CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
ORDER NO. R5-2003-0165
WASTE DISCHARGE REQUIREMENTS
FOR
SUPPORT TERMINALS OPERATING PARTNERSHIP, LP
STOCKTON TERMINAL
ENHANCED BIOREMEDIATION PILOT STUDY
SAN JOAQUIN COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereafter Regional Board), finds that:

1. The Support Terminals Operating Partnership, LP (hereafter Discharger) submitted a Report of Waste Discharge on 9 July 2003 and supplemental information on 29 July 2003 for an enhanced bioremediation pilot study. The Discharger owns the bulk fuel terminal at 2941 Navy Drive in Stockton, Assessor's Parcel Number 145-030-09 (hereafter referred to as Site), at township 1N, range 6E, section 8, Mount Diablo Base and Meridian. The general location of the facility is shown on Attachment A, which is attached hereto and made part of this Order by reference.

2. The Discharger, along with three other bulk fuel terminal companies on the same parcel, formed the Stockton Terminals Technical Committee (STTC) to address groundwater pollution across the entire parcel. Site groundwater monitoring is performed by the STTC as required by Monitoring and Reporting Program (MRP) No. 5-01-819. Currently, the Discharger's terminal has one on-site monitoring well and seven STTC off-site monitoring wells. Groundwater contains total petroleum hydrocarbons (TPH) as gasoline up to 150,000 micrograms per liter (µg/l), TPH as diesel up to 9,400 µg/l, benzene up to 45,000 µg/l, toluene up to 55,000 µg/l, ethylbenzene up to 23,000 µg/l, xylenes up to 130,000 µg/l, and methyl tertiary butyl ether up to 280,000 µg/l.

3. In April 2002, the Discharger reported two separate releases of gasoline from aboveground storage tanks (AST) 3301 and 3302. In June 2002, about 1,000 gallons of diesel were released from AST 1503. Investigations in August 2002 and March 2003 delineated the extent of petroleum pollution from these releases.

4. There are four identified groundwater bearing zones. Most of the mass of petroleum hydrocarbon pollution is in the A water bearing zone, which is from about 5 to 20 feet below ground surface.

5. The Discharger proposes to install two extraction wells, three injection wells, and six monitoring wells. The Discharger also proposes to install and operate an enzyme-catalyzed dissolved oxygen in situ treatment system for six months as a pilot study. Groundwater monitoring of amendments, breakdown products, and byproducts will continue until concentrations return to baseline levels, which will conclude the pilot study.

6. The proposed system will extract groundwater from two extraction wells screened in the A water bearing zone downgradient of the treatment area, as shown on Attachment B, which is attached hereto and made part of this Order by reference. The extracted groundwater will be piped to a 300-gallon storage tank at the upgradient end of the treatment area. The Discharger will add a bacterial consortium, enzyme enhancements, and specialized nutrients to the 300-gallon storage tank. Amended groundwater will then be re-injected back into the A water bearing zone upgradient of the treatment area via the Super Ox™ unit. Extracting groundwater at the downgradient end of the treatment area along with the natural groundwater flow direction will pull the amended groundwater through the treatment area.

7. The bacterial consortium is "PetroZyme" which is a proprietary product supplied by Enzyme Technologies that contains microbes (Multi-Enzyme Complexes and Total Petroleum Hydrocarbon Bacterial Consortium) that produce enzymes. These enzymes cause a chemical change without undergoing any change themselves and are capable of catalyzing the breakdown of petroleum hydrocarbons. The groundwater will also be amended with nitrogen, phosphorus and potassium in a nutrient mix called NutriMax, also supplied by Enzyme Technologies, in an effort to support bacterial cell growth. Based on stoichiometric relationships between nitrogen, phosphorous and potassiuim, the uptake ratio is 100:10:1. Therefore, NutriMax is about 30 percent nitrogen, three percent phosphorus, and 0.3 percent potassium. The remaining percentage is hydrogen and oxygen that is present in the compounds that make up NutriMax.

8. The Discharger proposes to inject 50 gallons of PetroZyme and 25 pounds of NutriMax for the initial inoculation. After one month of operation, the Discharger will add 10 gallons of PetroZyme and 25 pounds of NutriMax on a monthly basis for the following five months. The Discharger estimates these amounts based on the calculated petroleum hydrocarbon mass determined from previous investigations. The pollutant breakdown process may produce tert-butyl alcohol and acetone, but because the microbial process is continuous, any intermediate degradation products will be broken down to carbon dioxide and water. No nutrient concentrations will remain in the subsurface because the nutrient addition rate will match the microbial nutrient uptake rate. Bench-scale testing has not been performed because Multi-Enzyme Complexes and Total Petroleum Hydrocarbon Bacterial Consortium have both been used at numerous sites and the microbes have shown the ability to degrade petroleum hydrocarbons. These microbes degrade petroleum hydrocarbons through natural biological processes and do not create reaction or byproducts.

