



California Regional Water Quality Control Board

Los Angeles Region



Linda S. Adams
Cal/EPA Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: <http://www.waterboards.ca.gov/losangeles>

Arnold Schwarzenegger
Governor

November 30, 2009

Mr. Mark Alling
Phibro-Tech, Inc.
8851 Dice Road
Santa Fe Springs, CA 90670

GENERAL WASTE DISCHARGE REQUIREMENTS (ORDER NO. R4-2007-0019, SERIES NO. 111, MRP NO. CI-9558), INJECTION OF A CALCIUM POLYSULFIDE SOLUTION - PHIBRO-TECH, INC., 8851 DICE ROAD, SANTA FE SPRINGS, CALIFORNIA 90670 (FILE NO. 08-120, DTSC-LEAD SITE)

Dear Mr. Alling:

Los Angeles Regional Water Quality Control Board (Regional Board) staff have completed our review of your application for coverage under General Waste Discharge Requirements (WDR) for the injection of calcium polysulfide solution (CPS) in the vadose zone and shallow groundwater beneath your site to stabilize hexavalent chromium, and potentially remediate halogenated volatile organic compounds during a pilot-scale test. We have determined that the proposed discharge meets the conditions specified in Regional Board Order No. R4-2007-0019, *Revised General Waste Discharge Requirements for Groundwater Remediation at Petroleum Hydrocarbon Fuel, Volatile Organic Compound and/or Hexavalent Chromium Impacted Sites*, adopted by this Regional Board on March 1, 2007. Please refer to the attached Fact Sheet.

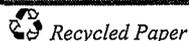
You may begin to inject a maximum of 63,600 gallons of CPS solution (with Rhodamine WT tracer dye), at a concentration of 5-7% by volume, into the 11 injection points at the approximate locations and depths indicated in Figures 3 and 4 of the May 29, 2008 *Revised Groundwater Corrective Action Pilot Test Work Plan*, which was approved by the California Department of Toxic Substances Control (DTSC), the lead-agency for the site, in correspondence dated June 27, 2008.

Enclosed are your Waste Discharge Requirements, consisting of Regional Board Order No. R4-2007-0019 (Series 111) and Monitoring and Reporting Program (MRP) No. CI-9558. Please note that the discharge limits in Attachment B [DWR Basin No. 4-11 (Los Angeles Coastal Plain – Central Basin)] of this Order No. R4-2007-0019 are applicable to your discharge.

The "Monitoring and Reporting Program" requires you to implement the monitoring program on the effective date of this enrollment (November 30, 2009) under Regional Board Order No. R4-2007-0019. All monitoring reports shall be sent to the Regional Board, ATTN: Information Technology Unit.

To avoid paying future annual fees, please submit a written request for termination of your enrollment under the general permit in a separate letter, when your project has been completed and the permit is no longer needed. Be aware that the annual fee covers the fiscal year billing period beginning July 1 and ending June 30, the following year. You will pay the full annual fee if your request for termination is made after the beginning of the new fiscal year beginning July 1.

California Environmental Protection Agency



Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

Mr. Mark Thek
Phibro-Tech

- 2 -

November 30, 2009

When submitting monitoring or technical reports to the Regional Board per these requirements, please include a reference to "Compliance File No. CI-9558", which will assure that the reports are directed to the appropriate file and staff. Also, please do not combine other reports with your WDR monitoring reports. Submit each type of report as a separate document.

Should you have any questions, please contact Dr. Rebecca Chou at (213) 620-6156.

Sincerely,

 A.E.O. for

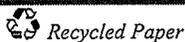
Tracy J. Egoscue
Executive Officer

Enclosures:

- 1) Fact Sheet
- 2) General Waste Discharge Requirements, Order No. R4-2007-0019
- 3) Monitoring and Reporting Program, CI No. 9558

cc: Ms. Kathy San Miguel, Department of Toxic Substances Control (ksanmigu@dtsc.ca.gov)
Ms. Pearl Pereira, Iris Environmental (pearl@irisenv.com)

California Environmental Protection Agency



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

MONITORING AND REPORTING PROGRAM NO. CI-9558

FOR

PHIBRO-TECH, INC., SANTA FE SPRINGS
8851 DICE ROAD
SANTA FE SPRINGS, CALIFORNIA

ORDER NO. R4-2007-0019 (Series No. 111)
FILE NO. 08-120,

I. Monitoring and Reporting Requirements

- A. Phibro-Tech, Inc. (hereinafter Discharger) shall implement this monitoring program on the effective date of this enrollment (November 30, 2009) under Regional Board Order No. R4-2007-0019. Upon the initiation of monthly groundwater monitoring and sampling, the first monitoring report shall be submitted by **May 15, 2010** for the first three months (December 2009 through February 2010) of this remediation program. Subsequent quarterly monitoring reports shall be received by the Regional Board according to the following schedule:

<u>Monitoring Period</u>	<u>Report Due</u>
January – March	May 15
April – June	August 15
July – September	November 15
October – December	February 15
Annual Summary Report	February 15 of each year beginning in 2011

- B. If there is no discharge or injection, during any reporting period, the report shall so state. Monitoring reports must be addressed to the Regional Board, Attention: Information Technology Unit.
- C. By February 15 of each year, starting in 2011, the Discharger shall submit an annual summary report to the Regional Board. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous calendar year. 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 waste discharge requirements.
- D. The Discharger shall comply with requirements contained in Section G. of Order No. R4-2007-0019 "*Monitoring and Reporting Requirements*" in addition to the aforementioned requirements.

II. Discharge Monitoring

Prior to the start of the in-situ injection of Calcium Polysulfide Solution (CPS), the Discharger shall sample from the following groundwater monitoring wells for baseline groundwater parameters:

- up-gradient wells MW-13S and MW-13D;
- down-gradient wells UHA-PM-1 through UHA-PM-6, MW-4, MW-4A, MW-9, MW-14S, MW-14D, MW-17, MW-19 and MW-20;
- cross-gradient wells MW-8 and MW-10; and
- injection zone wells UHA-Inj-1 through UHA-Inj-3, and MW-18S.

Following the collection of baseline groundwater samples, all of the above-listed up-gradient, down-gradient, cross-gradient, and injection zone wells shall be monitored for the life of the CPS remediation pilot test project in accordance with the following discharge monitoring program:

LABORATORY ANALYSES			
CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS
Hexavalent Chromium (EPA Method 7199)	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter
Total Chromium (EPA Method 6010B)	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter
Volatile Organic Compounds (EPA Method 8260B)	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter
Major Anions (bromide, chloride, sulfate, nitrate, nitrite, O-phosphate, and sulfide)	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter
Major Cations (barium, calcium, magnesium, manganese, potassium and sodium)	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter
Total Organic Carbon (groundwater) (EPA Method 9060 Modified)	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter
Ferrous Iron, Manganese, Arsenic, Lead	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter
CO ₂ , CH ₄ , Ethane, Ethene	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter

FIELD PARAMETERS			
CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS
Total Daily Injection Waste Flow	liters/day (to indicate solution concentration)	Not Applicable	<ul style="list-style-type: none"> • Daily during injection
Rhodamine WT	N/A (monitoring via visual inspection and/or with a field fluorometer)	grab	<ul style="list-style-type: none"> • Daily during Phase I and Phase II injection • Prior to start of Phase II injection • Daily following completion of Phase II injection for a minimum of one week • Quarterly thereafter
Total Dissolved Solids and Total Suspended Solids	mg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Daily during Phase I and Phase II injection • Monthly first month through third month • Quarterly thereafter
Specific Conductivity	µmhos/cm	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Daily during Phase I and Phase II injection • Monthly first month through third month • Quarterly thereafter
pH	pH units	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Daily during Phase I and Phase II injection • Monthly first month through third month • Quarterly thereafter
Oxidation-Reduction Potential	millivolts	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Daily during Phase I and Phase II injection • Monthly first month through third month • Quarterly thereafter
Temperature	°F/°C	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Daily during Phase I and Phase II injection • Monthly first month through third month • Quarterly thereafter
Groundwater Elevation	Feet, mean sea level (msl) and below ground surface (bgs)	in situ	<ul style="list-style-type: none"> • Baseline prior to injection • Daily during Phase I and Phase II injection • Monthly first month through third month • Quarterly thereafter
Dissolved Oxygen	µg/L	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Daily during Phase I and Phase II injection • Monthly first month through third month • Quarterly thereafter
Turbidity	NTU	grab	<ul style="list-style-type: none"> • Baseline prior to injection • Monthly first month through third month • Quarterly thereafter

Footnotes:

- 1) Groundwater elevation data shall be collected from all monitoring wells at the site during each monitoring event and a groundwater potentiometric surface map shall be created from the monthly and quarterly data and provided in the monitoring reports.

