California Regional Water Quality Control Board

Los Angeles Region

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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

APC

March 27, 2003

Ms. Teresa Olmsted
ITT Remediation Management , Inc.
1054 N. Tustin Avenue
Anaheim, California 92807

ADOPTED REVISED WASTE DISCHARGE REQUIREMENTS AND MONITORING REPORTING PROGRAM FOR ITT INDUSTRIES, INC. - FORMER ITT BARTON FACILITY, 900 S. TURNBULL CANYON ROAD, CITY OF INDUSTRY, CALIFORNIA (WDR NO. R4-2003-0045, CI NO. 8373)

Dear Ms. Olmsted:

Pursuant to Division 7 of the California Water Code, this Regional Board at a public hearing held on March 13, 2003, reviewed the revised tentative waste discharge requirements, considered all factors in the case, and adopted Order No. R4-2003-0045.

The "Monitoring and Reporting Program" issued on January 24, 2002 remains unchanged. All monitoring reports should be sent to the Regional Board, ATTN: Information Technology Unit.

When submitting monitoring or technical reports to the Regional Board per these requirements, please include a reference to Compliance File CI-8373 and Order No. R4-2003-0045 which will assure that the reports are directed to the appropriate file and staff. Please do not combine your discharge monitoring reports with other reports. Submit each type of report as a separate document.

Enclosed are copies of the following:

a. Waste Discharge Requirements. Order No. R4-2003-0045
b. Monitoring and Reporting Program CI-8373

If you have any questions, please contact Angelica Castaneda at (213) 576-6755 or call me at (213) 576-6803.

Sincerely,

Dixon A. Oriola, Unit Chief
Well Investigation Program

Enclosures

cc: Environmental Protection Agency, Region IX, Permits Branch (WTR-5)
Penny McDaniel, USEPA, Region IX, San Francisco
U.S. Army Corps of Engineers
NOAA, National Marine Fisheries Service
Department of Interior, U.S. Fish and Wildlife Service
Governor's Office of Planning and Research, State Clearinghouse
Jim Maughan, State Water Resources Control Board
Robert Sams, Office of Chief Counsel, State Water Resources Control Board
Vera Melnyk-Vechio, State Department of Health Services
Harlan R. Jeche, Department of Toxic Substances Control
Department of Fish and Game, Region 5
Stephen J. Buswell, Department of Transportation
Carol Williams, Main San Gabriel Valley Watermaster
Grace Burgess, San Gabriel Basin Water Quality Authority
Mike Whitehead, San Gabriel Valley Water Company
Jason Wen, South California Water Company
Brian Hooper, Los Angeles County Department of Public Works
Jack Petralia, Los Angeles County Department of Health Services
Carl G. Brooks, South Coast Air Quality Management District
Jim Williams, City of Huntington Park, Water Department
Mark Gold, Heal the Bay
Jacqueline Lambricts, Friends of the San Gabriel River
Friends of the Los Angeles River
Santa Monica Bay Keeper
Mary Crow, ITT Industries, Inc
James K. Nguyen, ARCADIS G&M

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. R4-2003-0045
WASTE DISCHARGE REQUIREMENTS
FOR
ITT INDUSTRIES, INC.
(FILE NO. 2001-163)

CITY OF INDUSTRY, CALIFORNIA

(GROUNDWATER REMEDIATION USING CARBOHYDRATE SOLUTION)

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board), finds:

1. ITT Industries, Inc. (hereafter referred to as the Discharger) owned and operated the former ITT Barton Instruments, a manufacturing plant of scientific instruments, from 1977 to 1998. The plant is located at 900 South Turnbull Canyon Road, City of Industry, California in a mixed commercial-residential-industrial area (Figure 1). The plant property was transferred to Barton Instrument Systems in 1998. However, the Discharger has assumed environmental cleanup liability at the site.

2. The instruments manufactured by the Discharger were used for sensing, measuring, and computing various conditions of liquids and gases. The following operations were conducted as part of facility operations: grinding, drilling, machining, degreasing, acid cleaning, soldering, welding of metal parts, assembly, and painting.

3. The plant property consists approximately 13 acres within the Puente Valley Operable Unit, a USEPA Superfund area impacted by past releases of chlorinated volatile organic compounds (VOCs). Due to facility operations, groundwater beneath the site was impacted with VOCs such as tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), and cis-1,2-dichloroethene (c-1,2-DCE). The Discharger is responsible for having discharged or allowing the discharge of VOCs into the soil and groundwater at the property.

