California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

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Arnold Schwarzenegger
Governor

October 26, 2006

John Cullinane, Ph.D., P.E.
U.S. Army Research & Development Center
CEERD-EM-J – 3909 Halls Ferry Road
Vicksburg, MS 39180

WASTE DISCHARGE REQUIREMENTS FOR TECHNOLOGY DEMONSTRATION TO EVALUATE BIOREMEDIATION OF PERCHLORATE IN AREA 11 ALLUVIAL GROUNDWATER - FORMER WHITTAKER-BERMITE FACILITY, SANTA CLARITA, CALIFORNIA (FILE NO. 06-114)

Dear Dr. Cullinane:

Pursuant to Division 7 of the California Water Code, this Regional Board at a public hearing held on October 24, 2006, reviewed the tentative requirements, considered all factors in the case, and adopted Order No. R4-2006-0076 (copy attached) relative to this waste discharge. Section 13263 (e) of the California Water Code provides that all Requirements shall be reviewed periodically and, upon such review, may be revised by the Regional Board.

The "Monitoring and Reporting Program" requires you to implement the monitoring program on the effective date of this Order. 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-9195 and Order No. R4-2006-0076, 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.

Please call Mr. Peter Raftery at (213) 576-6724, or Dr. Arthur Heath at (213) 576-6725 if you have any questions.

Sincerely,

David A. Bachowski, AEO
Jonathan Bishop
Executive Officer

Enclosures: Monitoring and Reporting Program CI-9195
Waste Discharge Requirements Order No. R4-2006-0076
Resolution No. R06-019

cc: See Mailing List next page

Environmental Protection Agency, Region 9, Permits Branch (WTR-5)
John Youngerman, State Water Resources Control Board, Division of Water Quality
Department of Fish and Game, Region 5
Kurt Souza, State Department of Health Services, Drinking Water Field Operations Branch
Jose Diaz, Department of Toxic Substances Control, Glendale
Eric Lardiere, Esq., Simi Valley
Lisa Hardy, Santa Clarita
David Lippincott, Shaw Environmental, Inc., Lawrenceville
Paul Hatzinger, Shaw Environmental, Inc., Lawrenceville

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. R4-2006-0076

WASTE DISCHARGE REQUIREMENTS FOR THE ARMY CORP OF ENGINEERS TECHNOLOGY DEMONSTRATION FOR PERCHLORATE IN SHALLOW GROUNDWATER AT AREA 11 OF THE FORMER WHITTAKER-BERMITE SITE

(FILE NO. 06-114)

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

1. The Army Corp of Engineers (hereafter Discharger) has filed a Report of Waste Discharge and applied for Waste Discharge Requirements (WDR) to use an amendment consisting of citric acid and diammonium phosphate solutions to bioremediate perchlorate in shallow groundwater through reductive decomposition to environmentally acceptable compounds at the Technology Demonstration site in Area 11. The Department of Toxic Substances Control (DTSC) is the lead agency for the site. The Regional Board is providing the WDR for the technology demonstration.

2. The Site encompasses approximately 4,000 square feet within the former Whittaker-Bermite property. The Whittaker-Bermite property consists of 996 acres of land and is located at 22116 Soledad Canyon Road, Santa Clarita, California, in Assessor's Parcel Number 2836-012-011 (Latitude 34° 24' 46.96" North, Longitude 118° 31'09.15" West, see Figure 1). The site is located in an undeveloped area. The property was first subdivided in 1912. From 1934 to 1936, the Bermite facility was used to manufacture dynamite under the ownership of the L.A. Powder Company. The Halifax Explosives Company manufactured fireworks there from 1936 to 1942. In 1939, Golden State Fireworks also manufactured fireworks at the facility. In 1942, E.P. Halliburton manufactured oil field explosives there. Production by the Bermite Powder Company occurred from 1942 to 1967, and included flares, explosives, detonators, fuses, boosters, coated magnesium, and stabilized red phosphorus. In 1967, Whittaker took ownership of the property. Whittaker manufactured 20-millimeter (mm) and 30-mm cannon shells, detonators, fuses, boosters, flares, signal cartridges, tracers, pyrophoric pellets, rocket motors, torpedo gas generators, oil filed explosives, JATO boosters, and artillery and missile main explosive charges. The current owner Santa Clarita LLC plans to redevelop the property and build more than 2900 dwelling units and associated retail, office, and commercial buildings.

3. Environmental investigations began at the site in 1981. Soil and groundwater contamination are widespread at the site. The primary contaminants are perchlorate, perchloroethene (PCE), and trichloroethene (TCE). The contamination is associated with open burn areas, subgrade explosive detonation areas, chemical storage and handling areas, manufacturing areas, waste pipelines, and clarifiers.

4. Shallow groundwater beneath the Site is first encountered at approximately 25 to 30 feet below ground surface, this is in alluvial material, resting on bedrock. Bedrock occurs approximately 150 feet below grade. The shallow alluvial aquifer is comprised primarily of sand and gravel. The alluvium has relatively high hydraulic conductivity and the underlying bedrock has relatively low hydraulic conductivity.

5. The Discharger has conducted a comprehensive site-wide soil and groundwater investigation, with numerous soil borings and monitoring wells. The demonstration area represents a very small portion of the site (less that 0.1-acre of 996 acres). There are 18 monitoring wells in the 4,000 square feet of the demonstration area (Figures 2 and 3). Groundwater sampling began at the site in the early 1990s.

6. In the demonstration area the primary contaminant detected in soil and groundwater is perchlorate. In the demonstration area the concentration of perchlorate in groundwater ranges from 240 micrograms per liter (µg/L) to 670 µg/L. Recent perchlorate and other analyte data for groundwater are shown on Figure 4.

7. The Discharger has implemented numerous soil remedial activities at the 996-acre facility under the direction of the DTSC.

8. There are 4 water supply wells within approximately 1 mile of the Site. Several of the wells have been impacted with perchlorate from the site. The technology being demonstrated under this WDR is a technology that may be used to help restore the aquifer.

9. The Discharger proposes to conduct a perchlorate in groundwater remediation technology demonstration. Prior to the technology demonstration, a 6-week, sodium bromide tracer test will be conducted. The tracer test will involve injection of approximately 702,000 gallons of 20 milligram per liter (mg/L) sodium bromide solution into the shallow alluvial aquifer. An 18-week technology demonstration will follow the tracer test. The technology demonstration involves the recirculation of groundwater and the injection of amendments, including citric acid (citrate) and nutrients (i.e., diammonium phosphate). The amendments will be added to groundwater extracted from two extraction wells (EW-1 and EW-2) and re-injected into a single, central, injection well (IW-1). These wells are shown on Figure 3. A conceptual cross section of the process is provided as Figure 5. The extraction and injection wells will be screened from approximately 27 feet below grade (bg) to approximately 107 feet bg, with 10 feet of blank casing backed by well seal from 67 bg to 77 feet bg. Groundwater occurs approximately 28 feet bg. The design extraction rates for each of the extraction wells is 5.8 gallons per minute (gpm) and the design injection rate is 11.6 gpm. During the first 6 weeks of the demonstration, approximately 116,928 gallons of 1,600 mg/L citric acid solution will be injected into groundwater. An additional 116,928 gallons of 1,600 mg/L citric acid solution will be injected during the subsequent 12 weeks. The citric acid solution will be injected in three pulses per day (maximum). Each pulse will be 2 hours long. The design involves extraction and injection wells to be operated in a cycled-manner, with 7 days "on" and 14 days "off". Approximately 106 gallons of diammonium phosphate will be injected over the 18 weeks.

