

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

In the Matter of Remedial Action by:

UNOCAL OIL COMPANY OF CA,  
A WHOLLY OWNED SUBSIDIARY  
OF CHEVRON CORPORATION

AMENDMENT NO. 5 TO ORDER ON  
CONSENT

No. DE 88-N223

STATEMENT OF CURRENT CONDITIONS

A. The previous amendment (Amendment No. 4 to Order on Consent, July 18, 1995) identifies specific groundwater monitoring wells to be used for demonstrating compliance for the Offsite Area in Section H.4.IV.a (pg. 15). *"The points of compliance monitoring for ground water in the offsite Area shall be existing monitoring wells MW-8, MW-10, MW-20, MW-25 and MW-52 after evaluating their suitability for dual function for such compliance monitoring, together with three additional monitoring wells to be installed by Unocal adjacent to Elliot Bay at locations mutually agreed by Unocal and Ecology."* Compliance monitoring wells MW-67, MW-70, and MW-71 were subsequently identified as the three additional monitoring wells for the Offsite Area.

B. Significant cleanup work has been performed. Changes in the site conditions due to cleanup actions, construction activities, and information gained from groundwater monitoring since 1995 supports the need to revise the Offsite Area compliance monitoring well provisions of Amendment No. 4. In addition, the Offsite Area compliance wells identified in Amendment No. 4 have been abandoned to accommodate site development. New Offsite Area compliance monitoring wells need to be identified to monitor groundwater and to demonstrate compliance in order to have an end-point for determining when to terminate the active groundwater treatment system in accordance with Section H.4.IV.c of Amendment No. 4 to the Order on Consent.

C. The eight Offsite Area compliance monitoring wells identified in Amendment No. 4 have been abandoned for site development and will be replaced by eight new compliance monitoring wells identified as MW-200 through MW-207 identified in the attached figure.

D. Thus, a revision to Amendment No. 4 is needed to identify new Offsite Area compliance monitoring wells in order to provide an end-point for terminating the active groundwater treatment at Trench D.

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Amendment No. 5  
Order on Consent No. DE 88-N223  
UNOCAL Oil Company of CA  
March 13, 2007

E. Sections H.4.IV.c and H.4.IV.g of Amendment No. 4 are in conflict with demonstrating groundwater compliance in accordance with existing law. These sections currently allow for one compliance monitoring well to exceed “remedial action levels” when demonstrating groundwater compliance for the Lower Yard Area and the Offsite Area. The closest equivalent under the current laws, Model Toxics Control Act (MTCA) (Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC), to “remedial action levels” would be the current regulatory concept of cleanup levels. MTCA does not provide for compliance monitoring wells to exceed cleanup levels when demonstrating that a site meets required cleanup levels at the standard point of compliance.

F. Thus, in amending this agreement, the revision to Amendment No. 4 must now require that all compliance wells in the Lower Yard Area and Offsite Area meet the “remedial action levels” in demonstrating compliance.

G. Ecology recognizes the applicability of WAC 173-340-702(12), which states that the cleanup levels set by the Department at the time that it issued the final cleanup action plan for a release for sites under an order or decree will remain in effect despite subsequent rule amendments unless, based on a case by case analysis, the previous cleanup action is no longer sufficiently protective of human health and the environment. Ecology believes that the “remedial action levels” set in the Consent Order and subsequent amendments, are sufficiently protective of human health and the environment and thus should remain in effect in this Amendment No. 5 to the Order on Consent.

#### AMENDMENT No. 5 TO ORDER ON CONSENT

Based on the foregoing, the parties stipulate and agree that the Order on Consent shall be amended, pursuant to the provisions of Paragraph XIX “Amendment of Order”, as follows:

A. AMENDMENT NO. 4 TO ORDER ON CONSENT, Section H.4.IV.a shall be replaced by the following:

The eight points of compliance ground water monitoring wells for the Offsite Area shall be MW-200, MW-201, MW-202, MW-203, MW-204, MW-205, MW-206, and MW-207 as shown in the attached figure.

B. AMENDMENT NO. 4 TO ORDER ON CONSENT, Section H.4.IV.c(ii) shall be replaced by the following:

Ground water quality in all eight Offsite Area point of compliance monitoring wells complies with the remedial action levels listed in Section H.4.IV.b above for four consecutive quarterly monitoring events, and

Amendment No. 5  
Order on Consent No. DE 88-N223  
UNOCAL Oil Company of CA  
March 13, 2007

C. AMENDMENT NO. 4 TO ORDER ON CONSENT, Section H.4.IV.c(iii) shall be replaced by the following:

Ground water quality in all five Lower Yard point of compliance monitoring wells complies with the remedial action levels listed in Section H.3.I.d for four consecutive quarterly monitoring events.

D. AMENDMENT NO. 4 TO ORDER ON CONSENT, Section H.4.IV.g(ii) shall be replaced by the following:

Ground water quality in all eight Offsite Area point of compliance monitoring wells complies with the remedial action levels listed in Section H.4.IV.b above for eight consecutive quarterly monitoring events, and

E. AMENDMENT NO. 4 TO ORDER ON CONSENT, Section H.4.IV.g(iii) shall be replaced by the following:

Ground water quality in all five Lower Yard point of compliance monitoring wells complies with the remedial action levels listed in Section H.3.I.d for eight consecutive quarterly monitoring events.

F. Ecology has determined that the amendment set forth below is a minor change to the Consent Order, and therefore public comment on this amendment is unnecessary.

Except as set forth above, all provisions of the Consent Order, including the contents of Amendments 1 through 4, remain unchanged by this Stipulated Fifth Amendment to the Order on Consent.

Further, by their signatures, the undersigned represent that they have the authority to legally bind the entities they represent.