4. The former vapor degreaser (VD) area and the former underground storage tank (UST) area have been identified as areas of concern of soil and groundwater contamination at the site. During the sampling event on July 20, 2000, VOCs concentrations in the former VD groundwater monitoring well were 1,100 µg/L of PCE, 650 µg/L of cis-1,2-dichloroethene (c-1,2-DCE), and 350 µg/L of TCE, whereas VOCs concentrations in the former UST groundwater monitoring well were 3,600 µg/L of PCE; 1,100 µg/L of 1,1,1-TCA; 180 µg/L of TCE and 120 µg/L of c-1,2-DCE. The California maximum contaminant levels (MCLs)

for the chemicals are 5 µg/L for PCE, 6 µg/L for c-1,2-DCE, 200 µg/L for 1,1,1-TCA, and 5 µg/L for TCE.

5. Since 1985, the Regional Board's San Gabriel Valley Cleanup Unit has overseen assessment and cleanup activities at this site. The chlorinated VOC groundwater plume covers an area of approximately 90 feet by 140 feet in the former VD area, and an area of 110 feet by 140 feet at the former UST location. PCE was detected in the soil above the groundwater table, ranging from 6.6 µg/kg at 5 feet below ground surface (bgs) to 23,000 µg/kg at 19 feet bgs in the former VD area; and from 12 µg/kg at 10 feet bgs to 3,000 mg/kg at 15 feet bgs in the former UST location. The remediation plan for the site includes the removal of VOCs sources from the vadose zone through a soil vapor extraction system (SVE), and groundwater remediation using an in-situ reactive zone (IRZ) technology at the former VD and UST areas. The SVE system extracts air through the pores of the vadose zone, creating an aerobic environment. Therefore, soil cleanup must be achieved before groundwater remediation because the IRZ requires an anaerobic environment to be effective.

6. The Discharger proposes to use IRZ technology to cleanup groundwater. IRZ technology involves the injection of a food-grade carbohydrate solution (e.g. molasses, cheese whey) into the subsurface to create an anaerobic and reducing condition in groundwater to facilitate the natural reductive dechlorination of VOCs by bacteria. By injecting a carbohydrate source, such as sucrose, glucose, or lactose into groundwater, indigenous heterotrophic microorganisms readily degrade the carbohydrates using available dissolved oxygen (DO). This process drives the system to a more anaerobic and reduced state. Hydrolysis and fermentation of the carbohydrates result in the production of acetate and hydrogen, which serve as sources of energy for bacteria using sulfate and carbon dioxide (CO_2) as electron acceptors. The anaerobic group of methanogens are responsible for reductive dechlorination since they use CO_2 as an electron acceptor which transforms VOCs into less chlorinated intermediates, and finally to CO_2 and water. The metabolic pathway is shown in Figure 2. Final concentrations achieved at other remediation sites include 1 to 7 µg/L for TCE and 20 µg/L for 1,2-DCE.

7. Any injection of carbohydrate solution into the groundwater is considered a discharge of waste into the environment as defined by the California Water Code (CWC). However, the discharge of the carbohydrate solution is intended to provide more efficient remediation of chlorinated VOCs. The nearest downgradient drinking water well is Well B7C, state well number: 1S/10W-31P06S, located approximately 1 mile north of the site which is operated by the San Gabriel Valley Water Company. Figure 3 shows production wells nearby the project. Groundwater is estimated to migrate at a rate of 5.7 feet per year at the site, therefore, migration off site is not expected to occur within the time-frame of the treatment operation.

8. The original Waste Discharge Requirements Order No. R4-2002-0025 for this discharge was adopted by the Regional Board on January 24, 2002. The groundwater remediation project started in June 2002. A total of forty-eight injection wells (IRZ wells) were installed. Ten IRZ wells are located in the former VD area and thirty-eight are located in the former UST

area. See Figure 4. Existing wells MW-6 and MW-7 in the former UST and VD areas, respectively, and the cross-gradient well MW-8 are used to monitor the performance of the IRZ system. Additionally, monitoring wells MW-9 and MW-10, downgradient of the remediation areas, were installed to detect any migration off-site. MW-9 is screened in the perched zone and in the upper groundwater zone. If changes are observed in these wells, the carbohydrate solution will cease and, if necessary, groundwater will be extracted from downgradient well MW-10 following the contingency plan submitted by the Discharger. Groundwater will be extracted from downgradient well MW-10 until background total organic carbon (TOC) levels are achieved. Figure 4 shows the location of injection and monitoring wells. The ¾-inch diameter injection wells are completed to a total depth of 25 feet below ground surface (bgs) and screened between 15 and 25 feet below ground surface (bgs). Depth to perched groundwater was 18 feet bgs on April 2002.