10. The contingency plan, should indications of offsite migration occur, is the operation of the extraction wells at maximum pumping rates, without injection, and the containment of any injected material.

11. The technology demonstration is being conducted as proposed in a February 9, 2006, document titled, *Technology Demonstration Plan-Revised In Situ Bioremediation of Perchlorate in Area 11 Alluvial Groundwater* (Workplan) as approved by the DTSC in a letter dated April 3, 2006. The Regional Board received the Workplan on February 10, 2006, and following discussions with various parties involved with the project, concurred with DTSC's approval in a letter dated June 30, 2006.

12. The Discharger submitted a "Form 200" Report of Waste Discharge (dated May 17, 2006), to the Regional Board for injection of citric acid and diammonium phosphate solution into groundwater at the Site for use in in-situ bioremediation technology demonstration to address perchlorate in the groundwater. The Form 200 was received on May 18, 2006. Supplemental information on the revised location of an upgradient monitoring well was received on June 2, 2006, and the Form 200 was deemed complete by the Regional Board in a letter dated June 22, 2006.

13. The Shaw Environmental, Inc. work plan presents proposed procedures for monitoring the technology demonstration. Evaluation of the injection volume and concentrations, and the frequency of injection will be adjusted based on the results of field monitoring. Groundwater conditions will be monitored during the operation to evaluate the efficiency of the injection.

14. Groundwater will be treated using enhanced in-situ bioremediation as presented in the Shaw Environmental, Inc, workplan. An amendment solution consisting of citric acid and diammonium phosphate will be injected into an areas within Area 11, where it will promote biological reduction of perchlorate. The bioremediation area will be under hydraulic control. The injection well will be between two extraction wells, and it is anticipated that all injected material will be captured by the extraction wells. The contingency plan, should indications of offsite migration occur, is the installation of a hydraulic containment system. The rate of groundwater flow within and down gradient of the technology demonstration area allows for sufficient time to complete design, installation, and implementation of a hydraulic containment system if necessary.

15. Any injection of a solution into the groundwater is a discharge of waste as defined by the California Water Code. However, the discharge of citric acid and diammonium phosphate solution is intended to provide effective remediation of perchlorate-impacted groundwater and is expected to significantly reduce the anticipated site cleanup time as compared to pump-and-treat technology.

16. The application of citric acid and diammonium phosphate amendments to groundwater may result in temporary adverse impacts to groundwater quality, but impacts that may result will be localized, and of short-term duration, and will not impact any existing or prospective uses of groundwater.

17. The Regional Board adopted a revised Water Quality Control Plan for the Los Angeles Region on June 13, 1994. The Plan contains beneficial uses and water quality objectives for the Central Groundwater Basin. The requirements contained in this Order, as they are met, will be in conformance with the goals of the Plan.

18. The beneficial uses for the groundwater in the Santa Clara – Bouquet and San Francisquito portion of the Eastern Santa Clara River Groundwater Basin as municipal and domestic supply, industrial process supply, industrial service supply, and agricultural supply.

19. The permitted discharge is consistent with the anti-degradation provisions of State Water Resources Control Board Resolution No. 68-16 (Anti-degradation Policy). The discharge may result in some localized temporary exceedances of background concentrations total organic carbon total organic carbon, chloride, iron, manganese, phosphorus, arsenic, and total dissolved solids (TDS), and certain microorganisms. However, after the injection of amendments, these parameters are not anticipated to exceed the primary or secondary standards to the extent that these parameters do not already exceed the respective standard. Moreover, 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 uses of such water, and

c. Will not result in water quality less than that prescribed in the Water Quality Control Plan for Central Groundwater Basin.

20. The Regional Board has assumed lead agency role for this project under the California Environmental Quality Act (Public Resources Code section 21000 et seq.) and has conducted an Initial Study in accordance with section 15063 of the "State CEQA Guidelines" at California Code of Regulations, title 14, section 15000 et seq. Based upon the Initial Study, the Regional Board prepared a Mitigated Negative Declaration that the project, as mitigated, will not have a significant adverse effect on the environment.

21. The Regional Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written comments 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 the Army Corp of Engineers, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted there under, shall comply with the following:

A. Discharge Limits

1. The Discharger shall not cause the groundwater outside of the remediation area to exceed background concentrations of chloride and TDS established prior to start of remediation.

2. The discharge of citric acid or diammonium phosphate solution, into the groundwater shall be only performed while this Order is in force.

3. During this remediation, the injected volume of 20 mg/L sodium bromide tracer solution shall not exceed 750,000 gallons, the injected volume of 1,600 mg/L citric acid solution shall not exceed 250,000 gallons, the injected volume of diammonium phosphate shall not exceed 150 gallons, and the injected volume of chlorine dioxide shall not exceed 150 gallons at the Site, unless approved by the Executive Officer.

4. Discharge duration shall not exceed more than 2 years, unless approved by the Executive Officer.

5. The amendment solution shall be limited to potable water, extracted groundwater, amendments specified in the approved Workplan and Form 200, Report of Waste Discharge.

B. Discharge Specifications

1. The Discharger shall stop further addition of amendments to the groundwater if citric acid, diammonium phosphate, sodium bromide, or chlorine dioxide solutions are observed to be migrating off-site. After this control measure has been implemented the remaining amendments in the groundwater will naturally break down, effectively removing the food source and allowing the groundwater system to return to natural conditions.

2. The Discharger shall not cause if citric acid, diammonium phosphate, sodium bromide, or chlorine dioxide solutions, and the by-products of the bioremediation process to migrate outside of the treatment area established by the Discharger and approved by the Executive Officer.

3. The discharge of if citric acid, diammonium phosphate, sodium bromide, or chlorine dioxide solutions solution or any by-products into any surface water or surface water drainage course is prohibited.

4. The Discharger shall not cause the groundwater to contain taste or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses outside the treatment area.

5. The Discharger shall not cause the groundwater to contain concentrations of chemical substances or its by-products, including if citric acid, diammonium phosphate, sodium bromide, or chlorine dioxide solutions in amounts that adversely affect any designated beneficial use as a result of the injection of solution.

6. The Discharger shall implement hydraulic control to prevent off-site migration if necessary.

C. **Provisions**:

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

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

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

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

5. In accordance with section 13260 of the Water Code, the Discharger shall file a report of any material change or proposed change in the character, location or volume of discharge.