Effective date of this Amendment: \_\_\_\_\_

3/28/07

**UNION OIL COMPANY OF  
CA, A CALIFORNIA CORPORATION**

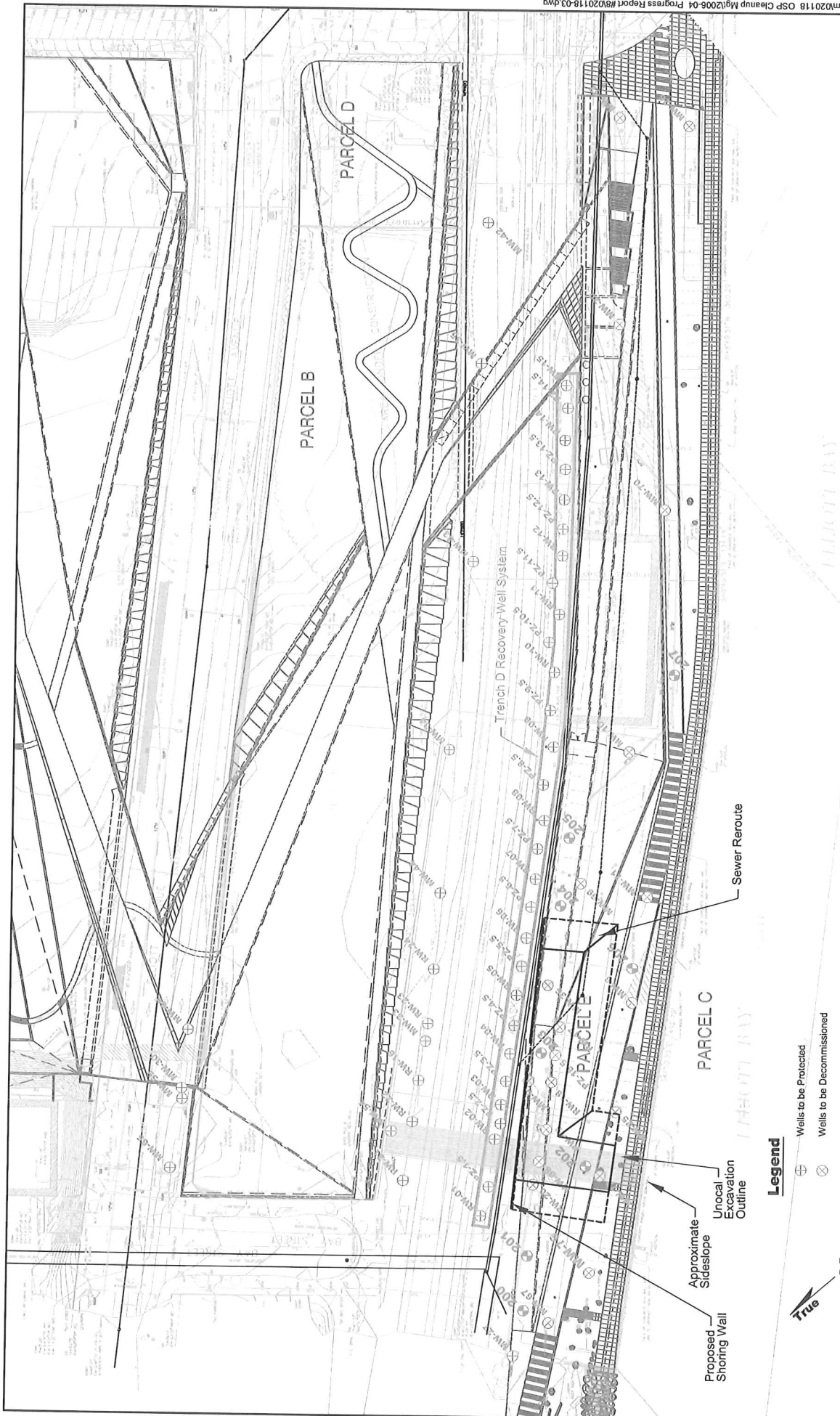
**STATE OF WASHINGTON,  
DEPARTMENT OF ECOLOGY**



James J. Dean  
Integration Manager  
(925) 842-3381



James J. Pendowski, Manager  
Toxics Cleanup Program  
(360) 407-7177



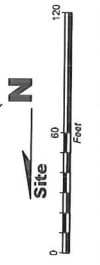
DATE	APR 2006	PROJECT NO.	020118
DESIGNED BY	LJM	FIGURE NO.	1
CHECKED BY	JIS		
APPROVED BY			

**Proposed Compliance Monitoring Well Plan  
Former Unocal Site Monitoring Network**  
Olympic Sculpture Park  
Seattle, Washington

**Aspect consulting**  
AN ENVIRONMENTAL PERSPECTIVE  
1700 University Street, Suite 1000  
Seattle, WA 98101  
206.465.4500  
www.aspectconsulting.com

**Legend**

- ⊕ Wells to be Protected
- ⊗ Wells to be Decommissioned
- ⊕ Proposed Compliance Well Location
- Wells with Recent or On-Going LNAPL Recovery Operations



ORIGINAL

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

In the matter of: )  
UNION OIL COMPANY OF ) NO. DE 88-N223  
CALIFORNIA, d/b/a UNOCAL ) AMENDMENT NO. 4  
 ) TO ORDER ON CONSENT

STATEMENT OF CURRENT CONDITIONS

A. This Order on Consent ("ORDER") became effective on December 3, 1988.

B. The Order on Consent is a negotiated agreement between Unocal and Ecology. The Order was negotiated pursuant to, and is effective under, the provisions of RCW 70.105B, et seq. ("Old Law").

C. The Order identified four specific areas to be remediated, described as: Upper Yard, Elliott Avenue, Lower Yard, and Offsite Area. In addition, there were three general areas identified as locations for "offshore sampling." (Exhibit B to Order on Consent.)

D. Pursuant to the Order, a Remedial Action Plan was adopted by the parties as of March 23, 1989.

E. Since December 1988, the parties have undertaken to fulfill the obligations set forth in the Order and in the Remedial Action Plan.

F. Effective March 1, 1989, the Old Law was replaced by the Model Toxics Control Act ("MTCA"), RCW 70.105D, et. seq.

G. Under the "Old Law" RCW 70.105B.020 (6), (f) Definitions: "petroleum and petroleum products" are defined as a "hazardous substance." Under MTCA, "petroleum or petroleum products" are defined as a "hazardous substance."

H. Pursuant to MTCA, the State of Washington Department of Ecology ("Ecology") has adopted various policies, rules and regulations. Effective May 4, 1990, regulations were promulgated under MTCA as set forth in the Washington Administrative Code (WAC), Chapter 173-340. In 1991, cleanup standards were adopted (generally referred to as Method A, Method B and Method C), and these standards are also set forth in WAC 173-340.

I. In the Order Paragraph VI, "Work to be Performed," pp. 9-11, there is a general description of work to be performed by Unocal at the site, with a statement that Unocal "shall achieve" certain cleanup "targets." Those targets are set forth on pages 10 and 11 of the Order on Consent.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

J. Unocal and Ecology have proceeded in good faith, with significant effort to abide by Paragraph VI and other provisions of the Order on Consent.

K. During the course of administering the Order, based on information obtained as a result of work performed at the site, the Remedial Work Plan was amended on December 30, 1988. Among other things that amendment addressed offshore sampling, analytical testing methods, and compliance monitoring wells.

L. The Order on Consent has been amended three times:

Amendment No. 1, 3/23/89  
Amendment No. 2, 9/29/89  
Amendment No. 3, 2/17/93

M. Paragraph VI, "Work to be Performed" of the Order on Consent identifies specific objectives of the remediation program for the Seattle Marketing Terminal. As of the date of this Amendment, the status of those objectives is as follows:

(1) **Pilot Studies.** No field pilot studies have been conducted. Three bench-scale pilot studies were performed to evaluate the biotreatability of petroleum-contaminated soil in the Lower Yard. These studies were completed by Unocal's Science & Technology group, ECOVA, and DuPont Biosystems. None of the treatability studies demonstrated sufficient treatment of Lower Yard soil to attain the specified TPH cleanup target (200 ppm).

(2) **Solid-phase biotreatment of contaminated soils from the Upper Yard.** Approximately 34,000 cubic yards of soil from the Upper Yard have been treated successfully and removed from the site. Remnant petroleum-contaminated soil exists in the Upper Yard immediately adjacent to portions of the western and northern property lines, and the final treatment left in the Upper Yard. Removal of the remnant contaminated soil adjacent to the property lines for treatment or disposal is not feasible without the installation of vertical shoring along the property lines. Amendment No. 3 to this Order on Consent stipulates that Unocal begin treatment of remnant contaminated soil in the Upper Yard no later than June 30, 1997.

(3) **Solid-phase biotreatment of contaminated soils located above the water table in the Lower Yard.** Following

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

demolition activities, all of the soil in the Lower Yard was excavated and screened to remove large debris (to make the soil more amenable to solid-phase biotreatment). After the soil was screened it was placed back into the excavation. Treatment of the uppermost lift of this screened soil took place for a period of 18 months before achieving the 200 ppm cleanup level for TPH. The recalcitrant nature of the petroleum hydrocarbons in this soil was demonstrated by the bench-scale treatability studies referenced above. These treatability studies were undertaken after approximately 3 months of treatment of the Lower Yard soil did not achieve the specified cleanup targets. Further treatment of soil in the Lower Yard was terminated 15 months thereafter based on the infeasibility of treatment.

(4) In-situ biotreatment of contaminated soils located below the water table in the Lower Yard. This treatment concept envisioned construction of a drainage blanket in the water table zone of the Lower Yard after the contaminated soil above the water table had been treated successfully and removed. The drainage construction and in-situ treatment has not been attempted beneath the Lower Yard because solid-phase biotreatment of Lower Yard soil has proved to be infeasible and the water table is 8 to 10 feet below the current ground surface of the Lower Yard.

(5) In-situ biotreatment with soil venting beneath a portion of Elliott Avenue. In-situ treatment utilizing Trenches A and B took place between December 1989 and May 1991. It became infeasible to operate these trenches after May 1991, as the grade of the Upper Yard was lowered below the level of Elliott Avenue through successful treatment and removal of Upper Yard soil. Subsequent studies were performed in the vicinity of MW-30, located in the sidewalk of Elliott Avenue. Ecology contends that the intermittent presence of NAPL (non-aqueous phase liquid) in MW-30, and in nearby MW-59, gives evidence that further remediation is needed in this area. The Schedule of Deliverables for Amendment No. 3 to the Order on Consent requires free product mitigation in and near MW-30 by October 1995.