9. The purpose of monitoring is to adjust the concentration of the carbohydrate solution, monitor the reactions leading to decreased concentrations of VOCs, and to detect any off-site migration of the carbohydrate solution. As of January 2003, three injection events have been conducted and a total of 24,000 gallons of carbohydrate solution have been added to perched groundwater. Based on parameters such as oxidation-reduction potential, dissolved oxygen, and total organic carbon, a reducing environment in perched groundwater has been achieved, enhancing biodegradation. A reduction of total VOCs has been observed in both remedial areas, demonstrating that remediation is progressing. In order to continue cleanup of VOCs at the site, additional application of carbohydrate solution is needed. Three to five injection events will be conducted to achieve remediation. It is estimated that an additional 30,000 to 50,000 gallons in total will be required.

10. IRZ can have the following adverse effects:

    a) Incomplete reactions can produce cis-1,2-dichloroethene and vinyl chloride, whose MCLs are 6 µg/L and 0.5 µg/L, respectively. However, degradation of these products is expected at a later stage of the remediation process and its occurance will be monitored.
    b) Natural background concentrations of parameters like pH, total dissolved solids (TDS), total organic carbon (TOC), oxidation-reduction potential (ORP), nitrate, nitrite, manganese, ferrous iron, sulfate, hydrogen sulfide, alkalinity, dissolved oxygen (DO), specific conductance, temperature, and methane are expected to change in the remediation area. These parameters will be monitored within and outside the remediation area by the monitoring wells. Once the remediation is achieved these parameters will be monitored to observe whether background concentrations are recovered through time.
    c) Inadequate carbohydrate solution distribution in the aquifer and/or an inadequate dosing may limit the effectiveness of this technology. Therefore, a complete understanding of the geochemical and hydrological conditions of the aquifer and careful monitoring are required to determine the effectiveness of the treatment.

11. The advantages of the IRZ technology include: 1) indigenous microflora promote the biological reactions, 2) using food grade electron donor sources (e.g. molasses and whey), 3) electron donor source is highly soluble and can move through both diffusive and advective

processes into difficult lithologies, and 4) eliminates the need for transferring contaminant mass to other media.

12. The hydrogeology of the former VD and former UST locations has been characterized. Three general lithological layers were observed in the former VD area: upper silts, a saturated sand unit (perched zone), and underlying lower silts. This saturated layer was sandwiched between lower permeability layers, such as clayey or sandy silts. The perched zone varies in thickness from approximately 1 to 6 feet in both areas. The location of the perched zone is approximately from 11.5 to 25.5 feet. Visual observation and geotechnical analysis indicate that soil samples collected from above this saturated layer were not saturated, suggesting that perched water preferentially flows within this layer.

13. According to the Water Quality Control Plan for the Los Angeles Region, the existing beneficial uses of the groundwater are municipal and domestic supply, and industrial service and process supply in the Puente Basin in the San Gabriel Valley.

14. The permitted discharge is consistent with the antidegradation provisions of the State Water Resources Control Board Resolution No. 68-16 (Anti-degradation Policy). The discharge may result in some localized exceedance of background concentrations of constituents such as pH, total dissolved solids (TDS), total organic carbon (TOC), oxidation-reduction potential (ORP), nitrate, nitrite, manganese, ferrous iron, sulfate, hydrogen sulfide, alkalinity, dissolved oxygen (DO), specific conductance, temperature, and methane. It is expected that these parameters change to background concentrations once the injection of the carbohydrate solution stops. Any parameter change resulting from the discharge:

    a) will be consistent with maximum benefit to the people of the State,
    b) will not unreasonably affect present and anticipated beneficial use of such waters, and
    c) will not result in water quality less than that prescribed in the Water Quality Control Plan for the Los Angeles Region.

15. The Regional Board is serving as the lead agency for this project under the California Environmental Quality Act (Public Resources Code section 21000 et seq.). The Regional Board has conducted an Initial Study in accordance with title 14, California Code of Regulations, section 15063. Based on the Initial Study, the Regional Board adopted a Mitigated Negative Declaration on January 24, 2002, that the project will not have a significant adverse effect on the environment.

16. The Regional Board has notified the applicant and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge and to the tentative requirements.