6. The Discharger shall notify Regional Board immediately by telephone of any adverse condition resulting from this discharge or from operations producing this waste discharge, such notifications to be affirmed in writing within one week from the date of such occurrence.

7. This Regional Board considers the property operator and owner to have continuing responsibility of correcting any problem that may arise in the future as a result of this discharge.

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

9. The use of a citric acid and diammonium phosphate solutions shall not cause a condition of pollution or nuisance as defined by California Water Code, section 13050.

10. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as specified in the attached Monitoring and Reporting Program No. CI-9195. Violations of any conditions may result in enforcement action, including Regional Board or Court Order requiring corrective action or imposition of civil monetary liability, or revision, or rescission of the Order.

11. This Order does not exempt the Discharger from compliance with any other laws, regulations, or ordinances, which may be applicable. This Order does not legalize the waste treatment Site, and leaves unaffected any further restraints on the Site that may be contained in other statutes or required by other agencies.

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

13. In accordance with section 13263 of the California Water Code, these requirements are subject to periodic review and revision by this Regional Board.

14. 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.

15. The Regional Board, through its Executive Officer, will modify the Monitoring and Reporting Program, as necessary. The California Environmental Quality Act (CEQA) initial study and associated public comment were conducted once as part of the Waste Discharge Requirement (WDR) permit application process and will not be required for the expansion or modification of this remediation program.

D. Expiration Date

This Order expires on October 24, 2011.

The Discharger must file a Report of Waste Discharge in accordance with title 27, California Code of Regulations, not later than 180 days in advance of such date as application for issuance of new waste discharge requirements.

I, Jonathan Bishop, 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, Los Angeles Region on October 24, 2006.