(6) In-situ biotreatment with soil venting in the Offsite Area. Continuous in-situ biotreatment with soil venting has occurred in the Offsite Area since December 1989. Shortly after pumping from Trench D began, free product was recovered in unanticipated quantities. This led to the installation of eight additional recovery wells in the vicinity of the Burlington

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

Northern Railroad tracks in December 1990. Monthly free product recovery has declined significantly since its peak of 550 gallons in March 1991; product continues to be recovered at a rate of approximately 10 to 30 gallons per quarter as of the date of this Amendment.

(7) Cleanup monitoring and termination. The Schedule of Deliverables for Amendment No. 3 to the Order on Consent requires that in-situ treatment in the Offsite Area be complete by June 1996. Unocal is conducting free product recovery, ground water sampling, testing and reporting as required in the Order.

N. The past four years of ground water monitoring of the single remaining monitoring well in the Upper Yard (MW-37) indicate compliance with all cleanup targets specified in the Order at that location only. Because of ongoing remedial treatment and excavation activities, and based on past compliance with the ground water cleanup targets, all Upper Yard monitoring wells were abandoned except for MW-37, with the prior approval of Ecology. The current ground water quality in the area of former wells MW-3, MW-12 and MW-24, where free product had been encountered or where the concentrations of TPH exceeded the cleanup target, is not known.

O. Pursuant to a "work plan" entitled "Former Seattle Marketing Terminal Investigation and Development of Cleanup Levels, Lower Yard, Seattle, Washington", dated May 8, 1992, as approved in Amendment No. 3, a draft report was prepared in August 1993, entitled "Investigation and Development of Cleanup Levels, Former Seattle Marketing Terminal, Lower Yard, Seattle, Washington" ("Draft Report").

P. After approving Amendment No. 3, Ecology adopted a policy regarding TPH contamination to the effect that applicable cleanup levels for TPH contamination should be as set forth in Method A under the MTCA regulations.

Q. Both Unocal and Ecology desire to complete remediation of the Seattle Marketing Terminal as expeditiously and cost-efficiently as possible.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

AMENDMENTS TO ORDER ON CONSENT

Based on the foregoing, the parties stipulate and agree that the Order on Consent shall be amended, pursuant to the provisions of Paragraph XIX "Amendment of Order", as follows:

A. GENERAL:

1. Paragraph IV, "Statement of Facts", shall be amended by adding the foregoing "Statement of Current Conditions".

2. Unocal acknowledges that Ecology does not currently recommend or endorse the use of site-specific risk assessments for any MTCA cleanup site for the establishment of TPH cleanup levels. As set forth in the Ecology publication "Focus" 5/94, Ecology recommends the use of either the Method A standards or the Leaking Underground Storage Tank (LUST) matrix.

3. For the purposes of this Amendment, "Detection Monitoring" shall mean the placement of ground water monitoring wells to monitor ground water quality to assess the extent of ground water contamination. Detection monitoring occurs during site investigation and remediation activities.

For the purposes of this Amendment, "Compliance Monitoring" shall mean the placement of ground water monitoring wells to monitor ground water quality to confirm the long term effectiveness of a cleanup action and to form the basis for evaluating termination of remedial actions. Compliance monitoring will occur as described herein for the Upper Yard, Elliott Avenue, the Lower Yard and the Offsite Area.

Some detection monitoring wells may be converted to compliance monitoring wells as appropriate.

4. Paragraph VII, "Designated Project Coordinators" shall be amended by adding the following:

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

The Project Manager for Ecology is:

Nnamdi Madakor, Hydrogeologist III  
Northwest Regional Office  
3190 160th Avenue S.E.  
Bellevue, WA. 98008-5452  
Telephone (206) 649-7112  
Telecopier (206) 649-7098

The Project Manager for Unocal is:

Joe Comstock, Senior Engineer  
Unocal Corporate Environmental Remediation and  
Technology  
Union Oil Company of California, dba Unocal  
Mailing Address:  
P. O. Box 76  
Seattle, WA. 98111  
Street Address:  
11720 Unoco Road  
Edmonds, WA 98020  
Telephone (206) 640-7613  
Telecopier (206) 640-7601

**B. WORK TO BE PERFORMED IN AMENDMENT NO. 4**

Paragraph VI, "WORK TO BE PERFORMED," shall be amended by adding the following:

**1. SUPPLEMENTAL SITE CHARACTERIZATION**

Conduct supplemental site characterization for soil and/or ground water for the Upper Yard, Elliott Avenue, Lower Yard, and Offsite Area respectively as provided in the attached Work Plan which by this reference is incorporated herein as Attachment 1.)

**2. FOCUSED FEASIBILITY STUDIES**

Conduct focused feasibility studies and optional pilot studies as proposed by Unocal and approved by Ecology, for technology selection for the Lower Yard and the Offsite Area.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

post '95  
CAPs offshore  
Lower yard

### 3. DRAFT CLEANUP ACTION PLAN

Present to Ecology a Draft Cleanup Action Plan (CAP) for the Lower Yard (Section H.3.III), a Decision Document for the Upper Yard (Section H.1.II), and a Draft Cleanup Action Plan for the Offsite Area (Section H.4.III), after Items B.1 and B.2 of the above are completed and approved by Ecology. A 30-day public comment period is required for each Draft Cleanup Action Plan and Decision Document submitted.

### 4. REMEDIAL ACTION AND COMPLIANCE MONITORING

Conduct remedial actions per approved Cleanup Action Plan, or Decision Document, and perform compliance monitoring at the site. Compliance monitoring requires a compliance monitoring plan to be submitted to Ecology for each applicable area of the site.

#### C. MYRTLE EDWARDS PARK

Myrtle Edwards Park is not part of the site which is subject to the provisions of this Order on Consent.

#### D. OFFSHORE AREA:

The sediment and biological report of the recently completed investigation of the "offshore" area shows that sediment remediation is not required.

#### E. DISPUTE RESOLUTION:

The parties agree that, pursuant to Section V, Judicial Review and Civil Enforcement, this Order on Consent itself is not appealable.

(1) Unocal and the Ecology site manager shall work together in an attempt to resolve all disputes which may arise during the implementation of this Order on Consent. The site managers shall meet and confer as necessary in an effort to resolve the dispute. When the site managers agree that they are unable to resolve the dispute, the Ecology site manager shall issue a written decision within fourteen (14) days.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

(2) Upon receipt of the site manager's written decision, Unocal has twenty-one (21) days within which to make a written request to the Ecology Toxics Cleanup Program Regional Section Manager or his/her designee for dispute resolution. Upon receipt of Unocal's written request, the Regional Section Manager or designee shall conduct a review of the dispute and shall issue a written decision regarding the dispute within twenty-one (21) days.

(3) If Unocal disagrees with the decision of the Regional Section Manager, Unocal may, within twenty one (21) days of receipt of the Regional Section Manager's decision, make a written request for Ecology management review of the decision.

(4) Ecology's Toxics Cleanup Program Manager shall then conduct a review of the dispute. Unocal shall be entitled to meet and confer with the Program Manager in an effort to resolve the dispute. This process shall be expedited as quickly as possible. The Program Manager's written decision shall be Ecology's final decision on the disputed matter.

(5) If Ecology's final written decision is unacceptable to Unocal, Unocal may appeal the decision to the Court. In the event that Unocal presents an issue to the Court for review, the Court shall review the action or decision of Ecology as a review of Other Agency Action under RCW 34.05.570(4) and render a decision based on such standard of review.

(6) The parties agree to only use the dispute resolution process in good faith and not for purposes of delay, and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

(7) Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order on Consent, unless Ecology agrees in writing to a schedule extension or the Court so orders.

**F. PUBLIC COMMENT REQUIREMENTS FOR AMENDMENT NO. 4**

A 30 day Public Comment Period is required after agreement is reached on this Amendment.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

G. DOCUMENTATION:

The parties will proceed in good faith and as expeditiously as possible to prepare any agreements and other documentation necessary to implement the terms and conditions of this Amendment. All such work will be completed in accordance with the Schedule of Deliverables to be submitted to Ecology prior to final agreement on this Amendment. The Schedule of Deliverables will be attached to this Amendment as Attachment 2 and is by this reference incorporated herein.

The project coordinators may agree to minor modifications to the Work Plan to be performed without formal amendments to this Order. Minor modifications will be documented in writing prior to implementation.