III. CERTIFICATION STATEMENT

Each report shall contain the following completed declaration:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the ____ day of _____

at _____

(Signature)

(Title)"

IV. MONITORING FREQUENCIES

Specifications in this monitoring program are subject to periodic revisions. Monitoring requirements may be modified or revised by the Executive Officer based on review of monitoring data submitted pursuant to this Order. Monitoring frequencies may be adjusted to a less frequent basis or parameters and locations dropped by the Executive Officer if the Discharger makes a request and the request is backed by statistical trends of monitoring data submitted.

All records and reports submitted in compliance with this Order are public documents and will be made available for inspection during business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region, upon request by interested parties. Only proprietary information, and only at the request of the Discharger will be treated as confidential.

Ordered by:

Samuel Unger
Tracy J. Egoscue
Executive Officer

Date: November 30, 2009

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
320 West 4th Street, Suite 200, Los Angeles, California 90013

FACT SHEET
WASTE DISCHARGE REQUIREMENTS
FOR
PHIBRO-TECH, INC., SANTA FE SPRINGS

CALCIUM POLYSULFIDE SOLUTION INJECTION

ORDER NO. R4-2007-0019 (Series No. 111)
CI-9558, FILE NO. 08-120

FACILITY ADDRESS

8851 Dice Road
Santa Fe Springs, CA 90670
Latitude 33° 57' 30" N
Longitude 118° 03' 45" W

FACILITY CONTACT MAILING ADDRESS

Mr. Mark Alling
Phibro-Tech, Inc.
8851 Dice Road
Santa Fe Springs, CA 90670

PROJECT DESCRIPTION:

The Phibro-Tech site measures approximately 4.8 acres, and is operated by Phibro-Tech, Inc. as an inorganic chemical manufacturing and recycling facility. The property is owned by Phibro Animal Health Corporation. A site vicinity map is shown in Figure 1, and a site map is shown in Figure 2. The facility has been in operation at the site from the 1960s until the present.

Soil and groundwater contamination encountered at the site includes hexavalent chromium, total chromium, and VOCs. Hexavalent chromium was detected at concentrations up to 1,160 milligrams per kilogram ($\mu\text{g}/\text{kg}$) in soil, and up to 124,000 micrograms per liter ($\mu\text{g}/\text{L}$) in groundwater. The contaminant releases at the site were associated with the storage, treatment, transfer and manufacture of both volatile organic chemicals (VOCs) and inorganic chemicals.

The site is approximately 150 feet above mean sea level. Groundwater occurs approximately 63 feet below ground surface (bgs). Soil beneath the site is dominated by of three primary stratigraphic units. Beneath the surface soils lies the unsaturated Gage Aquifer, a laterally extensive sand unit present at depths of 15 to 29 feet bgs. An unsaturated and unnamed aquitard lies below the unsaturated Gage Aquifer and consists of silts, clays, and fine sands at depths ranging from 25 to 56 feet bgs. The saturated upper Hollydale Aquifer occurs below the unnamed aquitard and consists primarily of coarse to fine sand beginning at depths ranging from 50 to 56 feet bgs.

Calcium Polysulfide Solution (CPS) will be injected into the unsaturated and saturated zones near the source area beneath the site at 11 injection points completed at three discrete depth intervals. CPS is expected to fixate hexavalent chromium in soil and groundwater. It is also anticipated, based on bench-scale testing data, that VOCs may also be destroyed through reaction with the CPS. In addition to the proposed CPS injection system, a soil vapor extraction (SVE) and bioventing system is being constructed to remediate halogenated and non-halogenated VOCs caused by historic underground storage tank spills. Groundwater has been monitored on a

quarterly basis at the site since 1995. The most recent soil and groundwater contamination plume data are present in Figures 3, 4, 5, and 6a through 6c.

VOLUME AND DESCRIPTION OF DISCHARGE/INJECTION:

A maximum of approximately 63,600 gallons of a 5% to 7% CPS solution will be injected into the proposed 11 injection points completed at three discrete depth intervals described below:

- **Unsaturated Zone – Gage Aquifer:** A maximum of approximately 2,400 gallons will be injected from 16 to 26 feet, at each of 4 direct push injection points (Figure 7) for a total of 9,600 gallons.
- **Unsaturated Zone – Aquitard:** A maximum of approximately 4,800 gallons will be injected from 27 to 49 feet, at each of 4 direct push injection points (Figure 8) for a total of 19,200 gallons.
- **Saturated Zone – Hollydale Aquifer:** A maximum of approximately 8,700 gallons will be injected into each of 3 existing one-inch diameter injection wells screened from 55 to 65 feet. One well will be injected during Phase I (Figure 9) and all three wells will be injected during Phase II (Figure 10) for a total of 34,800 gallons.

Because complete displacement of all existing pore fluids in each zone is considered structurally impossible, the estimated volumes are considered the upper bounds used to terminate injection at each location. It is anticipated that a somewhat lower volume will be injected.

The interval for injection was selected based on the distribution of contaminants. The rate of injection for the vadose zone will begin at a low flow rate and low pressure and slowly increase. No microfracturing is expected in the unsaturated Gage Aquifer due to the high permeability of the sand. If microfracturing is detected during injection, flow rates and pressure will be decreased to continue flooding the pore space while maximizing the flow rate. If flow rates are too slow as to be prohibitive of the scope of the pilot test (5-foot radius in unsaturated soils and a 10-foot saturated radius), flow rates and pressure will be increased to between 20 and 40 psi to induce microfracturing, depending on the shear strength of the lithologic interval that is being injected.

It is expected that the Upper Hollydale Aquifer and vadose zone injection and process monitoring will take approximately two to six weeks. Performance monitoring of the Upper Hollydale Aquifer will continue for a minimum of three months following injection, during which time sufficient data will be collected to determine the effectiveness of the pilot test injection.

Any potential adverse water quality impacts that may result will be localized, of short-term duration, and will not impact any existing or prospective uses of groundwater. Groundwater quality will be monitored to verify that there are no long-term adverse impacts to water quality.

IRIS ENVIRONMENTAL
1438 Webster Street, Suite 302
Oakland, California 94612
Ph. (510) 834-4747 Fax: (510) 834-4199
Drafter: EBH