FW David A. Bacharowski, AEO
Jonathan Bishop
Executive Officer

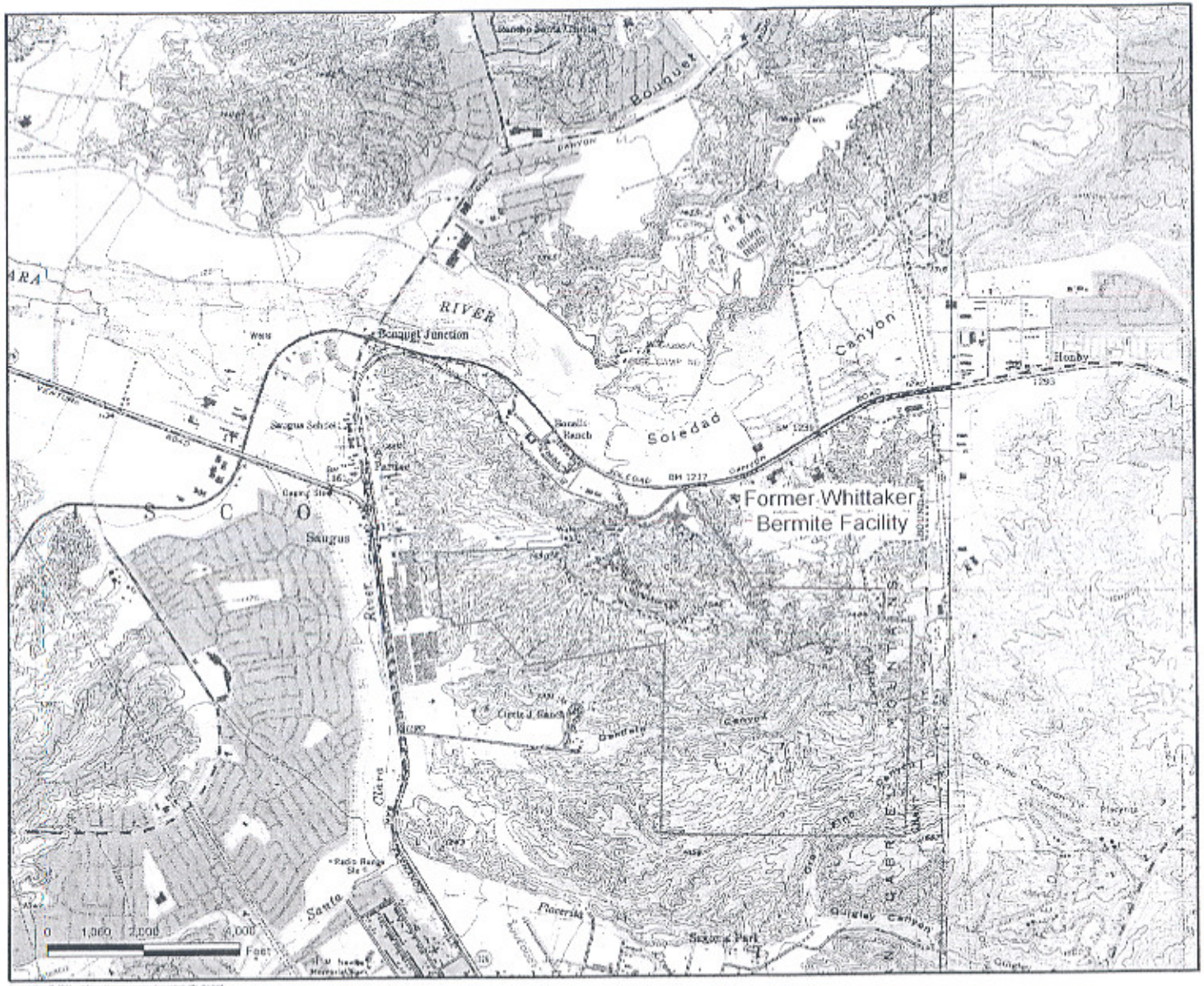

Figure 1

Site Location Map

Former Whittaker Corporation
Bermite Facility
Santa Clarita, California

Note: Topographic image downloaded from TerraServer

Shaw

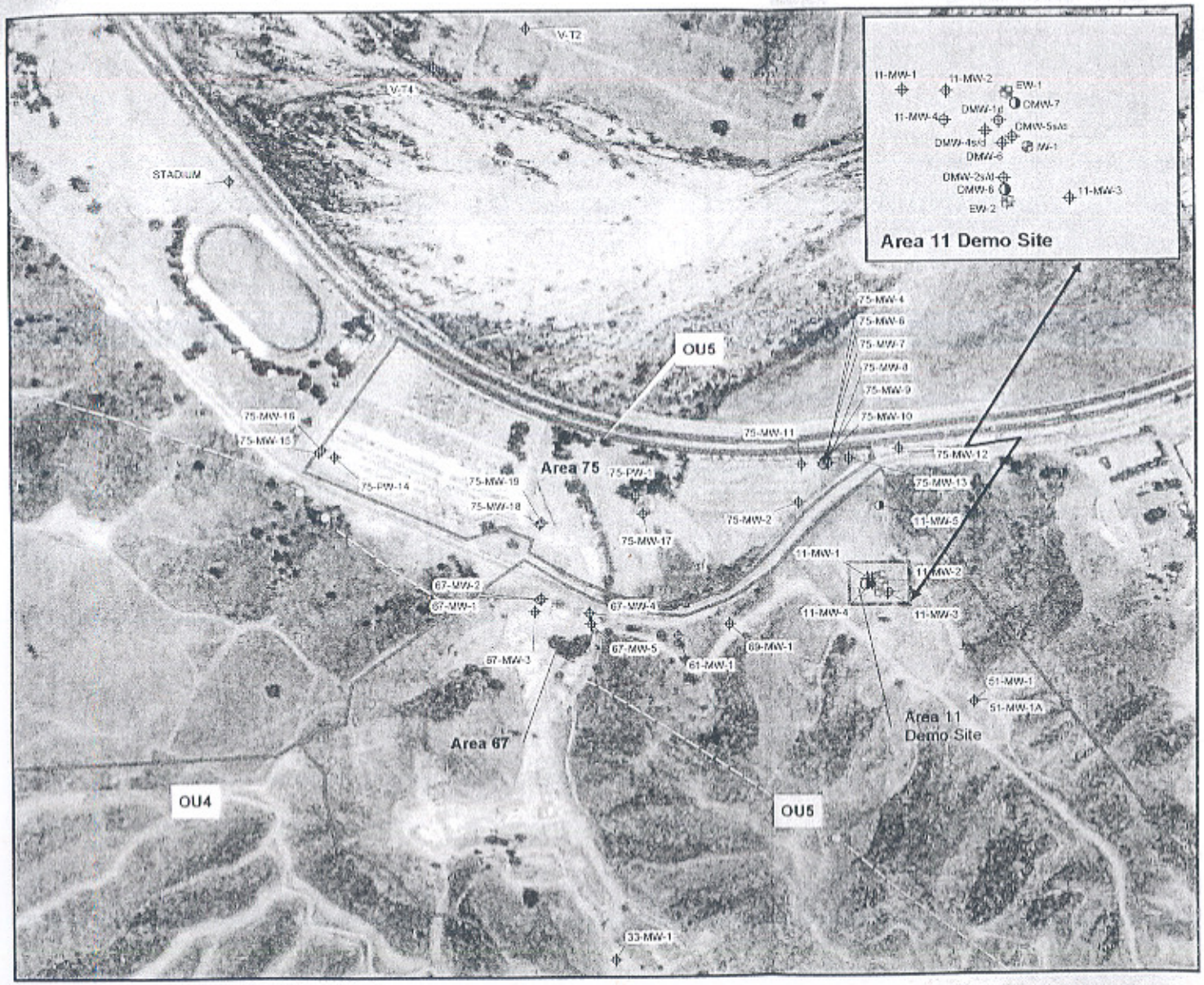

Figure 2

Demonstration Area
Location Detail

Former Whittaker Corporation
Bermite Facility
Santa Clarita, California

Legend

- Existing Monitoring Well
- Proposed Monitoring Well
- Proposed Extraction Well
- Proposed Injection Well
- Fault
- OU Boundary

N
W
E
S

0 200 400 800
Feet

Note: Aerial Photo downloaded from TerraServer

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Map Document: (C:\whittaker\gsworkspace\masterson\mxd\well_loc2.mxd)
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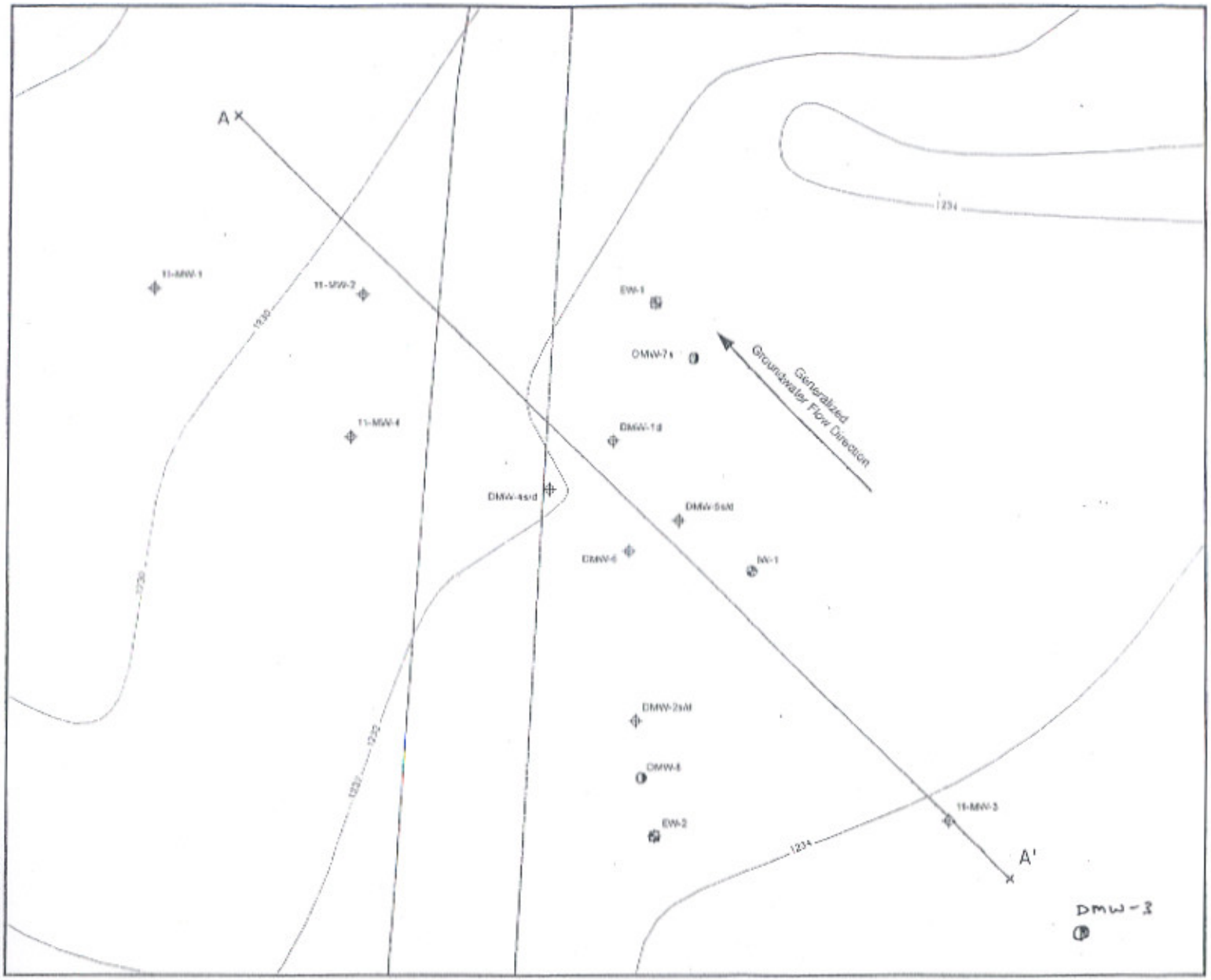