H. SCOPE OF WORK FOR AMENDMENT NO. 4

1. UPPER YARD:

I. Supplemental Site Characterization

a. Applicable ground water cleanup targets for the Upper Yard shall be:

<u>Parameter</u>	<u>Cleanup Target</u>	<u>Analytical Method</u>
NAPL	No visible sheen	Field measurement
TPH	1, 10, 15.0 mg/l	WTPH-G,D,D Extended.
Benzene	40 ug/l	EPA 8020
Ethylbenzene	1,400 ug/l	EPA 8020
Toluene	14,300 ug/l	EPA 8020
Total Xylenes	4,400 ug/l	EPA 8020
Diss. Lead	50 ug/l	EPA 7421

b. The points of detection and compliance monitoring for ground water in the Upper Yard shall include existing well MW-37 if, after evaluating its suitability for dual function, it meets both detection and compliance monitoring well criteria. The other points of detection and compliance monitoring shall be the four additional monitoring wells to be installed by Unocal at the western (downgradient) boundary edge of the Upper Yard. Two of the three wells to be installed will be located near the former locations of MW-3, MW-12 and MW-24. The additional well locations

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

will be mutually agreed upon by Unocal and Ecology. The attached supplemental site characterization work plan addresses installation of additional monitoring wells. The attached Schedule of Deliverables specifies compliance dates for documents and work to be completed.

c. Applicable soil cleanup targets for the Upper Yard shall be:

<u>Parameter</u>	<u>Cleanup Target</u>	<u>Analytical Method</u>
TPH	200 mg/kg	WTPH-G,D Extended
Benzene	0.4 mg/kg	EPA 8020
Toluene	143 mg/kg	EPA 8020

## II. Remedial Action and Compliance Monitoring

a. Two areas with residual soil contamination remain pending the installation of shoring around the perimeter of portions of the Upper Yard. These areas with residual soil contamination include: (a) the final lift of untreated soil on the active treatment bed, and (b) portions of the yard adjacent to the north and west property lines. Contaminated soil along the property lines cannot be removed until vertical shoring is constructed to retain the remedial excavation slopes. The final lift of untreated soil on the active treatment bed was left in place to provide a working surface for possible placement and treatment of soil removed from the slope areas (when the slope areas are excavated). Unocal shall restrict access to the Upper Yard pending remediation of all contaminated soil as required in the Decision Document.

Final disposition of remnant contaminated soil from the Upper Yard shall be based on evaluation of data from the supplemental site characterization and shall be included in a Decision Document prepared by Unocal for the Upper Yard that will be part of the supplemental site characterization report.

Ecology will respond within 30 calendar days of receipt of Unocal's Decision Document. Final determination of approval, denial, or proposed modifications to Unocal's Decision Document will be decided after the 30 day public comment period.

b. Condition to Defer Soil Remediation in Portions of Upper Yard Beyond June 30, 1997:

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

Unocal may defer installation of shoring and additional soil excavation in the Upper Yard beyond June 30, 1997, provided that ground water quality in the Upper Yard detection monitoring wells is in compliance with the ground water cleanup targets listed in Section H.I.I.a. above for a minimum of four consecutive quarters of sampling (one year).

If shoring and excavation are deferred, Unocal shall provide Ecology with appropriate institutional controls, deed restrictions on the property and specified compliance date to begin remediation action within 30 calendar days after the decision to defer or before June 30, 1997, whichever comes first.

Ecology shall respond with a written approval, denial or proposed modification within 30 calendar days of receipt of Unocal's written proposal.

If ground water quality targets are not achieved in accordance with the conditions and schedule noted above, shoring and soil excavation as described in the Decision Document shall commence prior to June 30, 1997.

c. Pursuant to Paragraph XIII, "Termination/Reopener," upon completion of a minimum of four successive quarters of successful ground water compliance monitoring, and confirmational soil sampling below cleanup targets for the soil left in portions of the Upper Yard, Ecology shall issue a "No Further Action" letter to Unocal; with appropriate deed restrictions where applicable.

**2. ELLIOTT AVENUE:**

**I. Supplemental Site Characterization**

a. The attached supplemental site characterization work plan addresses additional characterization of the free product in and near Elliott Avenue and installation of additional ground water monitoring wells.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

b. Applicable ground water cleanup targets for Elliott Avenue shall be:

<u>Parameter</u>	<u>Cleanup Target</u>	<u>Analytical Method</u>
NAPL	No visible sheen	Field measurement
TPH	1,10,15.0 mg/l	WTPH-G,D,D Extended
Benzene	40 ug/l	EPA 8020
Ethylbenzene	1,400 ug/l	EPA 8020
Toluene	14,300 ug/l	EPA 8020
Total Xylenes	4,400 ug/l	EPA 8020
Diss. Lead	50 ug/l	EPA 7421

## II. Remedial Action and Compliance Monitoring

a. Unocal will remove any free product from Elliott Avenue detection wells by hand bailing.

b. The points of compliance monitoring for Elliott Avenue ground water shall be existing monitoring wells MW-58, MW-30, MW-31, MW-32 after evaluating their suitability of dual function for such compliance monitoring objectives, and one additional monitoring well to be installed by Unocal at a location mutually agreed by Unocal and Ecology.

c. In the event the supplemental site characterization or ground water monitoring indicates the presence of free product in the additional detection wells, then Unocal will propose additional characterization, a proposed remedy and the rationale therefor.

## 3. LOWER YARD

### I. Supplemental Site Characterization

a. The attached supplemental site characterization work plan addresses additional characterization regarding limited additional subsurface characterization for the Lower Yard. The attached Schedule of Deliverables specifies compliance dates for documents and work to be completed.

Amendment No. 4  
 Order On Consent No. DE 88-N223  
 UNOCAL SMT  
 May 10, 1995

b. Applicable cleanup targets for the Lower Yard shall be:

<u>Matrix</u>	<u>Parameter</u>	<u>Cleanup Target</u>	<u>Analytical Method</u>
Soil	TPH	100,200 mg/kg	WTPH-G,D Extended
Soil	Benzene	0.4 mg/kg	EPA 8020
Soil	Toluene	143 mg/kg	EPA 8020
Water	NAPL	No visible sheen	Field measurement
Water	TPH	1,10,15.0 mg/l	WTPH-G,D,D Extended
Water	Benzene	40 ug/l	EPA 8020
Water	Ethylbenzene	1,400 ug/l	EPA 8020
Water	Toluene	14,300 ug/l	EPA 8020
Water	Tot. Xylenes	4,400 ug/l	EPA 8020
Water	Diss. Lead	50 ug/l	EPA 7421

c. Remedial action levels for soil in the Lower Yard shall be as follows. The rationale for these remedial action levels is presented in the attached Technical Memorandum, which by this reference is incorporated herein as Attachment 3.

<u>Parameter</u>	<u>Action Level</u>	<u>Analytical Method</u>
TPH	7,500 mg/kg	WTPH-G,D,D-Extended
CPAH <sup>1</sup>	0.6 mg/kg	EPA 8310/8270

<sup>1</sup>CPAH = The sum of the benzo(a)pyrene-TECs (toxicity equivalent concentration) calculated as described in the August 1993 draft report "Investigation and Development of Cleanup Levels," for all carcinogenic PAHs at the site.

d. Remedial action levels for ground water in the Lower Yard shall be protective of surface water quality and aquatic life based on ambient water quality criteria (AWQC). Applicable remedial action levels for subsurface water at the points of compliance shall be the levels set to protect surface water listed below:

<u>Parameter</u>	<u>Action Level</u>	<u>Analytical Method</u>
TPH	1,10,15 mg/l	WTPH-G,D,D-Extended
Benzene	43 ug/l	EPA 8020
Ethylbenzene	430 ug/l	EPA 8020
Toluene	5,000 ug/l	EPA 8020
Diss. Lead	5.6 ug/l	EPA 7421

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

II. Focused Feasibility Study for Technology Selection

a. Unocal shall conduct a review of available options and costs for remediation of soil and ground water having contaminant concentrations greater than the remedial actions levels.