IT IS HEREBY ORDERED that ITT Industries Inc., in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge (Injection) Limits

1. The discharge (injection) or its handling shall not cause pollution or nuisance as defined in the California Water Code and all water and nutrients shall be fully contained laterally and vertically, or recovered.

2. Injection shall be limited to potable water and nutrient solution. The maximum concentration of the carbohydrate solution shall be 25% by volume. Carbohydrate concentration(s) may be adjusted based upon remediation results. In addition, a buffering sodium bicarbonate solution may be added to control the pH, if necessary.

3. The original Waste Discharged Requirements Order No. R4-2002-0025 allowed the injection of 33,000 gallons of carbohydrate solution. Based on the initial seven months of operation, the Discharger may increase the volume to an additional 50,000 gallons to complete remediation. After that volume is reached and if additional carbohydrate solution is needed, the Executive Officer may authorize an additional discharge volume(s) upon demonstrating adequate remedial results, and submitting a written request before the application of carbohydrate solution. A written approval from the Executive Officer prior to any additional injection is needed.

4. Nutrient injection shall be limited to the perched zone and the soil immediately above and below it.

5. The Discharger shall not cause the groundwater outside the remediation area to exceed background concentrations of chloride, total dissolved solids, nitrate and nitrite, sulfates, sulfides, total organic carbon, iron, and manganese.

B. Discharge Prohibitions

1. The discharge of the carbohydrate solution or any by-products into any water course, surface water, or drainage course is prohibited.

2. Discharge of wastes to any point other than specifically described in this Order is prohibited and constitutes a violation thereof.

3. The Discharger shall not cause the permeability of the aquifer, either inside or outside of the treatment area(s), to be affected to such a degree that the Discharger is unable to effectively operate a groundwater pump-and-treat systems, if the IRZ technology is shown to be ineffective.

4. The Discharger's activities shall not cause the groundwater outside the treatment area(s) to contain taste, color or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

5. The Discharger's activities shall not cause the groundwater to contain concentrations of chemical constituents, including carbohydrates and its by-products, in concentrations that may adversely affect municipal, domestic, industrial or agricultural uses as a result of the remediation project.

C. Provisions

1. This Order includes the attached "Standard Provisions Applicable to Waste Discharge Requirements." If there is any conflict between provisions stated herein and the attached "Standard Provisions", those provisions stated herein prevail.

2. In the event of any change in name, ownership, or control of this facility, the Discharger shall notify the Regional Board in writing and shall notify any succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Regional Board.

3. A copy of these requirements shall be maintained at an on-site office and be available at all times to operating personnel.

4. The Discharger must evaluate any changes to the aquifer's transmissivity, hydraulic conductivity and/or storativity inside the treatment area(s). Mathematical and computer models should be used to predict groundwater flow and contaminant movement, when necessary. The workplan dated March 21, 2002, must be followed and results provided to this Regional Board within 60-days from completion of the remediation project.

5. The Discharger shall provide hydraulic control, that is, full and complete containment of any by-products of the biological degradation process, beginning no later than 4 months after the last injection of carbohydrate solution in the remediation area, or as soon as the carbohydrate solution is detected in downgradient wells.

6. This Order includes the attached Monitoring and Reporting Program No. CI-8373. If there is conflict between provisions stated in the Monitoring and Reporting Program No. CI-8373 and the Standard Provisions, those provisions stated in the former prevail. The Executive Officer may modify the monitoring frequency at specific monitoring wells depending on the progress of the remediation.

7. The Discharger shall notify Regional Board staff by telephone within 24 hours, followed by written notification within one week, in the event it is unable to comply with any of the conditions of this Order due to:

   a) Breakdown of waste treatment equipment,

b) Accident caused by human error or negligence,
c) Other causes such as acts of nature, or
d) Site construction or development operations.

8. In the event that wastes are transported and disposed of to a disposal site, the Discharger shall report types of wastes and quantity of each type; name and address of each hauler of wastes (or method of transport if other than by hauling); and location of the final point(s) of disposal for each type of waste.

9. The Discharger shall submit a Summary Report detailing the results of the remediation program within 60-days from completion of the remediation project. The report should include an evaluation of the effectiveness of using IRZ technology to remediate VOC-contaminated groundwater at the facility, the impact of any by-products on groundwater quality, the hydraulic properties of the aquifer, and any other effects the *in-situ* treatment may have.

10. The Discharger shall comply with all conditions of this Order, including timely submission of technical and monitoring reports as specified in Monitoring and Reporting Program No. CI-8373. 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.

11. The use of the nutrient (carbohydrate) solution shall not cause a condition of pollution or nuisance as defined by California Water Code section 13050.