9. The Super Ox™ oxygenation system takes the amended stream of water, oxygenates it to about 45 parts per million of dissolved oxygen, and injects it into the subsurface. The enzyme-catalyzed dissolved oxygen in situ treatment system is not expected to change hydraulic characteristics of the aquifer (i.e., clogging) based on the low extraction and injection rates. The Discharger proposes a total extraction and injection rate between one

to 10 gallons per minute. The injection will be distributed across the three injection wells using a timing system.

10. The Discharger will monitor extraction wells EX-1 and EX-2, injection wells IN-1, IN-2, and IN-3, and monitoring wells PS-1, PS-2, PS-3, PS-4, PS-5, and PS-6 prior to the startup, two weeks after startup, and then monthly until the conclusion of the pilot study as outlined in the attached MRP No. R5-2003-0165. In addition, the Discharger will sample downgradient monitoring wells PS/P-11, PS/P-12, and PS/P-13 for baseline concentrations of nitrogen, phosphorus, and potassium (collectively "nutrients") prior to startup, as outlined in the attached MRP No. R5-2003-0165. These wells are shown on Attachment C, which is attached hereto and made part of this Order by reference.

11. If the concentrations of nutrients exceed baseline concentrations by more than 20 percent in either extraction well EX-1 or EX-2, a confirmation sample will be collected within 7 days of receiving the results and the Discharger will notify Regional Board staff. The standard acceptable laboratory variation for these parameters is 20 percent. If the exceedance of nutrients is confirmed, the Discharger will stop injecting the nutrients and will sample wells PS/P-11, PS/P-12, and PS/P-13, which are located between 70 and 200 feet downgradient of the pilot study extraction wells and analyze for the nutrients. Groundwater is estimated to move between 5 and 69 feet per year. Therefore, the soonest the nutrients would be expected to reach these downgradient wells would be in a year following the arrival of these compounds at the location of the extraction wells. The Discharger will sample the downgradient wells at three and six months after the sixth month sampling event in the extraction wells (i.e., one year following the completion of the pilot study). If nutrients and/or intermediate breakdown products including, but not limited to, tertiary butyl alcohol or acetone, are detected in the downgradient wells above baseline concentrations, the Discharger will install extraction wells near the downgradient wells and begin extracting.

12. The injection of chemicals into waters of the State is subject to regulation under the California Water Code. This Order authorizes the Discharger to inject PetroZyme and NutriMax into groundwater subject to specific discharge requirements.

13. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition,* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board (State Board). Pursuant to Section 13263(a) of the California Water Code, waste discharge requirements must implement the Basin Plan.

14. Surface water drainage is to the San Joaquin River within the legal boundaries of the Sacramento – San Joaquin Delta. The beneficial uses of the Sacramento – San Joaquin Delta are municipal and domestic supply; agricultural supply; process and service industrial

supply; water contact recreation; noncontact water recreation; warm and cold freshwater habitat, migration of warm and cold freshwater species, spawning of warm freshwater species, wildlife habitat, and navigation.

15. The beneficial uses of underlying groundwater are municipal and domestic, agricultural, and industrial service and process water supply.

16. Surrounding land uses are residential, commercial, and industrial.

17. State Board Resolution No. 68-16 (hereafter Resolution 68-16 or the "Antidegradation Policy") requires the Board in regulating discharges to maintain high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in plans and policies (e.g., quality that exceeds water quality objectives). Temporal degradation of groundwater at this site due to the PetroZyme and/or NutriMax injection may occur. The temporary degradation allowed by this Order is consistent with Resolution 68-16 since (1) the purpose is to accelerate and enhance remediation of unacceptable concentrations of several waste constituents and such remediation will benefit the people of the state; (2) the discharge facilitates a pilot project to evaluate the effectiveness of cleanup technology in accord with SWRCB Resolution 92-49 and is limited in scope and duration; (3) best practicable treatment, including adequate monitoring and contingency plans to assure protection of water quality, are required; and (4) the injection will not cause water quality objectives to be exceeded beyond the project target area or the duration of the project as specified in Finding 5.

