*	Confirmational / Sentry
MW-16	C Yard*	Confirmational / Sentry
MW-18	C Yard*	Confirmational / Sentry
MW-5	D Yard	Performance / Confirmational
MW-6	D Yard	Performance / Confirmational
MW-14	D Yard	Performance
New Well #3	D Yard	Performance / Confirmational
MW-1	E Yard	Background / Confirmational

NOTES: All wells where water levels are measured serve as Performance or Confirmation wells for free product

* Located Off-site

Table 2
Groundwater Cleanup Levels
GATX Harbor Island Terminal
Seattle, Washington

Constituent	Cleanup Level (mg/L)
Benzene	0.071
Toluene	200.0
Ethylbenzene	29.0
TPH-G	1
TPH-D	10
TPH-O	10
Lead	0.0058

Table 3
Natural Attenuation Indicator Parameters
 GATX Harbor Island Terminal
 Seattle, Washington

PARAMETER	METHOD / UNIT
Temperature, pH, alkalinity	Field / variable
Dissolved Oxygen (DO)	Field / mg/l
Carbon dioxide	Field / mg/l
Nitrate (NO ₃)	Laboratory / mg/l
Nitrite (NO ₂)	Laboratory / mg/l
Dissolved ferrous iron (Fe ²⁺)	Laboratory / mg/l
Dissolved Methane (CH ₄)	Laboratory / mg/l
Sulfate (SO ₄)	Laboratory / mg/l
Sulfide (H ₂ S)	Laboratory / mg/l
Reduction/Oxidation potential (Redox, Eh)	Field / millivolts