12. The Discharger shall cleanup and abate the effects of injecting nutrient (carbohydrate) solution including extraction of any by-products which adversely affect beneficial uses and shall provide an alternate water supply source for any municipal, domestic or other water use wells that become contaminated in exceedance of water quality objectives as a result of injecting the nutrient (carbohydrate) solution.

13. All work must be performed by or under the direction of a California registered civil engineer, registered geologist, or certified engineering geologist. A statement is required in all technical submittals that the registered professional in direct responsible charge actually supervised or personally conducted all the work associated with the project.

14. All technical submittals must be wet stamped by a California registered civil engineer, registered geologist, or certified engineering geologist displaying expiration date of license.

15. These requirements do not exempt the Discharger from compliance with any other laws, regulations, or ordinances, which may be applicable. They do not legalize the waste treatment facility, and they leave unaffected any further restraints on the facility that may be contained in other statutes of and/or required by other agencies.

16. This Order does not alleviate the responsibility of the Discharger to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.

17. After notice and opportunity for a hearing, this Order may be terminated or modified for cause including, but not limited to:
    a. Violation of any term or condition contained in this Order;
    b. Obtaining this Order by misrepresentation, or failure to disclose all relevant facts;
    c. A change in any condition that requires either a temporary or permanent reduction or elimination of authorized discharge.

18. These waste discharge requirements expire on January 24, 2005. The Discharger must file a Report of Waste Discharge no later than 180 days in advance of such date as application for issuance of new waste discharge requirements.

19. Waste Discharge Requirements Order No. R4-2002-0025 is hereby rescinded except for enforcement purposes.

I, Dennis A. Dickerson, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on March 13, 2003.

Dennis A. Dickerson,
Executive Officer

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM NO. CI-8373
FORMER ITT BARTON INSTRUMENTS FACILITY
CITY OF INDUSTRY, CALIFORNIA
(CARBOHYDRATE SOLUTION GROUNDWATER INJECTION)

(FILE NO. 2001-163)

I. Discharge Monitoring

The Discharger shall sample from groundwater monitoring wells for baseline groundwater parameters two weeks prior to the start of the injections. Monitoring of the remedial project shall consist of samples collected from wells MW-6, MW-7, and MW-8. Monitoring wells shall be monitored for the duration of the remediation project in accordance with the following discharge monitoring program:

Table 1. Monitoring program for monitoring wells MW-6, MW-7, and MW-8.

CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS
Total daily injection waste flow	gallons/day (indicate solution concentration)	N/A	During injection (specify remediation area)
Dissolved Oxygen Field using YSI 6000 water quality transmitter unit Field using Hach test kit	mg/l	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Oxidation Reduction Potential Field using YSI 6000 water quality transmitter unit	millivolts	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
pH Field using YSI 6000 water quality transmitter unit	pH units	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Temperature Field using YSI 6000 water quality transmitter unit	°F/ °C	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Specific Conductivity Field using YSI 6000 water quality transmitter unit	µmhos/cm	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Iron, Ferrous Field using Hach test kit	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.

Hydrogen Sulfide Field using Hach test kit	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Total dissolved solids and Total suspended solids	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Turbidity	NTU	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Chlorinated Volatile Organic Compounds EPA Method 8260 B	µg/l	grab	• Every 6 weeks
Total Organic Carbon EPA Method 9060 Modified	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Manganese, total EPA Method 6010A	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Manganese, dissolved EPA Method 6010A	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Iron, total EPA Method 6010A	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Sulfate EPA Method 375.4	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Nitrate EPA Method 353.2	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Nitrite EPA Method 353.2	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Chloride EPA Method 325.2	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.

Major Cations (barium, calcium, potassium and sodium)	mg/l	grab	• Monthly first three months • Every 6 weeks thereafter • If no significant change is observed monitor every semester.
Carbon Dioxide	µg/l	grab	• Monthly first three months • Every 6 weeks thereafter
Nitrogen	µg/l	grab	• Monthly first three months • Every 6 weeks thereafter
Methane	µg/l	grab	• Every 6 weeks
Ethane	µg/l	grab	• Every 6 weeks
Ethene	µg/l	grab	• Every 6 weeks
Color (EPA Method 110.2)	Color unit	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Groundwater Elevation	Feet, mean sea level (msl) and below ground surface (bgs)	*In situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.

MW-9 and MW-10 will be used to detect off-site migration of the injection solution and/or contaminants.