Figure 3

Demonstration Well Layout - Area 11

Former Whittaker Corporation
Bermite Facility
Santa Clarita, California

Legend

- Road
- Surface Contour (2 ft)
- Existing Monitoring Well
- Proposed Monitoring Well
- Proposed Extraction Well
- Proposed Injection Well

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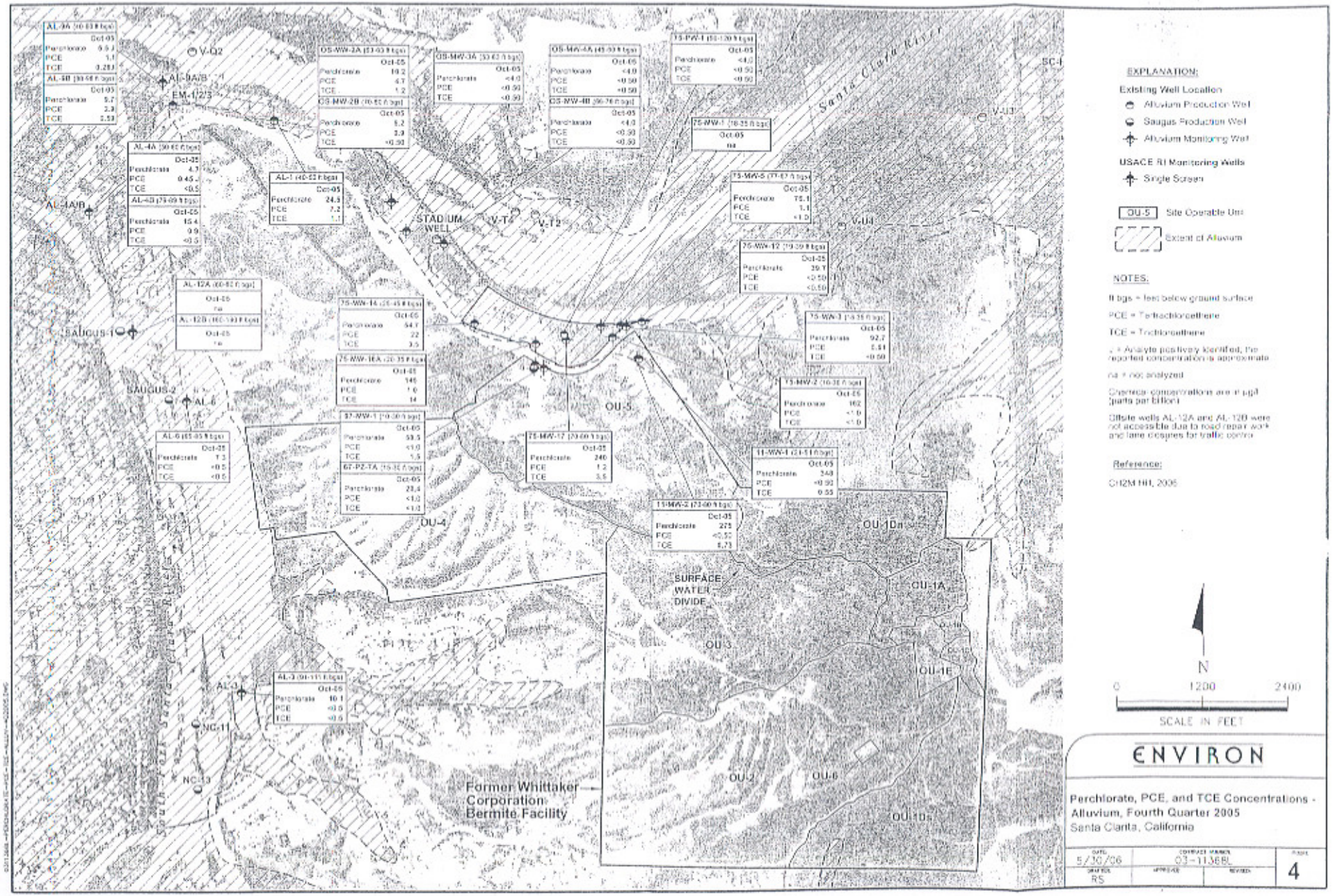
Former Whittaker Corporation Bermite Facility
Santa Clara River
SURFACE WATER DIVIDE
STADIUM WELL
SAUGUS-1
SAUGUS-2
AL-1A/B
AL-2A/B
AL-3
AL-4A/B
AL-5
AL-6
EM-1/2/3
V-Q2
V-T1
V-T2
V-U1
V-U3
NC-11
NC-13
SC-1
OU-1A
OU-1B
OU-1C
OU-1D
OU-2
OU-3
OU-4
OU-5
OU-6
EXPLANATION:
Existing Well Location
Alluvium Production Well
Saugus Production Well
Alluvium Monitoring Well
USACE RI Monitoring Wells
Single Screen
OU-5 Site Operable Unit
Extent of Alluvium
NOTES:
ft bgs = feet below ground surface
PCE = Tetrachloroethene
TCE = Trichloroethene
J = Analyte positively identified, the reported concentration is approximate
na = not analyzed
Chemical concentrations are in µg/l (parts per billion)
Offsite wells AL-12A and AL-12B were not accessible due to road repair work and lane closures for traffic control
Reference:
CH2M HILL 2006
N
0
1200
2400
SCALE IN FEET
ENVIRON
Perchlorate, PCE, and TCE Concentrations - Alluvium, Fourth Quarter 2005
Santa Clarita, California
DATE 5/30/06
CONTRACT NUMBER 03-113681
PAGE 4
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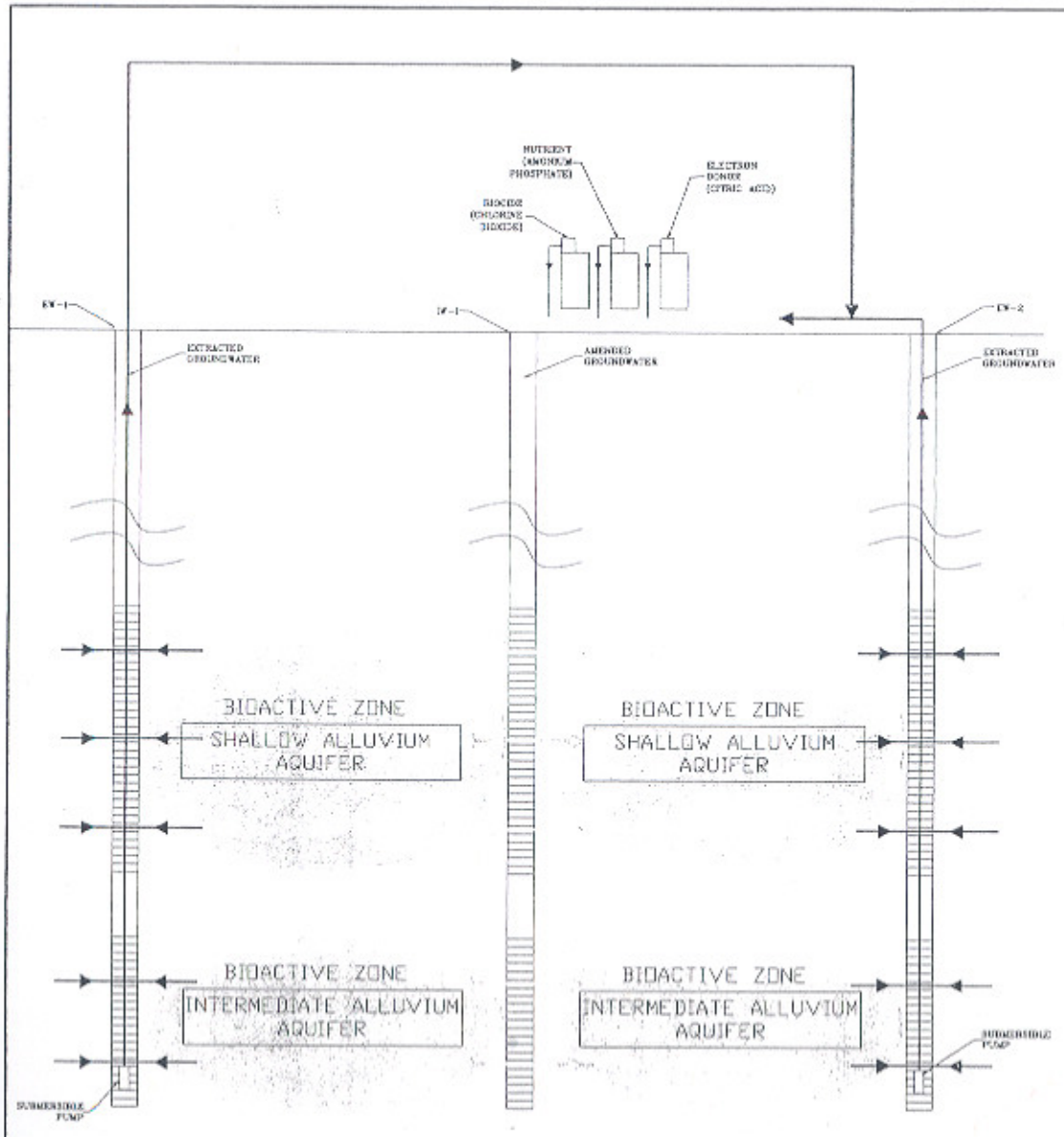
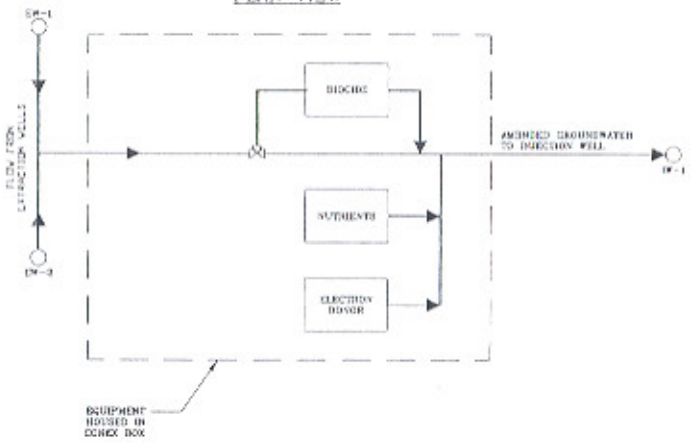
APPROVED
REVISED