III. Draft Cleanup Action Plan

a. Unocal shall determine remedial actions in the Lower Yard to address soil and ground water with contaminant concentrations greater than the remedial action levels.

b. Soil or ground water beneath the Lower Yard with contaminant concentrations greater than the cleanup targets but less than the remedial action levels shall be addressed with appropriate deed restrictions.

IV. Remedial Action and Compliance Monitoring

a. The points of compliance monitoring for ground water in the Lower Yard shall consist of five monitoring wells located as close as possible to the downgradient (western) property line of the Lower Yard. Selection of the locations and depths of these monitoring wells shall be accomplished jointly by Unocal and Ecology after the supplemental site characterization.

b. Active ground water pumping operation of the Trench D recovery wells will intercept potentially contaminated ground water that originates in the Lower Yard before that ground water migrates to Elliott Bay. Active ground water pumping operation of the Trench D wells shall continue until ground water monitoring in the Lower Yard points of compliance monitoring wells indicates compliance with the criteria identified in Section H.4.IV.c.

4. OFFSITE AREA:

I. Supplemental Site Characterization

a. The attached supplemental site characterization work plan addresses additional subsurface characterization of the Offsite Area, including proposed locations for additional compliance monitoring wells. The attached Schedule of Deliverables specifies compliance dates for documents and work to be completed.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

b. Applicable ground water cleanup targets for the Offsite Area shall be:

<u>Parameter</u>	<u>Cleanup Target</u>	<u>Analytical Method</u>
NAPL	No visible sheen	Field measurement
TPH	1,10,15 mg/l	WTPH-G,D,D Extended
Benzene	40 ug/l	EPA 8020
Ethylbenzene	1,400 ug/l	EPA 8020
Toluene	14,300 ug/l	EPA 8020
Total Xylenes	4,400 ug/l	EPA 8020
Diss. Lead	50 ug/l	EPA 7421

## II. Focused Feasibility Study for Technology Selection

a. Unocal shall conduct appropriate review of available options and costs for remediation of ground water having contaminant concentrations greater than the remedial action levels in the Offsite Area. After the supplemental site characterization and evaluation of the site ground water quality condition, if contaminant concentrations in groundwater are less than remedial action levels, then no Focused Feasibility Study for the Offsite Area is needed.

## III. Draft Cleanup Action Plan

a. Unocal shall determine remedial actions in the Offsite Area to address ground water with contaminant concentrations greater than remedial action levels. After the supplemental site characterization and evaluation of the site ground water quality condition, if contaminant concentrations in groundwater are less than remedial action levels, then no Draft Cleanup Action Plan for the Offsite Area is needed.

## IV. Remedial Action and Compliance Monitoring

a. The points of compliance monitoring for ground water in the Offsite Area shall be existing monitoring wells MW-8, MW-10, MW-20, MW-25 and MW-52 after evaluating their suitability for dual function for such compliance monitoring, together with three additional monitoring wells to be installed by Unocal adjacent to Elliott Bay at locations mutually agreed by Unocal and Ecology.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

b. Ground water remedial action levels in the Offsite Area, shall be protective of surface water quality and native aquatic life based on ambient water quality criteria (AWQC) marine values. Applicable remedial action levels for subsurface water at the points of compliance shall be the levels set to protect surface water listed below:

<u>Parameter</u>	<u>Action Level</u>	<u>Analytical Method</u>
TPH	1, 10, 15 mg/l	WTPH-G, D, D Extended
Benzene	43 ug/l	EPA 8020
Ethylbenzene	430 ug/l	EPA 8020
Toluene	5,000 ug/l	EPA 8020
CPAHs <sup>1</sup>	0.031 ug/l	EPA 8270/8310
Diss. Lead	5.6 ug/l	EPA 7421

c. Unocal shall provide Ecology with a written proposal to terminate active pumping of ground water from Trench D and other Offsite recovery wells (except for separation and removal of free product) when all of the following conditions are achieved with respect to contaminants originating from Unocal property or Unocal operations:

(i) Free product recovery has diminished to less than five gallons per quarter for two successive quarters; and

(ii) Ground water quality in at least seven of the eight Offsite points of compliance monitoring wells complies with the remedial action levels listed in Section H.4.IV.b. above for four consecutive quarterly monitoring events, and

(iii) Ground water quality in at least four of the five Lower Yard points of compliance monitoring wells complies with the Lower Yard remedial action levels for ground water listed in Section H.3.I.d. for four consecutive quarterly monitoring events.

Ecology will respond within 30 calendar days of receipt of Unocal's written proposal. Final determination of approval, denial,

---

<sup>1</sup>The remedial action levels for each of the following CPAH compounds is 0.03 ug/l: Benzo(a)Anthracene, Benzo(a)Pyrene, Benzo(b)Fluoranthene, Chrysene, Benzo(k)Fluoranthene, Dibenzo(a,h)Anthracene, Indeno(1,2,3-cd)Pyrene

Amendment No. 4  
Order on Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

or proposed modifications to Unocal's written proposal will be decided after the 30 day public comment period.

If quarterly monitoring events after termination of active ground water pumping indicate contaminant concentrations greater than the Offsite Area or the Lower Yard remedial action levels for ground water in more than one compliance monitoring well for two consecutive quarters, then Unocal shall provide Ecology with a written amended remedial alternative proposal within 30 calendar days of such determination of non-compliance.

If the proposal calls for the resumption of active ground water pumping, Ecology will respond with a written approval, denial or proposed modification within 30 calendar days of receipt of Unocal's written proposal. In the event that the proposal calls for a remedial action other than active ground water pumping, final determination of approval, denial or proposed modification to Unocal's written proposal will be decided after a 30 day public comment period.

d. Unocal shall conduct active free product recovery in the Offsite Area (by pumping from Trench D and other recovery wells) until the volume of free product recovered diminishes to less than five gallons per quarter for two successive quarters. If quarterly monitoring events after the date of termination of the active free product recovery operation indicate the presence of more than 0.1 foot of free product in any five or more of the Offsite monitoring and/or recovery wells, passive (non-pumping) free product recovery operations shall be implemented in the affected wells until less than five Offsite monitoring and/or recovery wells contain 0.1 foot or more of free product during a quarterly monitoring event.

e. Based on the meeting at Ecology, NWRO, of 2/6/95, between Ecology and Unocal representatives, and a written rationale provided to Ecology on February 7, 1995, a copy of which by this reference is incorporated herein as Attachment 4:

i. The current Vapor Extraction System shall be decoupled (terminated as of the signing of this Amendment) from the current in situ bioremediation system at this location.

Amendment No. 4  
Order on Consent No. DE 88-N223  
UNOCAL SMT.  
May 10, 1995

ii. Unocal may temporarily suspend the ground water active treatment (nutrient and air) at this location as of the signing of this Amendment, without dismantling the treatment systems. If justified, based on the supplemental site characterization, Unocal will propose permanent termination of the active treatment system. Ecology will respond within 30 calendar days of receipt of Unocal's written proposal. If permanent termination of the active treatment system is not justified, Unocal shall resume active treatment within 15 days of Ecology's response after Unocal submits the supplemental site characterization report to Ecology unless Unocal notifies Ecology that another remediation technology will be proposed in the focused feasibility study.

f. The efficiency and effectiveness of free product and contaminated ground water recovery in the Offsite Area can be improved by terminating the discharge of treated water into Trench C. Accordingly, Unocal shall submit a proposal to Ecology within 90 days of signing this Amendment to terminate the recharge of ground water removed from Trench D into Trench C. This proposal shall contain future options for disposal of contaminated/treated ground water removed from Trench D, and shall address substantive requirements for disposing of the contaminated/treated ground water. Ecology will respond to Unocal's proposal within 30 calendar days of receipt of Unocal's written proposal.

g. Unocal will continue quarterly monitoring of the existing monitoring wells in the Offsite Area, plus the three additional wells that will mark the points of compliance monitoring until all of the following conditions are achieved:

(i) Active free product recovery has not been necessary as noted above in Section H.4.IV.d. for a minimum of eight consecutive quarterly monitoring events;

(ii) Ground water quality in at least seven of the eight Offsite point-of-compliance monitoring wells complies with the remedial action levels listed in Section H.4.IV.b. above for eight consecutive quarterly monitoring events; and

(iii) Ground water quality in at least four of the five Lower Yard points of compliance monitoring wells complies with the Lower Yard remedial action levels for ground water listed in Section H.3.I.d. for eight consecutive quarterly monitoring events.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

When these conditions are met, Unocal shall provide Ecology with a written proposal within 30 calendar days of such determination that remedial objectives have been met as indicated by the compliance monitoring wells, that Unocal proposes to cease monitoring and abandon the wells.