Table 2. Monitoring program for monitoring wells MW-9 and MW-10.

CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS
Dissolved Oxygen Field using YSI 6000 water quality transmitter unit Field using Hach test kit	mg/l	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Oxidation Reduction Potential Field using YSI 6000 water quality transmitter unit	millivolts	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
pH Field using YSI 6000 water quality transmitter unit	pH units	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Temperature Field using YSI 6000 water quality transmitter unit	°F/ °C	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.

Specific Conductivity Field using YSI 6000 water quality transmitter unit	µmhos/cm	*In-situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Total dissolved solids and Total suspended solids	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Turbidity	NTU	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Chlorinated Volatile Organic Compounds EPA Method 8260 B	µg/l	grab	• Every 12 weeks
Manganese, total EPA Method 6010A	mg/l	grab	• Every 12 weeks.
Manganese, dissolved EPA Method 6010A	mg/l	grab	• Every 12 weeks.
Iron, total EPA Method 6010A	mg/l	grab	• Every 12 weeks.
Iron, Ferrous Field using Hach test kit	mg/l	grab	• Every 12 weeks.
Sulfate EPA Method 375.4	mg/l	grab	• Every 12 weeks.
Nitrate EPA Method 353.2	mg/l	grab	• Every 12 weeks.
Nitrite EPA Method 353.2	mg/l	grab	• Every 12 weeks.
Chloride EPA Method 325.2	mg/l	grab	• Every 12 weeks.
Hydrogen Sulfide Field using Hach test kit	mg/l	grab	• Every 12 weeks.
Total Organic Carbon EPA Method 9060 Modified	mg/l	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Monthly thereafter.
Methane	µg/l	grab	• Every 6 weeks
Color (EPA Method 110.2)	Color unit	grab	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.
Groundwater Elevation	Feet, mean sea level (msl) and below ground surface (bgs)	*In situ*	• Biweekly first 6 weeks. • Every 3 weeks the following 6 weeks. • Every 6 weeks thereafter.

II. Reporting and Laboratory Analyses

A. REPORTING REQUIREMENTS

1. In accordance with section 13267 of the California Water Code, the Discharger shall furnish, under penalty of perjury, technical monitoring reports to the Regional Board during the remediation and during the post-remediation monitoring period. Such reports shall be submitted in accordance with specifications prepared by the Executive Officer.

2. The monitoring reports shall be submitted monthly by the 15th of the following month, with the first report due on the 15th of the month following the first injection event.

3. All monitoring reports shall include discharge limitations in the Order (see A. Discharge Prohibitions), tabulated analytical data, the chain of custody, laboratory report (including but not limited to date and time of sampling, date of analyses, method of analysis and detection limits). If there is no discharge, the report shall so state it.

4. Two months after the end of the remediation, the Discharger shall submit an interim summary report to the Regional Board to report findings during the project.

5. Fourteen (14) months after the end of the remediation, the Discharger shall submit a final summary report to the Regional Board to report the comprehensive findings observed during the remediation and post-remediation monitoring period.

6. The report shall contain both tabular and graphical summaries of the monitoring data obtained prior to and proceeding the remediation. Provided data must ensure that the remediation areas have returned to the pre-existing aerobic environment. In addition, the Discharger shall discuss the compliance record and the corrective actions taken or planned, which may be needed to bring the discharge into full compliance with the site's waste discharge requirements, if any.

B. LABORATORY ANALYSIS REQUIREMENTS

1. All chemical, bacteriological, and toxicity analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services Environmental Laboratory Accreditation Program (ELAP) or approved by the Executive Officer.

2. Samples shall be analyzed within allowable holding time limits as specified in 40 CFR Part 136.3. All quality assurance/quality control (QA/QC) items should be run on the same dates when samples were actually analyzed and documentation shall accompany the laboratory reports.

3. The detection limits employed for sample analyses shall be lower than the permit limits established for a given parameter, unless the discharger demonstrates that a particular detection limit is not attainable and obtains approval for a higher detection limit from the Executive Officer.

III. Notification

1. The Discharger shall inform the Regional Board 24 hours before the start of the discharge.

2. The Discharger shall inform the Regional Board within 24 hours in the event that any discharge exceeds the discharge limit. Written confirmation shall follow within one week and shall include date and time, estimated volume and/or concentration, duration, cause, and all corrective actions taken.

3. The Discharger shall inform the Regional Board of the termination of the remediation project.

Ordered by: _____ Date: January 24, 2002
Dennis A. Dickerson
Executive Officer

/ACJ