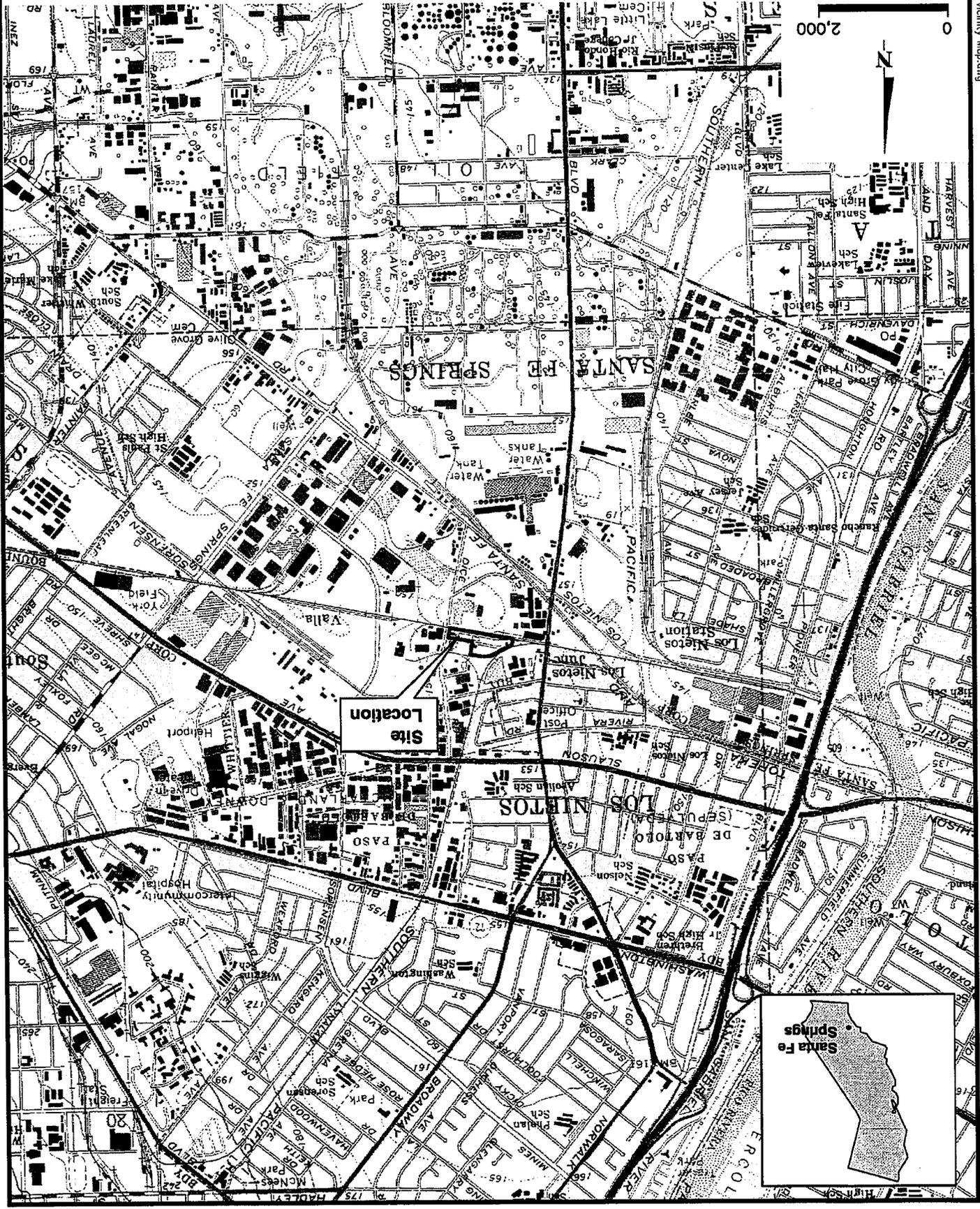
Site Vicinity Map
Groundwater Corrective Action Pilot Test Work Plan
Phibro-Tech, Inc., 8851 Dice Road
Santa Fe Springs, California

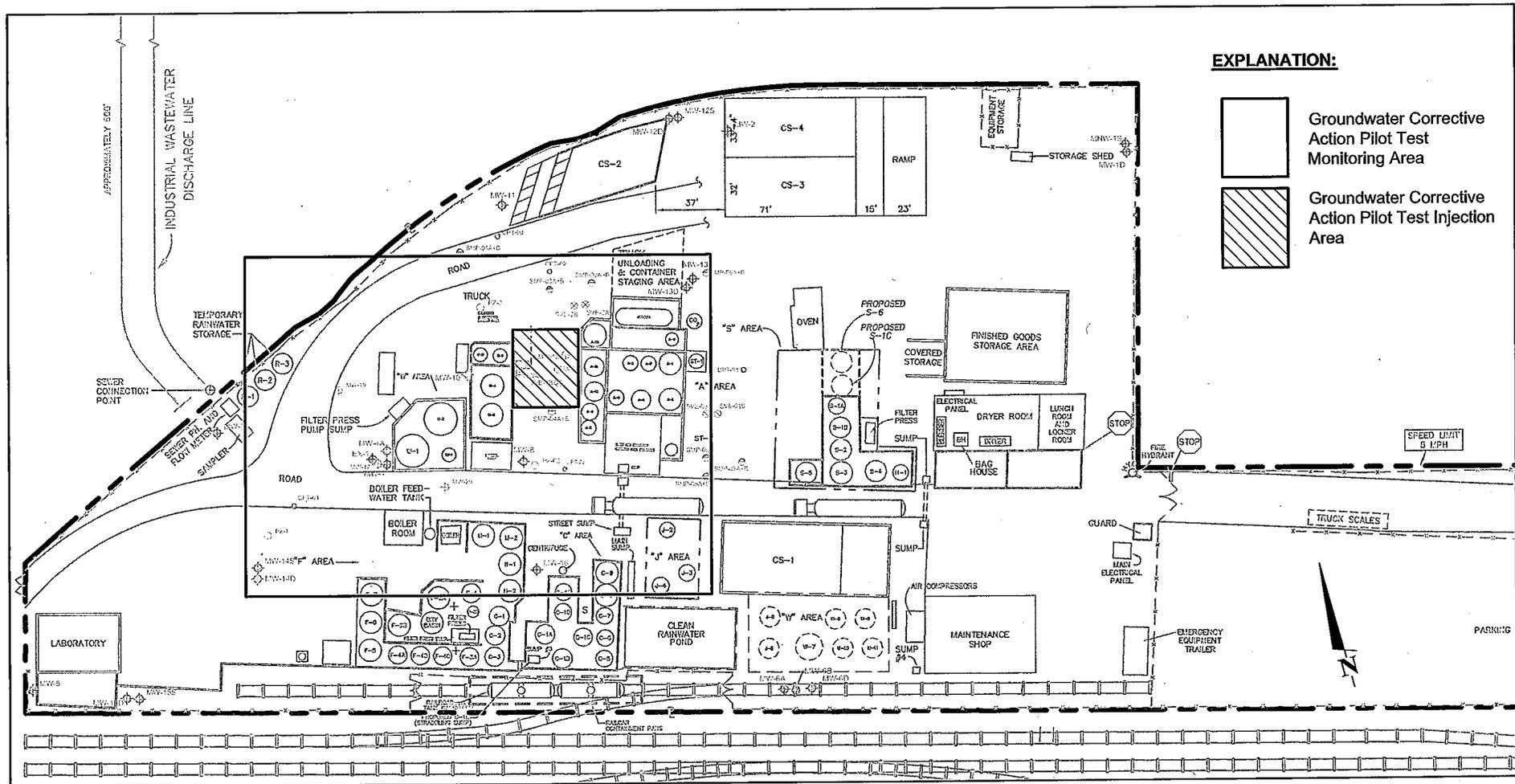
Contract Number: 06-44-B

Date: 9/26/07



Source: USGS 7.5' Whittier Quadrangle





EXPLANATION:

-  Groundwater Corrective Action Pilot Test Monitoring Area
-  Groundwater Corrective Action Pilot Test Injection Area



IRIS ENVIRONMENTAL
 1438 Webster Street, Suite 302
 Oakland, California 94612
 Ph. (510) 834-4747 Fax: (510) 834-4199