EQUIPMENT
PLAN VIEW



Shaw / Shaw E & I, Inc.	FORMER WHITTAKER BERMITE FACILITY SANTA CLARITA, CALIFORNIA FIGURE 5 GENERALIZED PROCESS SCHEMATIC				
DESIGNED BY	DFL	01/24/08	CHECKED BY	DMW	01/24/08
DRAWN BY	CA	01/24/08	APPROVED BY	FBH	01/24/08
SIZE: B	SCALE: NTS	DRAWING NO.: 100931-02	SHEET NO.		REVISION NO.: 0

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

MONITORING AND REPORTING PROGRAM NO. CI-9195
FOR
FORMER WHITTAKER-BERMITE FACILITY
SANTA CLARITA SITE

FILE NO. 06-114

The Discharger shall implement this monitoring and reporting program on the effective date of this Order.

I. GROUNDWATER MONITORING PROGRAM

It is anticipated that the pilot test will be initiated in the third quarter of 2006. The 18 monitoring wells to be used for this monitoring and reporting program (MRP) are 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, DMW-8, EW-1, EW-2, and IW-1. In those cases where the extraction and injection wells (EW-1, EW-2, and IW-1) are operating, they shall be monitored for injection and extraction rates only.

Figure 1 shows the location of the Site. Groundwater monitoring wells and the extraction wells and injection well are shown in (Figures 2 and 3). Baseline sampling will take place prior to injection.

CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS
Total Daily Injections	Liters	Measurement for IW-1	Daily
Groundwater Elevation	Feet below ground surface (bgs)	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8. When accessible EW-1, EW-2, and IW-1.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
Dissolved Oxygen	mg/l	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter

Oxidation-Reduction Potential	Millivolts	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
pH	pH units	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
Temperature	Degrees C	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
Specific Conductance	µS/cm	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
Turbidity	NTU	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
Perchlorate (EPA Method 314.0)	µg/l	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
Total Organic Carbon (EPA Method 9060 Modified	mg/l	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter
Anions (sulfate, nitrate, nitrite and chloride, phosphate) dissolved metals (manganese, iron and arsenic), and total sulfides	mg/l	Grab from 11-MW-1, 11-MW-2, 11-MW-3, 11-MW-4, DMW-1d, DMW-2s, DMW-2d, DMW-3, DMW-4s, DMW-4d, DMW-5s, DMW-5d, DMW-6, DMW-7s, and DMW-8.	• Prior to tracer injection • 1 week following tracer injection • 1 month after tracer injection • 1 week following amendment injection • 1 month after amendment injection • Quarterly thereafter

All groundwater monitoring reports must include, at minimum, the following:

a. Well identification, date and time of sampling;
b. Sampler identification, and laboratory identification; and
c. Semi-annual observation of groundwater levels, recorded to 0.01 feet mean sea level and groundwater flow direction.

III. REPORTING REQUIREMENTS

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

2. The monitoring reports shall be submitted quarterly by the 15th of the following month, with the first report due January 15, 2007. Subsequent quarterly reports shall be received at the Regional Board according to the following schedule:

Monitoring Period	Report Due
January – March	April 15
April – June	July 15
July – September	October 15
October – December	January 15
Annual Summary Report	March 1 of each year

3. 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.