Ecology will respond within 30 calendar days of receipt of Unocal's written proposal. Final determination of approval, denial, or proposed modifications to Unocal's written proposal will be decided after the 30 day public comment period.

The terms and conditions of this Amendment shall supersede any prior inconsistent provision of the Order or any earlier Amendment. Unless specifically modified, the original terms shall prevail.

DATED: 18 July 1995.

UNION OIL COMPANY OF CALIFORNIA,  
d/b/a UNOCAL

BY

R. K. Jemison  
R. K. JEMISON, GENERAL MANAGER  
REAL ESTATE SALES & DEVELOPMENT

Its

\_\_\_\_\_

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

BY

Mary E. Burg

Its

Program Manager

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

ATTACHMENT 2

UNOCAL'S FORMER SEATTLE MARKETING TERMINAL  
SCHEDULE OF DELIVERABLES  
AMENDMENT NO. 4

<u>DESCRIPTION</u>	<u>COMPLIANCE DATE</u>
UPPER YARD	
Supplemental Site Characterization Report and Decision Document: Submitted <u>Draft</u> to Ecology	Not Later than December 31, 1995
Compliance Monitoring Plan: Submitted <u>Draft</u> to Ecology	Not Later than December 31, 1995
Option 1 <sup>2</sup> - Defer Soil Excavation Proposed Institutional Controls and Deed Restrictions: Submitted to Ecology	Not Later than June 30, 1997
Option 2 <sup>2</sup> - Shoring Installation and Soil Excavation: Begin Remedial Action	Not Later than June 30, 1997
Final Compliance Monitoring Plan <sup>3</sup> : Submitted <u>Draft</u> to Ecology	Not Later than June 30, 1998

<sup>2</sup>If Option 1 is implemented, Unocal shall propose a specified compliance date for beginning remedial action. If Option 1 is not implemented, then Option 2 must occur per the compliance date specified.

<sup>3</sup>This compliance monitoring plan refers to compliance ground water monitoring after implementing Option 2.

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

DESCRIPTION

COMPLIANCE DATE

ELLIOTT AVENUE

Supplemental Site  
Characterization Report:  
Submitted Draft to Ecology

Not Later than  
December 31, 1995

Compliance Monitoring Plan:  
Submitted Draft to Ecology

Not Later than  
December 31, 1995

LOWER YARD

Supplemental Site  
Characterization Report:  
Submitted Draft to Ecology

Not Later than  
December 31, 1995

Focused Feasibility Study  
Summary Report:  
Submitted Draft to Ecology

Not Later than  
March 30, 1996

Draft CAP Report:  
Submitted Draft to Ecology

Not Later than  
June 30, 1996

Begin Implementation of  
Cleanup Action:

Not Later than  
June 30, 1997

Compliance Monitoring Plan:  
Submitted Draft to Ecology

Not Later than  
June 30, 1998

OFFSITE AREA

Supplemental Site  
Characterization Report:  
Submitted Draft to Ecology

Not Later than  
December 31, 1995

Amendment No. 4  
Order On Consent No. DE 88-N223  
UNOCAL SMT  
May 10, 1995

7/18/95

DESCRIPTION

COMPLIANCE DATE

Option 1 - Continue Active  
Ground Water Pumping Program:  
Compliance Monitoring Plan  
Submitted Draft to Ecology

Not Later than  
December 31, 1995

Proposal to Terminate Active  
Ground Water Pumping:  
Submitted Draft to Ecology

Not Earlier than  
November 30, 1996

Proposal to Terminate Ground  
Water Monitoring:  
Submitted Draft to Ecology

Not Earlier than  
November 30, 1997

Option 2 - Feasibility Study  
and Alternate Cleanup Action:  
Focused Feasibility  
Study Report:  
Submitted Draft to Ecology

30 days after non-  
compliance per Item  
H.4.IV.c. of Scope  
of Work, Amendment  
No. 4

Draft Cleanup Action Plan:  
Submitted Draft to Ecology

90 days after  
Ecology Approval  
of Focused  
Feasibility Study

STATE OF WASHINGTON	)	
DEPARTMENT OF ECOLOGY,	)	
	)	No. DE 88-N223
In the Matter of:	)	
	)	AMENDMENT NO. 4 TO
UNION OIL COMPANY OF CALIFORNIA	)	ORDER ON CONSENT
dba UNOCAL	)	

Pursuant to provisions of Paragraph XIX, "Amendment of Order", of the above captioned Order on Consent, the parties stipulate to the following additions or modifications to the Order on Consent:

AMENDMENT NO. 4 TO ORDER ON CONSENT

1. Paragraph II, "JURISDICTION", and Addendum NO. 3 TO REMEDIAL ACTION PLAN [February 17, 1993], shall be amended by adding a new subparagraph (Subparagraph G) following the end of line 8 on page 6. Subparagraph G shall read as follows:

The Puget Sound Water Quality Authority Act, Chapter 90.70 RCW, provided direction for the development of the Sediment Management Standards. The primary authority for implementing and enforcing the sediment cleanup process is provided by the MTCA, Chapter 70.105D RCW, and the WPCA, Chapter 90.48 RCW. The Sediment Management Standards are incorporated by reference [WAC 173-340-710(6)(d)] into the cleanup standards rules developed pursuant to the MTCA. The activities mandated by the MTCA are administered by Ecology's Toxics Cleanup Program.

2. Paragraph IV, "Work to be Performed", shall be modified by adding a new subparagraph (Subparagraph 9) following subparagraph 8. Subparagraph 9 shall read as follows:

"Sediment and Biological RI/FS Work Plan and Investigation. Unocal will submit plans for work to be performed to Ecology that describe:

- (1) Unocal's proposed approach to assessment of the sediments and biota of the Elliot Bay, adjacent to Pier 70, affected by spills, migrating plumes from the Unocal's upland property and by other historic activities associated with the site.
- (2) Unocal will also submit Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), and Health and Safety Plans (HSP) for this investigation.
- (3) A cleanup study (or remedial investigation) will be performed according to the work plans approved by Ecology
- (4) A cleanup study report will be prepared that documents the results of the investigation and presents alternatives for remediation, if needed.
- (5) The work plans, cleanup study, and cleanup study report will be performed according to the Sediment Management Standards and guidance contained in the Sediment Cleanup User's Manual (Ecology 1991), as revised and updated.

DATED: \_\_\_\_\_, 1993

UNION OIL COMPANY OF CALIFORNIA dba UNOCAL

By

\_\_\_\_\_  
Richard K. Jemison, President.  
Unocal Real Estate Division.

STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY

By

\_\_\_\_\_  
Carol L. Fleskes, Program Director  
Toxics Cleanup Program.



2. Paragraph VI, "Work to be Performed", schedule of deliverables, as previously modified in AMENDMENT NO. 2 to Order on Consent (September 25, 1989), shall be amended to read as follows:

"The schedule of delivery for items listed in the Order on Consent as well as other work products generated during site remediation shall be established in a separate agreement letter between Unocal and Ecology. The delivery schedule can be modified by mutual written agreement between Unocal and Ecology. Modifications to the delivery schedule presented in the letter agreement are not subject to public review and comment."

3. Paragraph VI, "Work to be Performed", Subparagraph 1 [Pilot Studies], shall be amended by adding the following to the end of the subparagraph section on page 12:

"If solid-phase biotreatment or in-situ biotreatment proves to be incapable of remediating soil from the site in a timely and cost-effective manner, pilot testing of other remedial technologies may be undertaken with the approval of Ecology. A desire to test an alternative technology must be requested in writing by Unocal along with a description of the process, the estimated duration of the test, and identification of any permits that may be needed to conduct the test. Ecology will respond with approval or denial of the request within 30 calendar days after receipt of the written request."