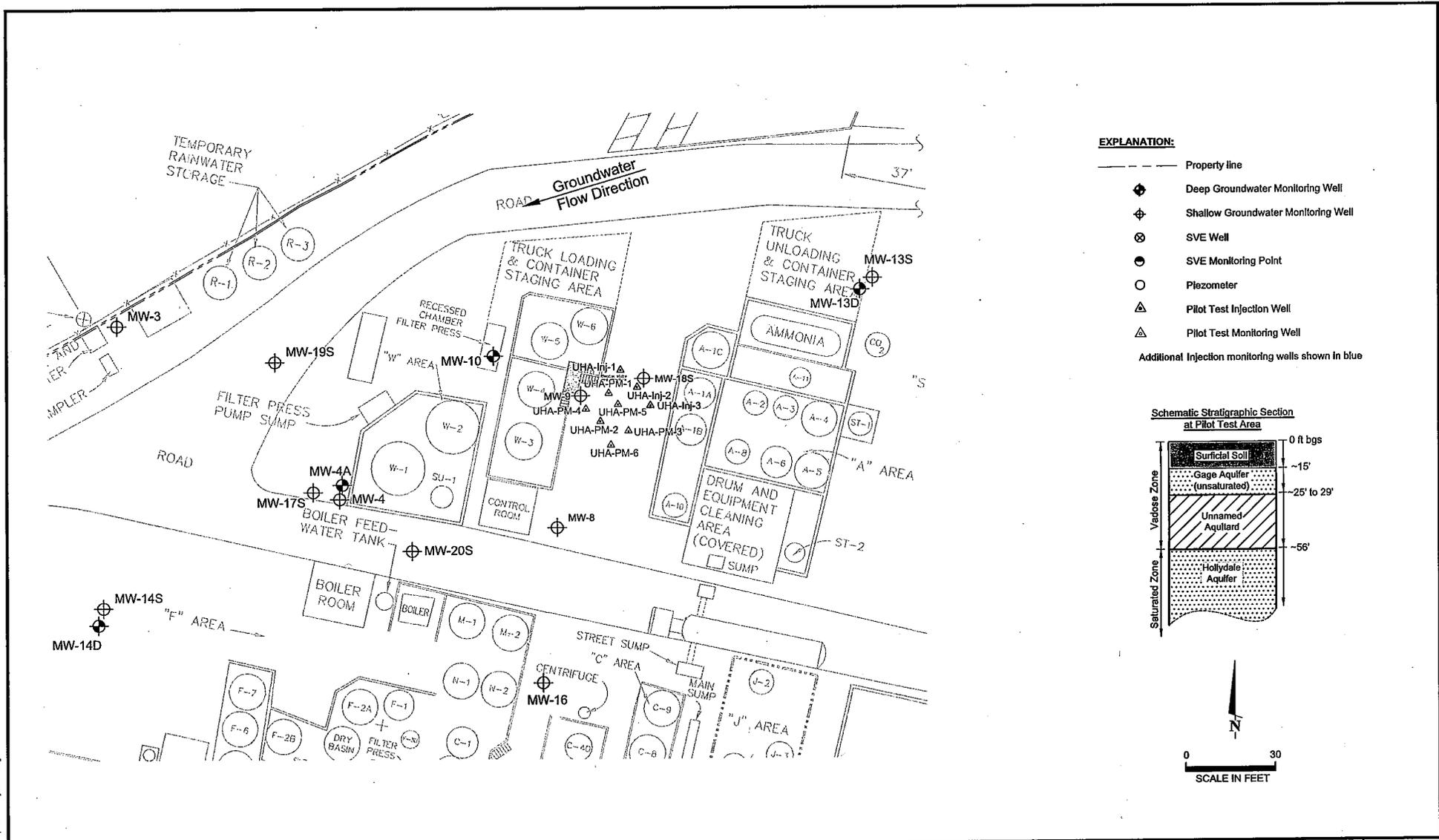
Pilot Test Area
 Phibro-Tech, Inc.
 8851 Dice Road
 Santa Fe Springs, California

Figure
2

Drafter: EC

Date: 10/13/09

Contract Number: 06-441-B

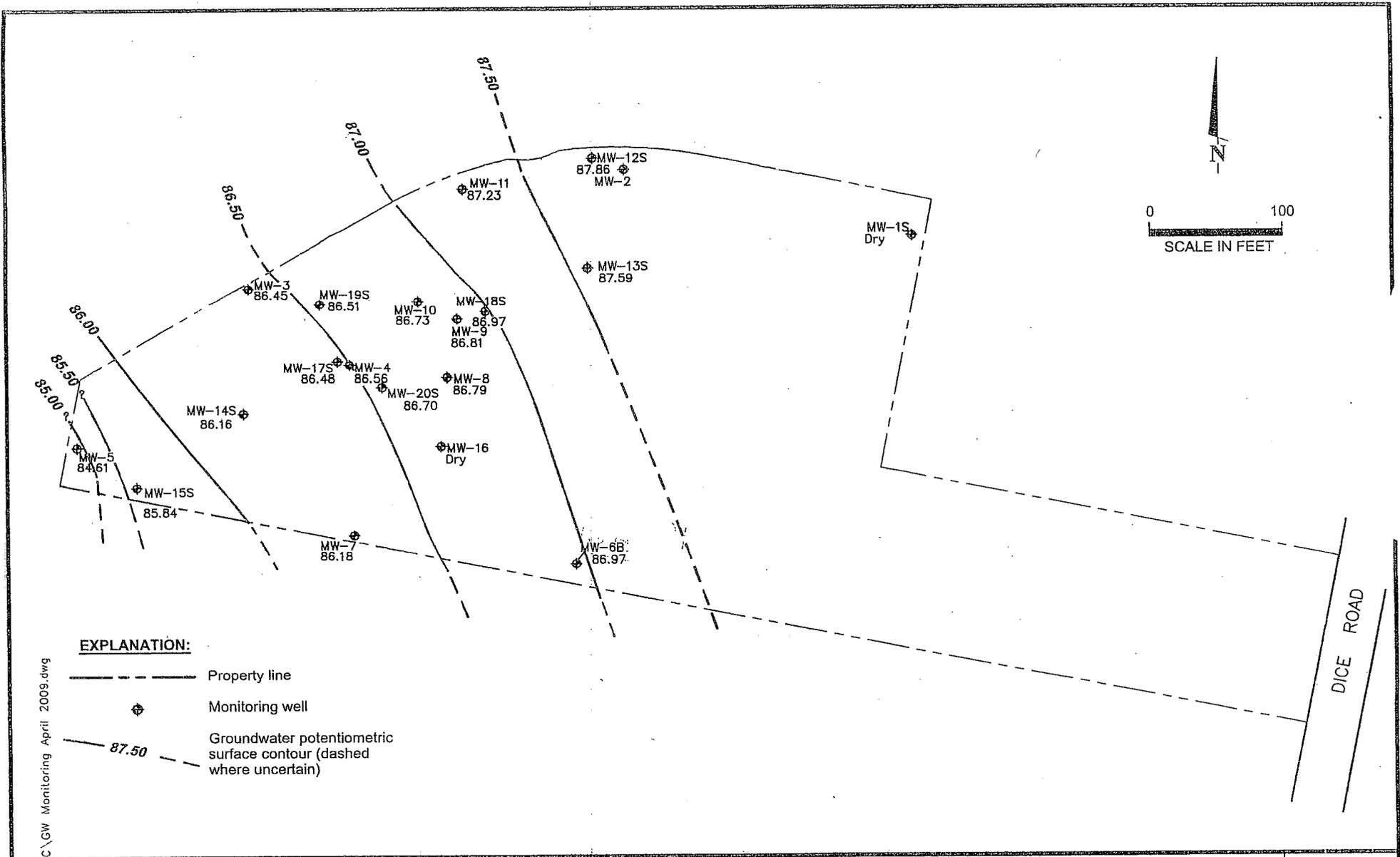


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IRIS ENVIRONMENTAL
 1438 Webster Street, Suite 302
 Oakland, California 94612
 Ph. (510) 834-4747 Fax: (510) 834-4199

Upper Hollydale Aquifer Injection Pilot Test - Monitoring Locations
 Phibro-Tech, Inc.
 8851 Dice Road
 Santa Fe Springs, California