18. Section 13267(b) of California Water Code provides that:

> In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The technical reports required by this Order and the attached MRP No. R5-2003-0165 are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the waste subject to this Order.

19. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells, as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 74-81* (December 1981). These standards, and any more stringent standards adopted by the State or County pursuant to California Water Code Section 13801, apply to all monitoring wells.

20. Issuance of this Order is an action to assure the restoration of the environment and is, therefore, exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.), in accordance with Section 15308 and 15330, Title 14, California Code of Regulations (CCR).

21. This discharge is exempt from the requirements of *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste,* as set forth in Title 27, CCR, Section 20005, et seq., (hereafter Title 27). The exemption pursuant to Section 20090(d), is based on the following:

    a. The Board is issuing waste discharge requirements,
    b. The discharge complies with the Basin Plan, and
    c. The wastewater does not need to be managed according to Title 22 CCR, Division 4.5, and Chapter 11, as a hazardous waste.

22. Pursuant to California Water Code Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

23. All the above and the supplemental data and information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge. The Discharger and interested agencies and persons were notified of intent to prescribe waste discharge requirements for this discharge and provided with an opportunity for a public hearing and an opportunity to submit written views and recommendations. In a public meeting, all comments pertaining to the discharger were heard and considered.

IT IS HEREBY ORDERED that pursuant to Sections 13263 and 13267 of the California Water Code, Support Terminals Operating Partnership, LP, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following while conducting the above-described pilot study:

[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991, incorporated herein.]

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. The injection of other than PetroZyme and NutriMax into groundwater is prohibited.

3. Discharge of waste classified as 'hazardous' under Section 2521 of Title 23, CCR, or as 'designated' under Section 13173 of California Water Code is prohibited.

4. Discharge of groundwater, PetroZyme, and/or NutriMax at a location or in a manner different from that described in Finding Nos. 6 through 9 is prohibited.

B. Discharge Specifications

1. The Discharger shall provide hydraulic control that provides full and complete containment within the treatment zone of any groundwater pollutants, amendments, and breakdown products of the in situ treatment process during injection of any groundwater. The Discharger shall continue to provide hydraulic control while injection and cleanup are ongoing.

2. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations.

3. This Order allows discharge of PetroZyme and NutriMax to the treatment area as described in Findings 6 through 9. No other products shall be discharged.

C. Groundwater Limitations

1. During the pilot study, the Discharger shall not cause more than a 20 percent increase above the baseline concentration of nitrogen, phosphorus, and/or potassium downgradient of the treatment area. Compliance shall be measured in extraction wells EX-1 and EX-2.

2. When the pilot study is completed, the amendments and byproducts shall not exceed baseline levels.

D. Provisions

1. The Discharger shall notify Board staff a minimum of one week prior to the injection of amended groundwater.

2. The Discharger shall comply with the attached MRP No. R5-2003-0165, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.

3. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements," dated 1 March 1991, which are attached hereto and by reference a part of this Order. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."

4. All of the following reports shall be submitted pursuant to Section 13267 of the California Water Code. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1. To demonstrate compliance with sections 415 and 3065 of Title 16, CCR, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

    a. The Discharger shall submit a Pilot Study Implementation Report due no later than **60 days** after startup of the enhanced bioremediation pilot study. The Pilot Study Implementation Report shall include a description of system installation, baseline concentrations, and results of the first month of operation.

    b. The Discharger shall submit a Pilot Study Status Report due no later than **30 days** after the third full month of system operation. The Pilot Study Status Report shall include a summary of system operations for the first three months of operation including analytical results and evaluation of system effectiveness.

    c. The Discharger shall submit a Pilot Study Evaluation Report no later than **3 months** after the conclusion of the six-month injection period. The Pilot Study Evaluation Report shall include a summary of system operations with analytical results, an evaluation of system effectiveness, and discussion of feasibility for full-scale remediation.

5. If groundwater samples from extraction wells EX-1 and/or EX-2 contain nitrogen, phosphorus, and/or potassium in concentrations exceeding 20 percent above baseline concentrations, the Discharger shall immediately notify Regional Board staff of the exceedance(s) and obtain a confirmation sample within **7 days** of receiving the results. Within **48 hours** of receiving the confirmation sample results, the Discharger shall notify Regional Board staff of the results followed by written notification within **7 days**.

6. **Within 30 days** of confirming an exceedance as described in Provision D.5, the Discharger shall implement the contingency plan as described in Finding 11 and submit sample results.

7. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Board or court order requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

8. The Discharger shall maintain records of all monitoring information including all calibration and maintenance records, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained for a minimum of three years from the date of the sample, measurement, or report. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Executive Officer.

9. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control that are installed or used by the Discharger to achieve compliance with this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are to be installed by the Discharger only when necessary to achieve compliance with the conditions of this Order.

10. The Discharger shall report any non-compliance, and/or accidental spill or release of liquid or material verbally to the Regional Board within 24 hours of the spill or release, and follow-up the verbal notification with written documentation of the spill or release within 14 calendar days of the incident.

11. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

12. As described in the Standard Provisions, the Discharger shall report promptly to the Regional Board any material change or proposed change in the character, location, or volume of the discharge.

13. While this Order is in effect, and prior to any change in ownership of the site or management of this operation, the Discharger shall transmit a copy of this Order to the succeeding Owner/Operator, and forward a copy of the transmittal letter and proof of transmittal to the Board.

14. The Discharger shall allow the Regional Board, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to:
    a. Enter upon the premises regulated by the Regional Board, or the place where records must be kept under the conditions of this Order;
    b. Have access to and copy, at reasonable times, any records that shall be kept under the conditions of this Order;
    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
    d. Sample or monitor, at reasonable times, for the purpose of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at this Site.

15. The Regional Board will review this Order periodically and will revise requirements when necessary.

I, THOMAS R. PINKOS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 17 October 2003.

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THOMAS R. PINKOS, Executive Officer

Attachments

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
MONITORING AND REPORTING PROGRAM NO. R5-2003-0165
FOR
SUPPORT TERMINAL OPERATING PARTNERSHIP, LP
STOCKTON TERMINAL
ENHANCED BIOREMEDIATION PILOT STUDY
SAN JOAQUIN COUNTY

This Monitoring and Reporting Program (MRP) incorporates requirements for monitoring the progress of the enhanced bioremediation pilot study. This MRP is issued pursuant to California Water Code Section 13267. Support Terminals Operating Partnership LP (hereafter Discharger) is required to comply with this MRP. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. In addition to this MRP, groundwater sampling and reporting outlined in MRP No. 5-01-819 is still required.

All samples shall be representative of the volume and the nature of the discharge and matrix of the sampled medium. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

REMEDIATION PILOT STUDY MONITORING

As shown on Attachment B, there are two extraction wells, three injection wells, and six monitoring wells at the facility. The groundwater monitoring program for these 11 wells and any wells installed subsequent to the issuance of this MRP, shall follow the schedule below. Monitoring wells with free phase petroleum product or visible sheen shall be monitored, at a minimum, for product thickness and depth to water. Sample collection and analysis shall follow standard EPA protocol.

A. BASELINE AND PILOT STUDY SAMPLING

Baseline and bioremediation pilot study sampling shall consist of groundwater samples collected from extraction wells EX-1 and EX-2, injection wells IN-1, IN-2, and IN-3, and monitoring wells PS-1, PS-2, PS-3, PS-4, PS-5, PS-6, PS/P-11, PS/P-12, and PS/P-13. These analyses shall be completed by a State certified laboratory and follow the schedule as shown on Table 1.

B. FIELD MEASURED PARAMETERS

Monitoring of the bioremediation pilot study shall include field measured parameters recorded from extraction wells EX-1 and EX-2, injection wells IN-1, IN-2, and IN-3, and monitoring wells PS-1, PS-2, PS-3, PS-4, PS-5, and PS-6 every time these wells are sampled. The field measured parameters to be recorded are listed in Table 2.

Table 2

Constituents	Units
Electrical conductivity	µmhos/cm
pH	pH units
Oxidation-reduction potential	millivolts
Dissolved oxygen	mg/l
Temperature	ºF/ºC
Groundwater elevation	Feet and hundredths, mean sea level

Field testing instruments (such as those used to test oxidation-reduction potential and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are field calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are provided with the appropriate monitoring report.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type, and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the MRP shall also be reported to the Regional Board

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by a registered professional or their subordinate and signed by the registered professional.

After the submittal of the status summary report as specified in Provision D.4.b, the Discharger shall begin submitting quarterly reports to the Regional Board by the **1st day of the second month following the end of each calendar quarter (i.e., by 1 February, 1 May, 1 August, and 1 November**). The reports shall be submitted separately from the quarterly monitoring reports required by MRP No. 5-01-819. At a minimum, the reports shall include:

1. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; calculation of casing volume; total volume of water purged, etc.;

2. Copies of all laboratory analytical report(s);

3. Cumulative data tables containing the water quality analytical results and depth to groundwater;

4. An evaluation of the performance of the bioremediation pilot study including an analysis of its effectiveness in destroying the pollutants, and a discussion of the potential for field scale application;

5. A discussion of compliance and the corrective action taken, if any, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements; and

6. A discussion of any data gaps, potential deficiencies/redundancies in the monitoring system or reporting program and the anticipated date for an effectiveness evaluation of the pilot study.