4. All monitoring reports shall include discharge limitations in the Order (Waste Discharge Requirements and 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.

5. Within six (6) months following the end of the evaluation the Discharger shall submit a final summary report to the Regional Board to report the findings.

   The report shall contain both tabular and graphical summaries of the monitoring data obtained prior to and proceeding the pilot test. In addition, the U.S. Army Corp of Engineers 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.

IV. 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)"

V. 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.

These records and reports are public documents and shall be made available for inspection during normal business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region.

Ordered by: David A. Bachorowski, AEO Date: October 24, 2006
Jonathan Bishop
Executive Officer

Figure 1

Site Location Map

Former Whittaker Corporation
Bermite Facility
Santa Clarita, California

Note: Topographic image downloaded from Terraserver

Shaw

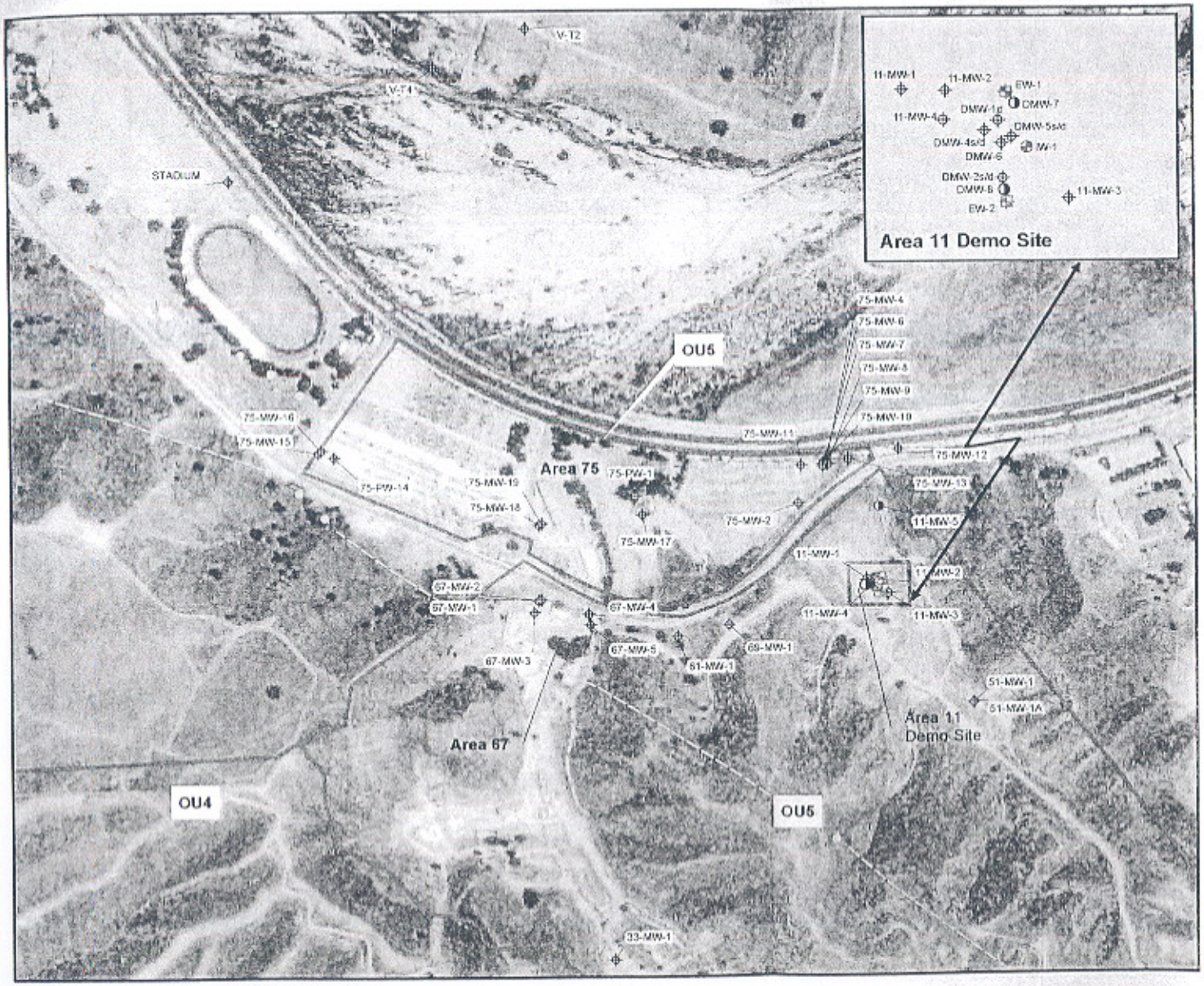


Figure 2

Demonstration Area
Location Detail

Former Whittaker Corporation
Bermite Facility
Santa Clarita, California

Legend

- Existing Monitoring Well
- Proposed Monitoring Well
- Proposed Extraction Well
- Proposed Injection Well
- Fault
- CU Boundary