Figure
3

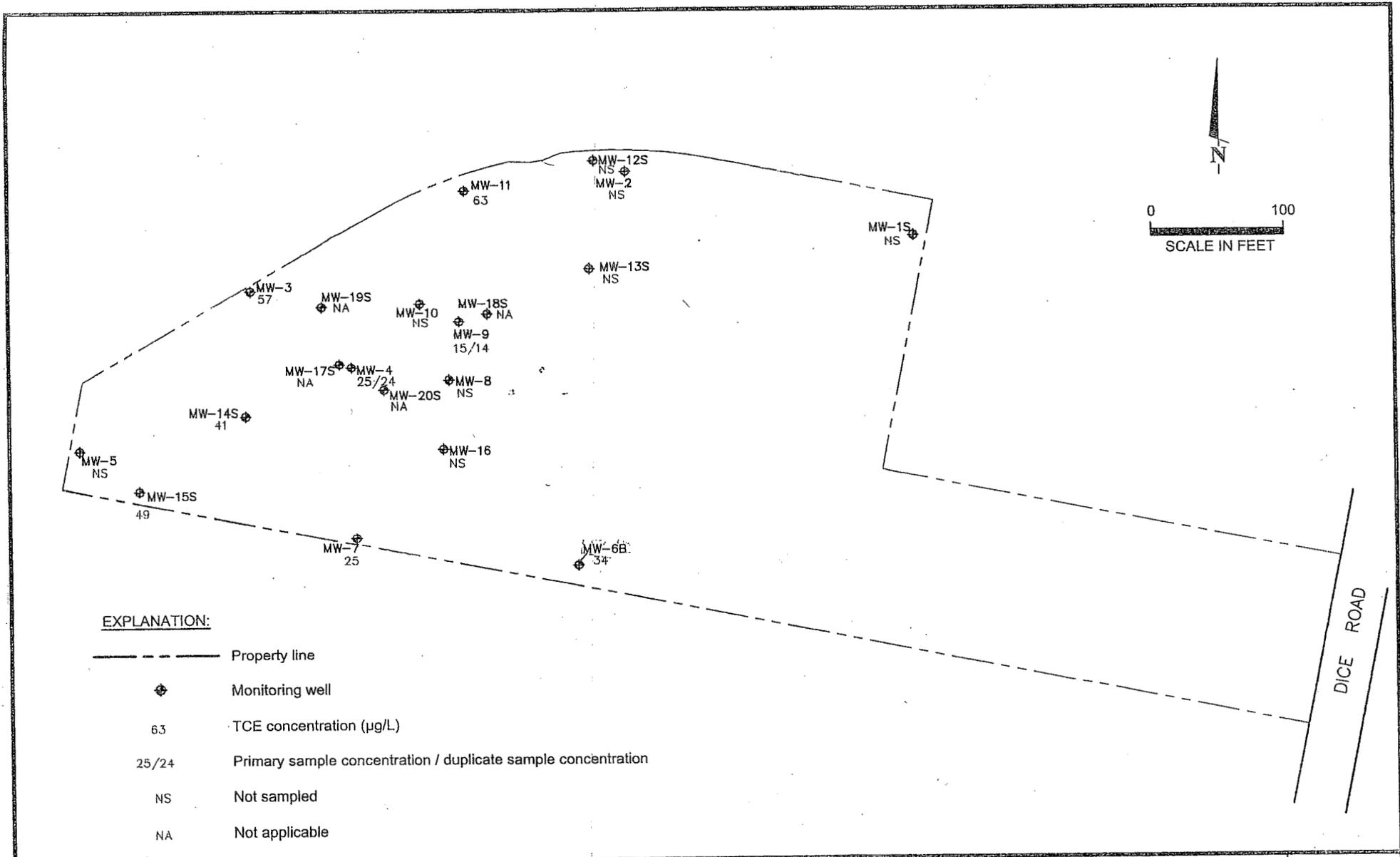


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IRIS ENVIRONMENTAL
 1438 Webster Street, Suite 302
 Oakland, California 94612
 Ph. (510) 834-4747 Fax: (510) 834-4199

Groundwater Potentiometric Surface - Upper Hollydale Aquifer
April 2009
 Phibro-Tech, Inc. - Santa Fe Springs, California

Figure
4



EXPLANATION:

- Property line
- ⊕ Monitoring well
- 63 TCE concentration (µg/L)
- 25/24 Primary sample concentration / duplicate sample concentration
- NS Not sampled
- NA Not applicable

IRIS ENVIRONMENTAL
 1438 Webster Street, Suite 302
 Oakland, California 94612
 Ph. (510) 834-4747 Fax: (510) 834-4199

TCE Concentrations - Upper Hollydale Aquifer
April 2009
 Phibro-Tech, Inc. - Santa Fe Springs, California

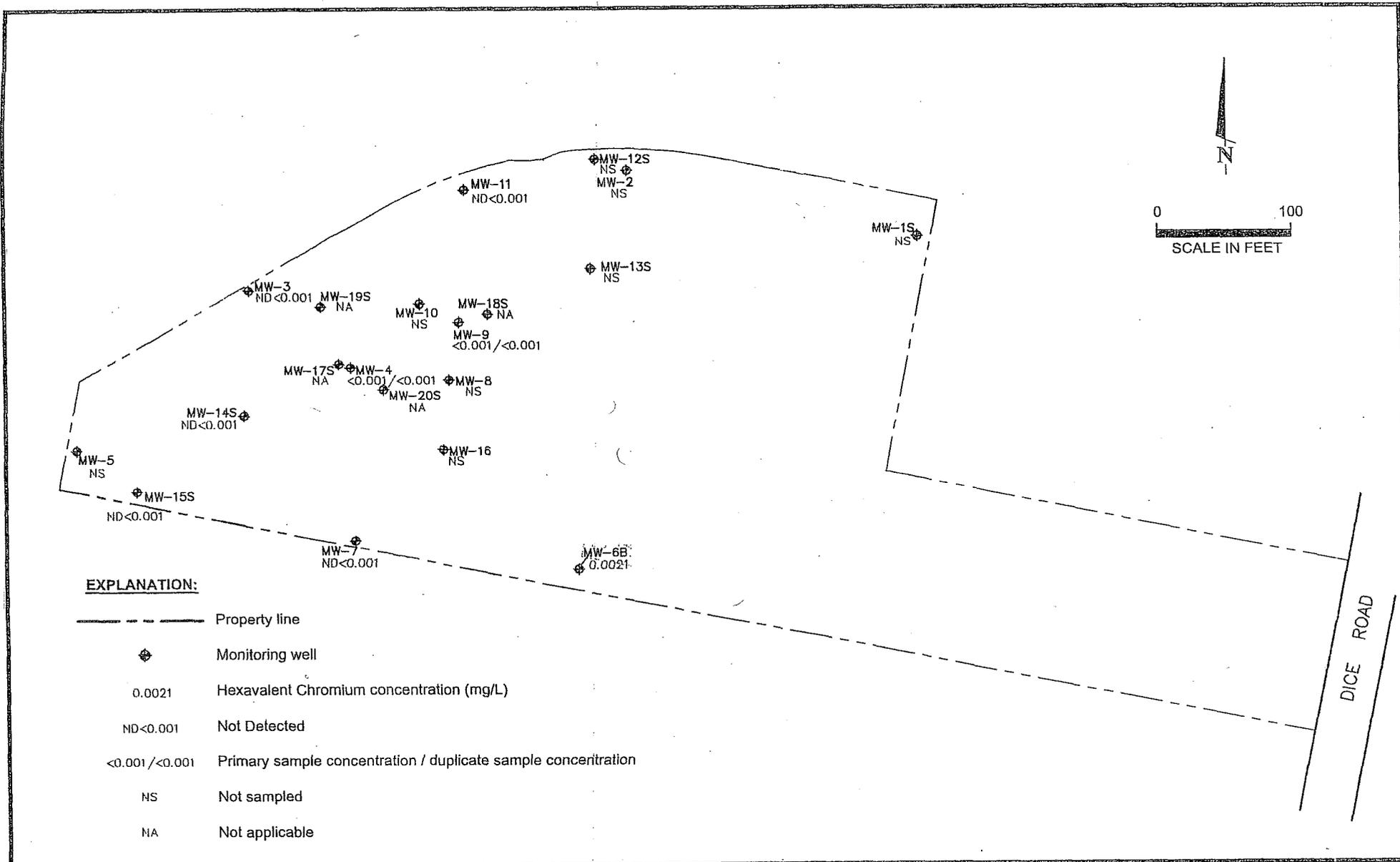
Figure

5

Drafter: EC

Date: 05/07/09

Contract Number: 06-441-C



IRIS ENVIRONMENTAL
 1438 Webster Street, Suite 302
 Oakland, California 94612
 Ph. (510) 834-4747 Fax: (510) 834-4199

Hexavalent Chromium Concentrations - Upper Hollydale Aquifer
April 2009
 Phibro-Tech, Inc. - Santa Fe Springs, California