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program as of the date of the Order.

Ordered by: _____
THOMAS R. PINKOS, Executive Officer

17 October 2003

Table 1
Summary of Analytical Methods and Sampling Frequency
Support Terminals Operating Partnership, LP
Stockton Terminal
Enhanced Bioremediation Pilot Study
Stockton, San Joaquin County

Well	Sampling Frequency							
	Baseline	Second Week	First Month	Second Month	Third Month	Fourth Month	Fifth Month	Six Month
Extraction Wells								
EX-1	A				A			A
EX-2	A				A			A
Injection Wells								
IN-1	A				A			A
IN-2	A				A			A
IN-3	A				A			A
Groundwater Monitoring Wells								
PS-1	A	B	B	B	A	B	B	A
PS-2	A	B	B	B	A	B	B	A
PS-3	A			B[1]	A	B[1]	B[1]	A
PS-4	A	B	B	B	A	B	B	A
PS-5	A			B[1]	A	B[1]	B[1]	A
PS-6	A			B[1]	A	B[1]	B[1]	A
PS/P-11	A							
PS/P-12	A							
PS/P-13	A							

Key:
A - Suite A includes the following water quality laboratory analyses:

VOCs by EPA Method 8260B or 8010 (full suite, including fuel oxygenates and BTEX)
Total petroleum hydrocarbons as gasoline and diesel by EPA Method 8015
Petroleum degrading bacteria by SM 9215 B
Nitrogen and ammonia by EPA Method 350.1
Orthrophosphate by EPA Method 365.2
Nitrate, nitrite, and sulfate by EPA Method 300.0
Iron, manganese, potassium by EPA Method 200.7

B - Suite B includes the following water quality laboratory analyses:

VOCs by EPA Method 8260B or 8010 (full suite, including fuel oxygenates and BTEX)
Petroleum degrading bacteria by SM 9215 B
Nitrogen and ammonia by EPA Method 350.1
Orthrophosphate by EPA Method 365.2
Nitrate, nitrite, and sulfate by EPA Method 300.0
Iron, manganese, potassium by EPA Method 200.7

1 Sample if results from previous month's sampling shows injected material has reached PS-2
VOCs Volatile organic compounds
BTEX Benzene, toluene, ethylbenzene, and xylenes
Fuel oxygenates Methyl tertiary butyl ether, tertiary butyl alcohol, tertiary amyl methyl ether, di-isopropyl ether, and ethyl tertiary butyl ether

INFORMATION SHEET

ORDER NO. R5-2003-0165
SUPPORT TERMINALS OPERATING PARTNERSHIP LP
STOCKTON TERMINAL
ENHANCED BIOREMEDIATION PILOT STUDY
SAN JOAQUIN COUNTY

Support Terminals Operating Partnership LP owns the bulk fuel terminal at 2941 Navy Drive in Stockton. Two separate gasoline releases occurred in March and April 2002. In June 2002, about 1,000 gallons of diesel were released. Investigations in August 2002 and March 2003 delineated the extent of the petroleum pollution. Petroleum pollution is limited to the A water bearing zone which is about 5 feet below ground surface.

The proposed system will extract groundwater from two extraction wells screened in the A water bearing zone downgradient of the treatment area. The extracted groundwater will be piped to a 300-gallon storage tank at the upgradient end of the treatment zone and then mixed with PetroZyme, which is a proprietary product that contains microbes that produce enzymes capable of catalyzing the breakdown of petroleum hydrocarbons and NutriMax, which is a nutrient mix that contains nitrogen, phosphorus, and potassium to promote microbial growth. The treated groundwater is then injected via three injection wells at the upgradient end of the treatment zone by the Super Ox^{TM} unit. The Super Ox^{TM} oxygenation system takes the amended stream of water, oxygenates it to about 45 parts per million of dissolved oxygen, and injects it into the subsurface. The downgradient extraction and natural groundwater will pull the treated groundwater through the treatment area. There is plume capture to ensure that water quality objectives will not be exceeded beyond the project area.

This remedial process allows microorganisms to degrade petroleum pollution to carbon dioxide and water. When the pilot study is completed, the amendments and byproducts shall not exceed baseline levels.

DLL 9/24/03