4. Paragraph VI, "Work to be Performed", Subparagraph 2 [Solid-phase biotreatment of contaminated soils from the Upper Yard] shall be amended by adding the following to the end of the subparagraph section on page 14:

"Following successful treatment of accessible contaminated soil in the Upper Yard, two areas with residual soil contamination may remain pending the installation of shoring around the perimeter of portions of the Upper Yard. These areas with residual soil contamination will include: (1) the lowest lift of untreated soil on the active treatment bed, and (2) portions of the yard adjacent to the north and west property

lines. Contaminated soil along the property lines cannot be removed until vertical shoring is constructed to retain the remedial excavation slopes. The lowest lift of untreated soil on the active treatment bed is intended to provide a working surface for placement and treatment of soil removed from the slope areas (when the slope areas are excavated). Unocal shall restrict access to the Upper Yard pending remediation of all contaminated soil. Monitoring well MW-37 will be sampled and tested on a semi-annual basis (summer and winter) to evaluate ground water quality beneath the slope areas. Sampling and testing of MW-37 will continue until contaminated soil present in the slope adjacent to the north property boundary of the Upper Yard is removed or when Ecology considers further monitoring of MW-37 to be unnecessary, whichever occurs first. The three remaining monitoring wells in this vicinity (MW-38, MW-39 and MW-40) will be abandoned in accordance with WAC 173-160. Treatment of remnant contaminated soil from the Upper Yard will be begun no later than June 30, 1997.

Final disposition of remnant contaminated soil from the Upper Yard may involve a remedial process other than solid-phase biotreatment, depending on timing, soil treatability and other factors. If an alternative remedial option is desired, Unocal will notify Ecology in writing along with a description of the preferred option and identification of any permits that may be needed to implement the soil treatment program. Ecology will respond with approval or denial of the request within 30 calendar days after receipt of Unocal's written request."

5. Paragraph VI, "Work to be Performed", Subparagraph 3 [Solid-phase biotreatment of contaminated soils located above the water table in the Lower Yard], shall be amended by adding the following to the end of the subparagraph section on page 15:

"In the event that on-site field experience and laboratory treatability studies demonstrate that treatment of contaminated soil in the Lower Yard is infeasible using solid-phase biotreatment and in-situ biotreatment methods, treatment can be terminated pending the development of risk-based cleanup levels.

If solid-phase biotreatment of Lower Yard soil is terminated because of infeasibility, Unocal will provide Ecology with its plan for future action in the Lower Yard after reaching agreement with Ecology regarding appropriate site-specific, risk-based cleanup levels for the Lower Yard. The risk based cleanup levels established for the Lower Yard also shall apply to remnant contaminated soil in the Upper Yard. Unocal's proposed actions are included in "Work Plan, Former Seattle Marketing Terminal, Investigation and Development of Cleanup Levels, Lower Yard, Seattle, Washington," dated May 8, 1992. The proposed actions will be based on detailed chemical characterization of Lower Yard soil and subsurface water, as well as a comparison of Lower Yard soil contaminant chemistry to risk-based cleanup levels for specific chemicals of concern. Unocal will undertake the data collection for the Work Plan in 1993 as soon as weather and site conditions reasonably permit. Ecology will respond with approval or denial of Unocal's Work Plan within 60 calendar days after receipt of the Work Plan."

6. Paragraph VI, "Work to be Performed", Subparagraph 4 [In-situ biotreatment of contaminated soils located below the water table in the Lower Yard], shall be amended by deleting all of subparagraph 4 on pages 15 and 16.

7. Paragraph VI, "Work to be Performed", Subparagraph 7 [Cleanup monitoring and termination] shall be amended by changing the second to last sentence in the section and adding two sentences to read:

"After that time, the remaining Offsite Area remediation equipment and corresponding monitoring wells will be dismantled and decommissioned. The Elliott Avenue system may be dismantled when water quality compliance has been obtained in monitoring wells MW-30, MW-31 and MW-32. Dismantling of the Elliott Avenue system does not relieve Unocal of its continued obligation to monitor water quality in MW-30, MW-31 and MW-32 for the required two year compliance period, unless Ecology considers a shorter time period appropriate at their sole discretion."

8. Paragraph VI, "Work to be Performed", shall be modified by adding a new subparagraph (Subparagraph 8) following the end of line 7 on page 19. Subparagraph 8 shall read as follows:

"Free product assessment and remediation in and near well MW-30. Viscous free product has been detected periodically in Well MW-30 during ground water monitoring events between 1989 and 1992. Unocal agrees to further explore and evaluate subsurface conditions in the vicinity of MW-30 in an effort to define the source and limits of the free product plume. Unocal further agrees to implement reasonable remedial measures to correct the periodic free product condition in MW-30, if warranted.

Unocal will submit work plans to Ecology that describe:

(1) Unocal's proposed approach to assessment of the free product plume, and (2) Unocal's proposed remedial measures for free product mitigation in and near MW-30. These work plans will be submitted as separate documents to Ecology and will be subject to review and approval by Ecology before work plans are implemented."

9. Paragraph XII. "Progress Reports" shall be amended so that the third sentence reads:

"All progress reports shall be submitted within 30 days following completion of the reporting period."

10. Paragraph XXI, "Other Actions", shall be modified by adding the following paragraph to page 35:

"Amendment No. 3 to this Order includes several references to written deliverables intended for review by Ecology. Reasonable time periods are stipulated for Ecology's review of these deliverables. If Ecology fails to provide written comment, whether in agreement or otherwise, to these and any future written deliverables within the time frames specified, Unocal can proceed with the actions proposed in the deliverables as if Ecology has agreed in full with the actions proposed."

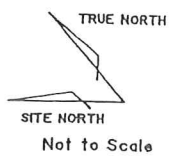
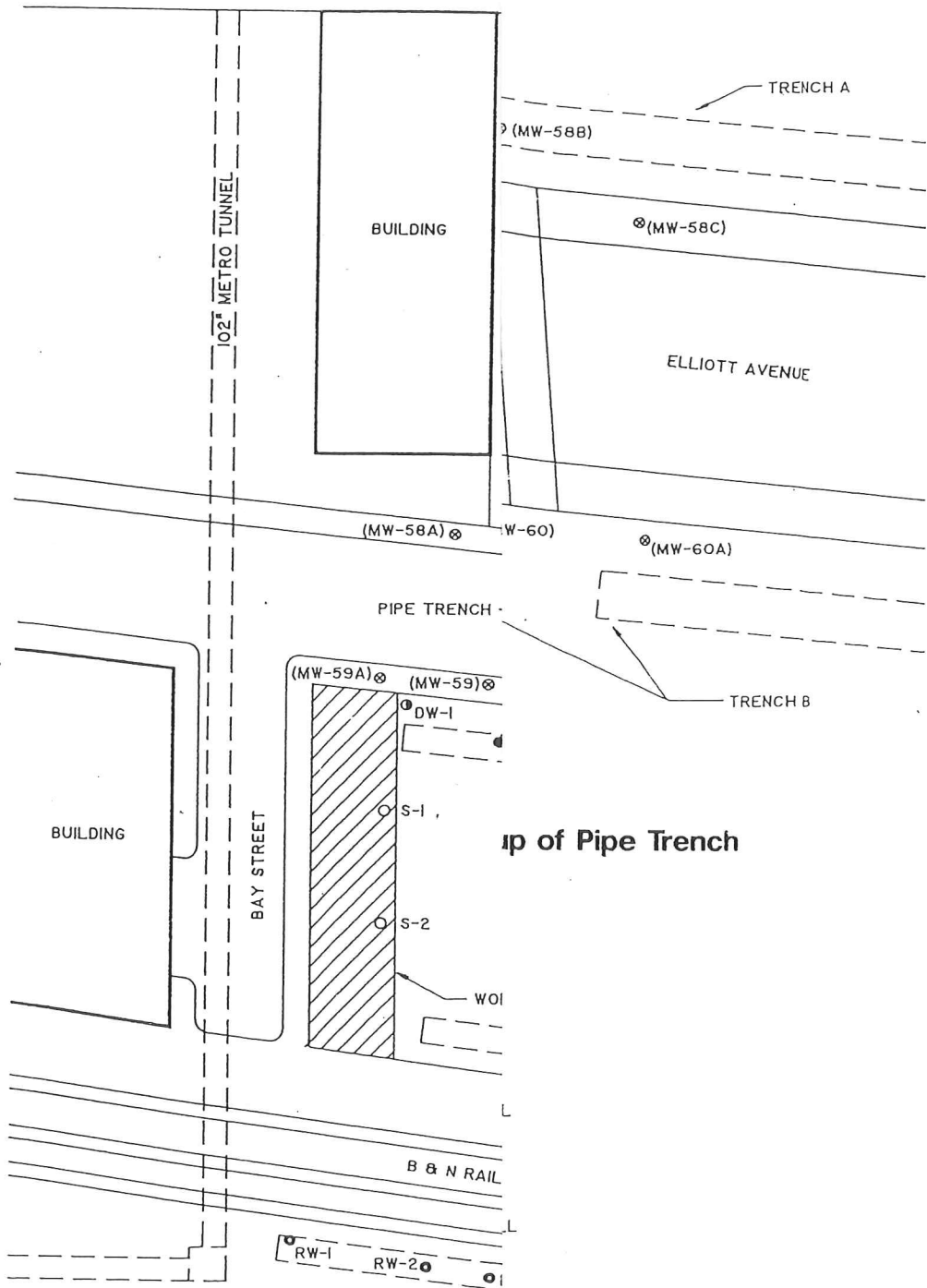
DATED: February 17, 199~~7~~<sup>3</sup>.