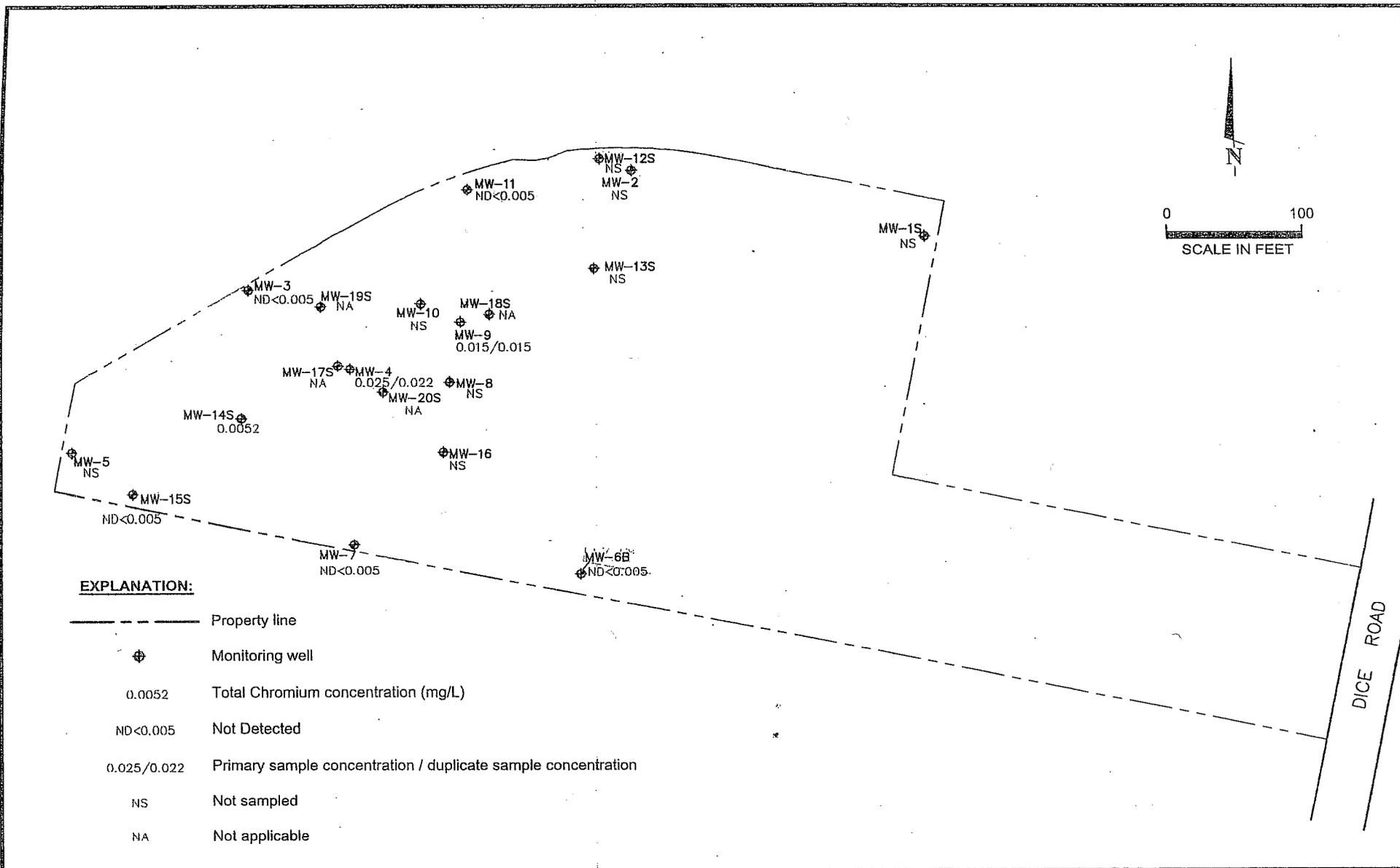
Figure

6a

Drafter: EC

Date: 05/07/09

Contract Number: 06-441-C



IRIS ENVIRONMENTAL
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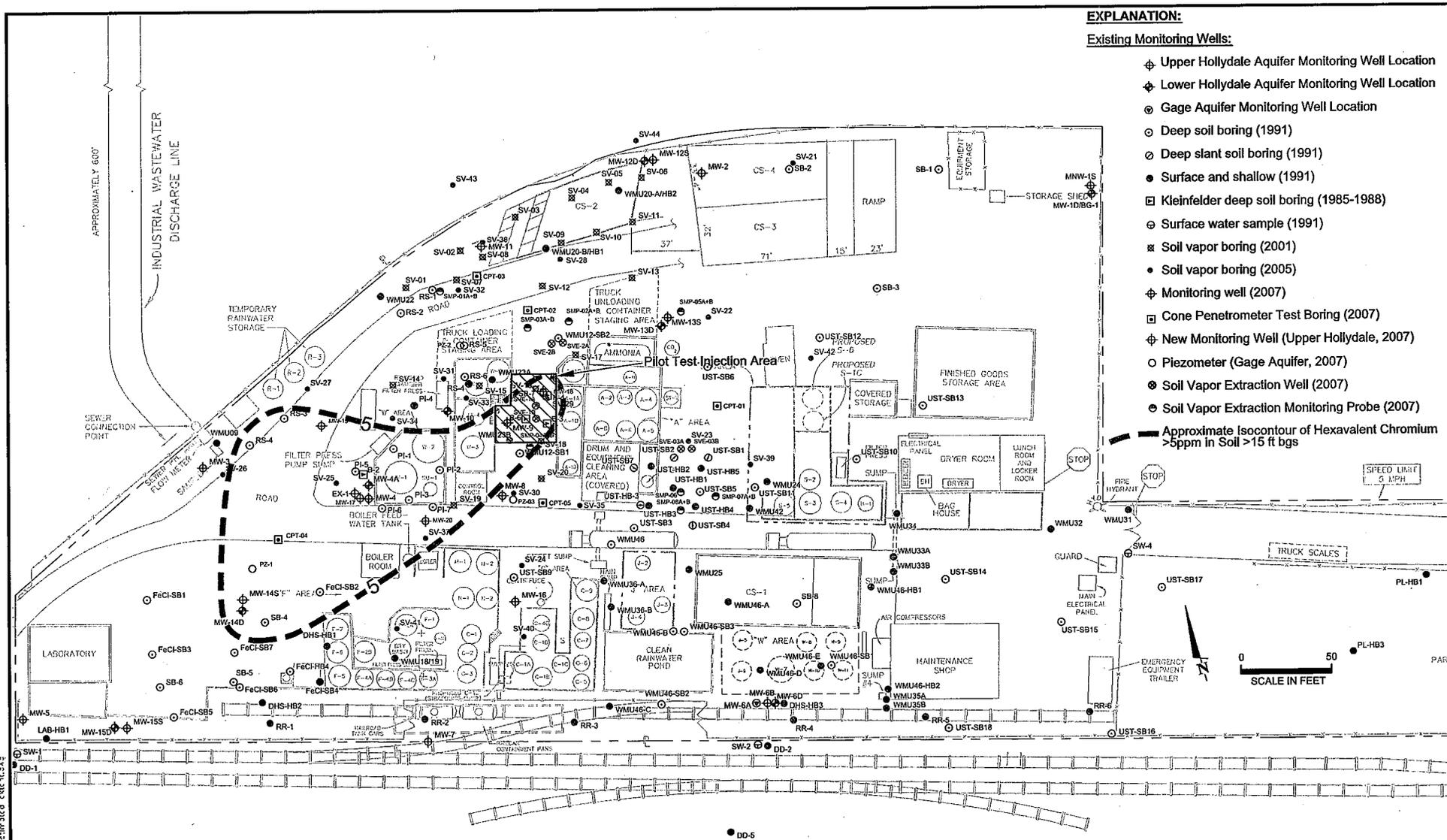
Total Chromium Concentrations - Upper Hollydale Aquifer
April 2009
 Phibro-Tech, Inc. - Santa Fe Springs, California

Figure
6b

Drafter: EC

Date: 05/07/09

Contract Number: 06-441-C



EXPLANATION:

Existing Monitoring Wells:

- ⊕ Upper Hollydale Aquifer Monitoring Well Location
- ⊕ Lower Hollydale Aquifer Monitoring Well Location
- ⊙ Gage Aquifer Monitoring Well Location
- Deep soil boring (1991)
- Deep slant soil boring (1991)
- Surface and shallow (1991)
- ⊠ Kleinfelder deep soil boring (1985-1988)
- ⊙ Surface water sample (1991)
- ⊠ Soil vapor boring (2001)
- Soil vapor boring (2005)
- ⊕ Monitoring well (2007)
- ⊕ Cone Penetrometer Test Boring (2007)
- ⊕ New Monitoring Well (Upper Hollydale, 2007)
- Piezometer (Gage Aquifer, 2007)
- Soil Vapor Extraction Well (2007)
- Soil Vapor Extraction Monitoring Probe (2007)

— Approximate Isocontour of Hexavalent Chromium >5ppm in Soil >15 ft bgs

IRIS ENVIRONMENTAL
 1438 Webster Street, Suite 302
 Oakland, California 94612
 Ph. (510) 834-4747 Fax: (510) 834-4199

Estimated Extent of Hexavalent Chromium in Soil below 15'
 Phibro-Tech, Inc.
 8851 Dice Road
 Santa Fe Springs, California

Figure
6C

Drafter: EC

Date: 10/15/09

Contract Number: 06-441-F

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

**ORDER NO. R4-2007-0019
REVISED GENERAL WASTE DISCHARGE REQUIREMENTS
FOR
GROUNDWATER REMEDIATION AT PETROLEUM HYDROCARBON FUEL, VOLATILE
ORGANIC COMPOUND AND/OR HEXAVALENT CHROMIUM IMPACTED SITES
(FILE NO. 01-116)**

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

1. Pursuant to Division 7 of the California Water Code, this Regional Board at a public hearing held on January 24, 2002, adopted the General Waste Discharge Requirements (WDRs) (Order No. R4-2002-0030) relative to the groundwater remediation at petroleum hydrocarbon fuel and/or volatile organic compound impacted sites. Subsequent to adoption of the initial general waste discharge requirements (WDRs), these WDRs have been revised to include the use of ozone as a treatment compound and the application and use of trace materials.
2. Since then, however, at sites throughout Los Angeles County, monitoring and municipal production wells have become polluted with dissolved hexavalent chromium. From the Pacoima – Sunland area in the northeastern San Fernando Valley to the basin's narrows in City of Los Angeles and from the northern edge of Central Basin to Long Beach, hexavalent chromium releases have threatened or have directly impacted monitoring or municipal supply wells.
3. Table I (Attachment A) of Order R4-2007-0019 includes a list of materials that can be used for in-situ remediation purposes. Newly added remedial compounds for in-situ reduction are calcium polysulfide, ferrous sulfate, sodium dithionite, and bioremediation agents such as molasses, lactose, cheese whey or starch and emulsified oil have demonstrated that they can effectively convert hexavalent chromium to chromium III, a less toxic and more stable compound. In addition, activated persulfate (KlozurTM) for chemical oxidation has proven to be effective for the remediation of petroleum impacted sites. The revised general WDRs are to include the above to the list of materials approved for in-situ remediation zone treatment purposes and include a brief list of tracer materials that can be utilized at sites to aid in determination of the effectiveness of clean up material application.

4. The California Water Code (CWC), section 13260, subdivision (a)(1) requires that any person discharging wastes, or proposing to discharge wastes other than into a community waste water collection system, which could affect the quality of the waters of the State, shall file a Report of Waste Discharge with the Regional Board. The Regional Board shall then prescribe requirements for the discharge or proposed discharge of wastes.
5. Section 13263, subdivision (i) of the CWC provides that a Regional Board may prescribe general waste discharge requirements for discharges produced by similar operations, involving similar types of wastes, and requiring similar treatment standards.
6. The adoption of general WDRs for in-situ groundwater remediation/cleanup or the extraction of polluted groundwater with above ground treatment and the return of treated groundwater to the same aquifer zone would: a) simplify the application process for dischargers, b) allow more efficient use of Regional Board staff time, c) reduce Regional Board time by enabling the Executive Officer to notify the discharger of the applicability of the general WDRs, d) enhance the protection of surface water quality by eliminating the discharge of wastewater to surface waters, and e) provide a level of protection comparable to individual, site-specific WDRs.
7. Petroleum hydrocarbon fuel, volatile organic compound and hexavalent chromium contaminated groundwater at various sites throughout the Los Angeles region and cause or threaten to cause adverse impacts to existing and potential beneficial uses of the region's groundwater resources. Remediation/cleanup of groundwater at these sites includes the use and application of chemical, biological, and physical treatment processes, such as, chemical oxidation, chemical reduction, oxygen enhanced process, nutrient or chemical addition for enhanced biodegradation, or groundwater pump and treat technology with the return of treated groundwater to the same aquifer zone in some cases.
8. The application of any material to groundwater may result in unintended adverse impacts to groundwater quality. Any potential adverse water quality impacts that may result will be localized, of short-term duration, and will not impact any existing or prospective beneficial uses of groundwater. Groundwater quality will be monitored before addition of any materials, during treatment, and after treatment is completed to verify no long-term adverse impact to water quality.
9. The implementation of in-situ cleanup may require a small-scale pilot testing program or demonstration study prior to the design and implementation of a full-scale remediation project. The discharges from the pilot test programs or demonstration study are also covered under these general WDRs.

- 10 The Regional Board adopted a revised Water Quality Control Plan (Basin Plan) for the Los Angeles Region on June 13, 1994. The Basin Plan contains water quality objectives and lists the beneficial uses of groundwater in the Los Angeles region. Beneficial uses of groundwater in the Los Angeles region include, among others: municipal and domestic supply, industrial service and process supply, agricultural supply and groundwater recharge. Beneficial uses for individual hydrologic sub-areas are specified in the Basin Plan. See Attachment B Table 3-10 water quality objectives for selected constituents in regional groundwaters.
- 11 The release of petroleum hydrocarbon fuel, volatile organic compounds and hexavalent chromium, at many sites within the Los Angeles region affects only shallow groundwater sources. Many of the shallow groundwater zones contain general mineral content (total dissolved solids, chloride, and sulfate, etc.) in concentrations, which are considered to be naturally occurring and not the result of pollution that may exceed Basin Plan Objectives for these constituents. Treated groundwater that exhibits general mineral content that are naturally occurring and exceeds Basin Plan Objectives may be returned to the same groundwater formations from which it is withdrawn, with concentrations not exceeding the original background concentrations for the site.
12. Treated groundwater that exhibits general mineral content that is naturally occurring and exceeds Surface Water Basin Plan Objectives must be treated if discharged into surface waters under a separate National Pollutant Discharge Elimination System (NPDES) Permit.
13. The general WDRs are applicable to groundwater remediation projects at, petroleum hydrocarbon fuel, volatile organic compound and hexavalent chromium impacted sites. Depending on the Report of Waste Discharge, the Executive Officer determines the annual fee based on the threat to water quality and complexity of the discharge. The general WDRs are to regulate groundwater discharges that have a threat to water quality of Category 3 and Complexity rating of A for a combined rating of 3-A.
14. Discharges with a rating of 3-A contain pollutants that could degrade water quality or cause a minor impairment of designated beneficial uses within the application area of the receiving groundwater. The discharges covered by these requirements will have a groundwater monitoring program to comply with requirements prescribed in this Order.
15. The requirements contained in this Order were established by considering, and are consistent with, all the water quality control policies, plans, and regulations mentioned above and, if they are met, will protect and maintain the existing beneficial uses of the receiving groundwater.
16. The permitted discharge is consistent with the antidegradation provisions of State Water Resources Control Board Resolution No. 68-16 (Anti-degradation Policy). The impact on

existing water quality will not be significant in comparison to individual WDRs, and the general WDRs will improve the quality of the affected groundwater.

17. These general WDRs are not intended to alter or supersede any existing restrictions or working arrangements relating to cleanup cases with local governmental agencies.
18. In accordance with the Governor's Executive Order requiring any proposed activity be reviewed to determine whether such activity will cause additional energy usage, this Regional Board has determined that implementation of these general WDRs will not result in a change in energy usage exceeding what would be used if site-specific WDRs were issued for cleanup at these sites.
19. The Regional Board has prepared an Initial Study and Mitigated Negative Declaration for the issuance of these general WDRs in accordance with the provisions of the California Environmental Quality Act (CEQA).
20. The Regional Board has notified interested agencies and persons of its intent to prescribe general WDR's for the discharges covered under these general WDRs, and has provided them with an opportunity to submit their written views and recommendations for the requirements.
21. The Regional Board, in a public meeting, heard and considered all comments pertaining to the tentative general WDRs.