UNION OIL COMPANY OF CALIFORNIA dba  
UNOCAL

By Richard K. Jemison  
Richard K. Jemison  
Its ~~Vice~~ President, Unocal Real Estate Division  
*By*

STATE OF WASHINGTON, DEPARTMENT OF  
ECOLOGY

By Carol L. Fleskes  
Carol L. Fleskes, Program Director  
Hazardous Waste Investigation and  
Cleanup Program



LL (PHASE I)  
 LL (PHASE II)  
 OFFSITE

**1-30 Assessment**  
 Former Seattle Marketing Terminal  
 Seattle, Washington

FIGURE  
**1**

DATE	REVISED	DATE
11/9/92		

552900

3/23/89

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

In the Matter of:	)	No. DE 88-N223
	)	
	)	AMENDMENT NO. 1 TO
UNION OIL COMPANY OF	)	ORDER ON CONSENT AND
CALIFORNIA dba UNOCAL	)	ADDENDUM NO. 2 TO
	)	REMEDIAL ACTION PLAN

Pursuant to the provisions of Paragraph XIX, "Amendment c  
Order", and Paragraph XVIII, "Extension of Schedules", of the  
above-captioned Order on Consent, the parties stipulate to the  
following additions or modifications to the Order on Consent a  
Remedial Action Plan:

1. AMENDMENT NO. 1 TO ORDER ON CONSENT

Paragraph VI, "Work to be Performed", in a portion of sub  
paragraph 6 (pages 17-18), shall be as follows:

The following schedule of delivery shall apply unless mo

<u>Item</u>	<u>Months (from date of order)</u>
RAP Addendum	1 1/89 <sup>To End of m</sup>
Permitting and meetings with adjacent property owners	1-6 1/89 - 5/89
Offshore studies	1-3 1/89 - 3/89
Contractor selection	1-3 1/89 - 3/89
Pilot studies	3-5 3/89 - 5/89
Demolition and site preparation	4-8 4/89 - 8/89
Upper Yard solid-phase treatment	7-11 7/89 - 11/89
Lower Yard solid-phase treatment	12-22 12/89 - 9/90
In-situ construction/preparation	
Elliott Avenue	8-9 8/89 - 9/89
Offsite	7-9 7/89 - 9/89
Lower Yard	23-25 10/90 - 12/90
In-situ treatment operations	
Elliott Avenue	10-70 10/89 - 10/94
Offsite	10-82 10/89 - 10/95
Lower Yard	23-82 10/90 - 11/95
Post-cleanup monitoring	82-106 10/95 - 10/97
Final closure report	106-107 10/97 - 10/98

AMENDMENT NO. 1/ORDER ON CONSENT  
ADDENDUM NO. 2/REMEDIAL ACTION PLAN - 1

LESOURD & PATTEN, P.S.  
ATTORNEYS AT LAW  
2400 COLUMBIA CENTER  
701 FIFTH AVENUE  
SEATTLE, WASHINGTON  
(206) 624-104

1           2.   ADDENDUM NO. 2 TO REMEDIAL ACTION PLAN

2           Analytical methods for determination of the chemical parameters  
3 described in Section VI of the Order on Consent will be as follows:

4

<u>Medium</u>	<u>Parameter</u>	<u>EPA Method No.</u>
5    Soil	Total Petroleum Hydrocarbons (TPH)	8015 (modified)
6    Soil	Benzene	8020
7    Soil	Toluene	8020
8    Water	Total Petroleum Hydrocarbons (TPH)	8015 (modified)
9    Water	Benzene	602
10   Water	Ethylbenzene	602
11   Water	Toluene	602
12   Water	Total Xylenes	602
13   Water	Dissolved Lead	7421
14   Soil	Ethylene Dibromide	504 (modified)

15           3.   Except as modified herein, all provisions of the Order  
16 on Consent DE 88-N223 and the attendant Remedial Action Plan shall  
17 remain in full force and effect as originally executed.

18           DATED:   March 23, 1989.

19                                   UNION OIL COMPANY OF CALIFORNIA dba UNOCAL

20           By Richard K. Jensen  
21           Its Unocal Real Estate Div. President

22                                   STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY

23           By Carol L. Fleskes  
24           Carol L. Fleskes, Program Director  
25           Hazardous Waste Investigation and  
26           Cleanup Program

COPY FOR YOUR INFORMATION

2/17/93

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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In the Matter of:	)	NO. DE 88-N223
	)	
UNION OIL COMPANY OF	)	AMENDMENT NO. 2 TO
CALIFORNIA dba UNOCAL	)	ORDER ON CONSENT

Pursuant to the provisions of Paragraph XIX, "Amendment of Order", and Paragraph XVIII, "Extension of Schedules", of the above-captioned Order on Consent, the parties stipulate to the following additions or modifications to the Order on Consent:

AMENDMENT NO. 2 TO ORDER ON CONSENT

1. Paragraph VI, "Work to be Performed", Subparagraph 2, shall be amended to add the following provisions on page 14:  
"Additional volumes of contaminated soils from the Upper Yard will be subject to solid-phase biotreatment in the Upper Yard.

"Once contaminated soils have been effectively treated, the treated soil may be removed from the Upper and Lower Yards for disposal at a suitable location. Non-contaminated soils encountered during excavation in the Upper Yard also may be removed from the site for disposal at a suitable location."

2. Paragraph VI, "Work to be Performed", Subparagraph 6 (a portion) shall be amended to read as follows:

"The following schedule of delivery shall apply unless modified:

<u>Item</u>	<u>Months (from date of order)</u>
RAP Addendum	1
Permitting and meetings with adjacent property owners	1-6
Offshore studies	1-3

AMENDMENT NO. 2 TO CONSENT ORDER - 1

ORIGINAL

LESOURD & PATTEN, P.S.  
ATTORNEYS AT LAW  
1400 COLUMBIA CENTER  
701 FIFTH AVENUE  
SEATTLE, WASHINGTON 98104-7003  
(206) 624-1040

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Contractor selection	1-3	
Pilot studies	3-5	
Demolition and site preparation	4-8	
Upper Yard excavation and solid-phase treatment	<del>7-11</del>	7-34
Lower Yard solid-phase treatment	<del>12-22</del>	9-34
In-situ construction/preparation		
Elliott Avenue	8-9	
Offsite	7-9	
Lower Yard	23-25	
In-situ treatment operations		
Elliott Avenue	10-70	
Offsite	10-82	
Lower Yard	23-82	
Post-cleanup monitoring	82-106	
Final closure report	106-107"	

DATED: September 25, 1989.

UNION OIL COMPANY OF CALIFORNIA dba UNOCAL

By Richard K. Jemison  
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Its President  
Unocal Real Estate Division

STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY

By Carol L. Fleskes  
Carol L. Fleskes, Program Director  
Hazardous Waste Investigation and  
Cleanup Program

AMENDMENT NO. 2 TO CONSENT ORDER - 2

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