IT IS HEREBY ORDERED THAT dischargers authorized under this Order shall meet the provisions contained in Division 7 of the California Water Code, and regulations adopted here under, by complying with the following:

A. ELIGIBILITY

1. A discharger may seek coverage under this Order for:
 - a. existing and future discharges to groundwater of remediation compounds from the cleanup of petroleum hydrocarbon fuel, volatile organic compound and/or hexavalent chromium impacted sites and similar discharges.
 - b. re-injection, percolation or infiltration of treated groundwater from a pump and treat remediation system(s).
2. To be covered under this Order, a discharge must meet the following criteria:
 - a. The Executive Officer must find, based on the Report of Waste Discharge submitted pursuant to Provision C, that the groundwater discharges for which coverage under this Order are sought have a threat to water quality of Category 3

and Complexity rating of A for a combined rating of 3-A, using the rating criteria noted (see on the Regional Board website at:
[http://www.waterboards.ca.gov/losangeles/html/permits/fee_schedule/fee%20schedules%20\(2004-005\).pdf](http://www.waterboards.ca.gov/losangeles/html/permits/fee_schedule/fee%20schedules%20(2004-005).pdf)

- b. The discharger must have an approved Remediation Action Plan (RAP). The discharger shall submit a copy of the approved RAP including any conditions of implementation with the Report of Waste Discharge for application of the general WDRs. At a minimum, the RAP shall include the following site-specific information:
- The background water quality of the aquifer of the groundwater remediation site(s) including contaminant types, total dissolved solids, sulfates, chlorides, nitrogen (NH₄, NO₃, NO₂), chemical oxygen demand, biological oxygen demand, phosphorus, pH, dissolved metals, nutrients, dissolved oxygen, dissolved carbon dioxide, methane, temperature, iron, and oxidation-reduction potential;
 - Information on any potential adverse impacts to groundwater quality, and whether the impacts will be localized and short-term;
 - The results of any pilot testing performed for the treatment technology to be used;
 - Site-specific geology (lithology and physical parameters) and hydrogeologic parameters, hydrologic report;
 - Infiltration rate;
 - Characterization and extent of petroleum hydrocarbon fuel, volatile organic compound and hexavalent chromium plume(s);
 - Description of the treatment system(s);
 - Adequate groundwater monitoring network with historical groundwater monitoring report;
 - Description of the aerial extent of the application area and identification of monitoring wells to be used to determine water quality upgradient, within the application area, downgradient from the application area and identify the compliance point;
 - Material Safety Data Sheet (MSDS) information and other product technical information for any materials to be used for cleanup;
 - Application rate(s), material type(s) and applied concentrations; and
 - Evaluation of loading rates for nitrogen compounds, total dissolved solids, sulfate, and chloride compounds.

- c. The General Waste Discharge Requirements would allow the following materials to be used for in-situ remediation purposes:

1. Oxidation/Aerobic Degradation Enhancement Compounds:

- Fenton's reagent (hydrogen peroxide, ferrous iron catalyst, and pH buffer)
- Hydrogen peroxide
- Potassium or sodium permanganate
- Oxygen release compound (ORC) magnesium peroxide
- Ozone
- Activated Persulfate (Klozur™)

2. Reducing/Reductive Degradation Enhancement Compounds (Table I):

- Calcium Polysulfide (Inorganic)
- Ferrous Sulfate (Inorganic)
- Ferrous Chloride (Inorganic)
- Sodium Dithionite (Inorganic)
- Zero-valent iron (Inorganic)
- Bio-remediation (Organic) using:
 - Molasses,
 - Lactose,
 - Cheese Whey and/or
 - Starch
 - Sodium Lactate
 - Ethanol
 - Emulsified Oil
 - Corn Syrup
 - Hydrogen Release Compound (HRC)–{proprietary}

3. Inorganics/Nutrients:

- Nitrate, ammonia, phosphate, vitamins

4. Carbon Sources/Electron Donors:

- Acetate, lactate, propionate, benzoate, oleate, ethanol, propanol, methanol, glucose, complex sugars such as molasses or corn syrup, other food process byproducts such as milk whey or yeast extract, other complex organic material such as wood chips

5. Study tracer compounds:

- The tracer compounds shall be highly contrast and not reactive with current contaminants to be treated. The tracers may be chloride-based and bromide-based salts, such as sodium-flouroscein, calcium chloride, sodium chloride, calcium bromide, sodium bromide, potassium bromide, potassium, iodide, Rhodamine WT, rhodamine (D), eosine, and fluoride salts, or similar materials as approved by the Executive Officer.
3. In applying these general WDRs, the monitoring program shall address changes in geochemistry that may alter the potential occurrence of transference of chromium (III) into chromium (VI), or vice versa, during the oxidation or reduction process in the in-situ remediation under these WDRs.
 4. For the purpose of renewal of existing individual requirements with these general WDRs, provided that all the conditions of these general WDRs are met, renewal is effective upon issuance of a notification by the Executive Officer and issuance of a new monitoring and reporting program.
 5. When the individual WDRs with more specific requirements are issued to a discharger, the applicability of this Order to that discharger is automatically terminated on the effective date of the individual WDRs.

B. AUTHORIZATION

To be authorized to discharge under this Order, the discharger must submit a Report of Waste Discharge in accordance with the requirements of Part C of this Order. Upon receipt of the application, the Executive Officer shall determine the applicability of this Order to such a discharge and the completeness of the application package. If the discharge is eligible, the Executive Officer shall notify the discharger that the discharge is authorized under the terms and conditions of this Order and prescribe an appropriate monitoring and reporting program. For new discharges, the discharge shall not commence until receipt of the Executive Officer's written determination and the discharger receives general WDRs to include a site specific monitoring and reporting program.

C. REPORT OF WASTE DISCHARGE

1. Deadline for Submission

- a. Renewal of permits of existing dischargers covered under individual WDRs that meet the eligibility criteria in Part A and have submitted Report of Waste Discharge will consist of a letter of determination from the Executive Officer of coverage under this Order.
 - b. New dischargers shall file a complete application to include all information identified in Items A1, A2 and as above at least 60 days before planned commencement of any discharge.
2. Forms for Report of Waste Discharge
- a. Dischargers shall use the appropriate forms (Standard Form 200) or equivalent forms approved by the State Water Resources Control Board or the Executive Officer of the Los Angeles Regional Board.
 - b. The discharger, upon request, shall submit any additional information that the Executive Officer deems necessary to determine whether the discharge meets the criteria for coverage under this Order, and/or in prescribing an appropriate monitoring and reporting program.
 - c. The Report of Waste Discharge shall be accompanied by the first annual fee (if appropriate) in accordance with the current version of California Code of Regulation, Title 23, Division 7, Chapter 9, Waste Discharge Report and Requirements Article 1 fees for a discharge. The check or money order shall be made payable to the "State Water Resources Control Board."

D. DISCHARGE PROHIBITIONS

1. The discharge of wastes other than those which meet eligibility requirements in Part A of this Order is prohibited unless the discharger obtains coverage under another general permit or an individual site specific permit that regulates the discharge of such wastes.
2. The discharge of any radiological, chemical, or biological warfare agent or high level radiological waste is prohibited.
3. Creation of a pollution, contamination, or nuisance, as defined by section 13050 of the California Water Code (CWC), is prohibited.
4. The surfacing as overflow of wastes from the treatment system at any time and at any location is prohibited.

5. The disposal of wastes in geologically unstable areas or so as to cause earth movement is prohibited.

E. DISCHARGE LIMITATIONS

1. The discharge of wastes shall not cause the pH of the receiving groundwater at the compliance point, downgradient outside the application area, beyond the range of 6.5 and 8.5.
2. The discharge of wastes shall not cause the mineral constituents of the receiving groundwater at the compliance point, downgradient outside the application area, in excess of applicable limits given in Attachment B. In the letter of determination, the Executive Officer shall indicate the groundwater limitations in Attachment B applicable to the particular discharge, and identify the compliance point(s) for the site.
3. The discharge of wastes shall not cause the concentrations of chemical constituents and radionuclides of the receiving groundwater designated for use as domestic or municipal supply at the compliance point, downgradient outside the application area, in excess of the Maximum Contaminate Levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into the Basin Plan: Table 64431-A of section 64431 (inorganic chemicals), Table 64431-B of section 64431 (fluoride), Table 64444-A of section 64444 (organic chemicals), and Table 4 of section 64443 (radioactivity). This incorporation by reference is prospective including future changes to the incorporated provisions as the changes take effect.
4. Waste discharged shall not cause the concentration of coliform organisms over any seven days period greater than 1.1/100ml.
5. Waste discharged shall not contain salts, heavy metals, or organic pollutants at levels that would cause receiving groundwater at the compliance point, downgradient outside the application area, to exceed the water quality objectives for groundwater or groundwater that may be in hydraulic connection with surface waters designated for marine aquatic life or body contact recreation.
6. Waste discharged shall not cause the groundwater to contain concentrations of chemical substances or its by-products in amounts that adversely affect any designated beneficial use, outside the application area or treatment zone at the compliance point(s).