N
W E
S

0 200 400 800
Feet

Note: Aerial Photo downloaded from TerraServer

Shaw

Map Document: (C:\whittaker\gisworkspace\masterson\mxd\well_loc2.mxd)
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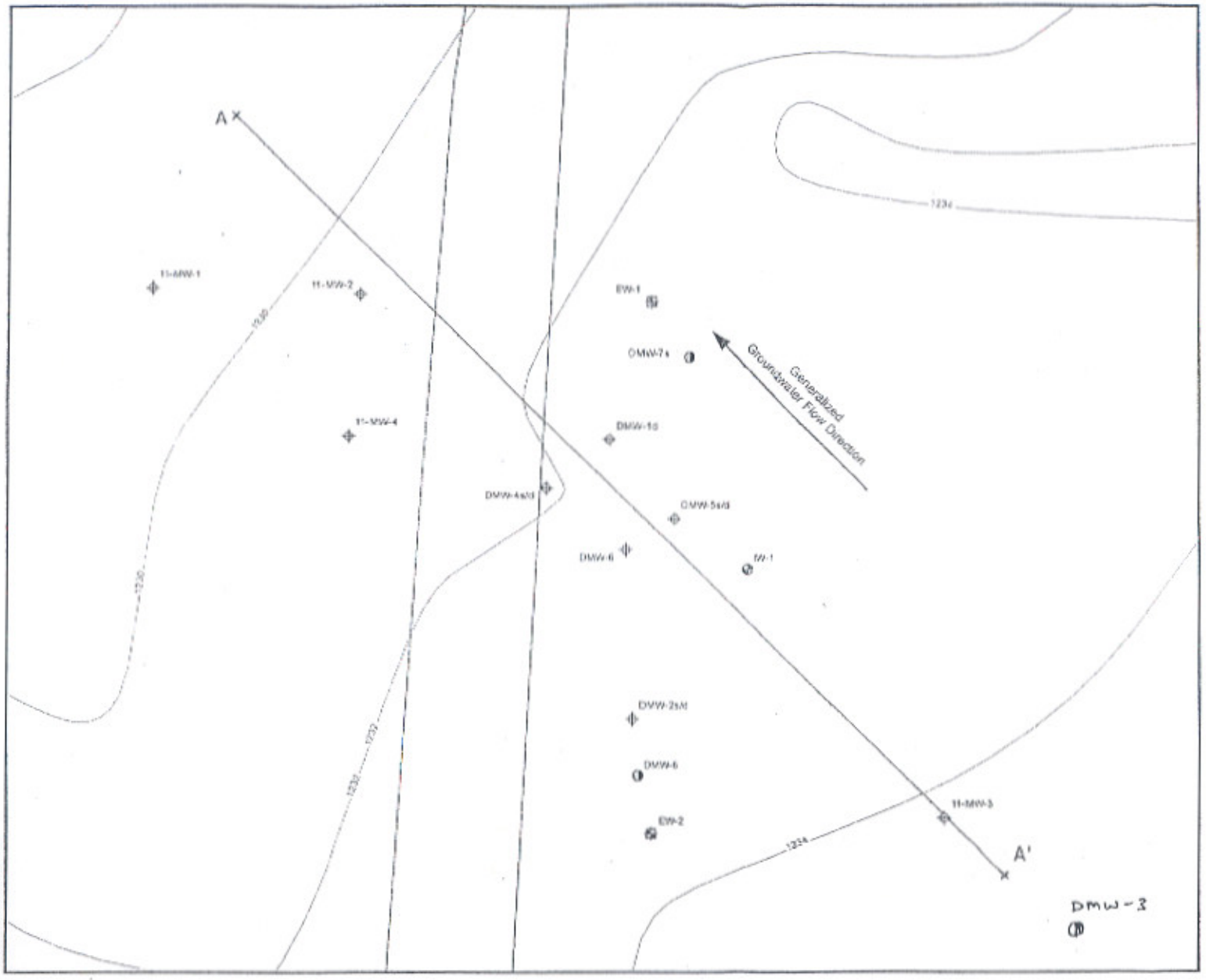

Figure 3

Demonstration Well Layout - Area 11

Former Whittaker Corporation
Bermite Facility
Santa Clarita, California

Legend

- Road
- Surface Contour (2 ft)
- Existing Monitoring Well
- Proposed Monitoring Well
- Proposed Extraction Well
- Proposed Injection Well

N
W
E
S

0 5 10 20
Feet

Shaw

Map Document: (C:\whittaker\gis\workspace\mastersite\mxd\area11_well_location_dec2005.mxd)
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STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

RESOLUTION NO. R06-019

APPROVING THE ENVIRONMENTAL CHECKLIST AND
ADOPTING A MITIGATED NEGATIVE DECLARATION FOR A
TECHNOLOGY DEMONSTRATION TO EVALUATE IN SITU BIOREMEDIATION OF
PERCHLORATE IN SHALLOW GROUNDWATER, AREA 11, FORMER WHITTAKER-
BERMITE FACILITY, SANTA CLARITA, CALIFORNIA
(FILE NO. 06-114)

WHEREAS, the California Regional Water Quality Control Board, Los Angeles Region finds that:

1. California Water Code (CWC) section 13260(a)(1) requires that any person discharging wastes, or proposing to discharge wastes other than into a community wastewater collection system, which could affect the quality of the waters of the State, shall file a report of waste discharge (ROWD) with the Regional Water Quality Control Board (Regional Board) exercising jurisdiction in the area, and that Regional Board shall then prescribe requirements for the discharge or proposed discharge of wastes.

2. The Whittaker-Bermite Company previously owned the property at 22116 Soledad Canyon Road, in Santa Clarita, California (Facility). The property in now owned by Santa Clarita LLC, a developer. The Technology Demonstration, to be conducted by the Army Corp of Engineers (Discharger), will take place on approximately 4,000 square feet of the property. The full property is approximately 996 acres. The property was first subdivided in 1912. From 1934 to 1936, the Bermite facility was used to manufacture dynamite under the ownership of the L.A. Powder Company. The Halifax Explosives Company manufactured fireworks there from 1936 to 1942. In 1939, Golden State Fireworks also manufactured fireworks at the facility. In 1942, E.P. Halliburton manufactured oil field explosives there. Production by the Bermite Powder Company occurred from 1942 to 1967, and included flares, explosives, detonators, fuses, boosters, coated magnesium, and stabilized red phosphorus. In 1967, Whittaker took ownership of the property. Whittaker manufactured 20-millimeter (mm) and 30-mm cannon shells, detonators, fuses, boosters, flares, signal cartridges, tracers, pyrophoric pellets, rocket motors, torpedo gas generators, oil filed explosives, JATO boosters, and artillery and missile main explosive charges. The current owner, Santa Clarita LLC, plans to redevelop the property and build more than 2900 dwelling units and associated retail, office, and commercial buildings.

3. Soil and groundwater beneath the Facility are primarily contaminated with perchlorate, perchloroethene (PCE), and trichloroethene (TCE).

4. The Discharger conducted a technology demonstration at the Facility to evaluate the remediation of perchlorate shallow groundwater by enhanced in-situ bioremediation. In-situ bioremediation involves the addition of amendments (citric acid and diammonium phosphate) to the shallow groundwater. Details of the technology demonstration methods are included in the February 9, 2006, "Technology Demonstration Plan-Revised In Situ Bioremediation of Perchlorate in Area 11 Alluvium Groundwater" prepared by Shaw Environmental, Inc.

5. The Discharger has filed a Report of Waste Discharge and applied for Site-Specific Waste Discharge Requirements to use citric acid and diammonium phosphate for the bioremediation of perchlorate at this Facility. The Report of Waste Discharge was deemed complete by the Regional Board in a letter dated June 22, 2006.

6. Groundwater beneath the Facility is unconfined, occurs approximately 25 feet below grade, with the direction of flow varying across the Facility but generally toward the northwest. The Discharger shall monitor concentration of injection solution and contaminants and evaluate flow conditions and any potential for migration of contaminants outside the remediation areas. As specified in the Waste Discharge Requirements and Notice of Preparation of Mitigated Negative Declaration, the Discharger will provide hydraulic control to prevent offsite migration. Monitoring of groundwater quality and flow conditions across the entire Facility is required by a comprehensive separate Facility-wide groundwater monitoring program.

7. The injection of the citric acid, diammonium phosphate, sodium bromide, and chlorine dioxide to the groundwater is a discharge of waste pursuant to section 13260 of the California Water Code. However, the discharge of the citric acid and diammonium phosphate is intended to provide more efficient remediation of perchlorate-contaminated groundwater and is anticipated to reduce cleanup time and costs.

8. The Water Quality Control Plan (Basin Plan) for the Los Angeles Region designates the beneficial uses of groundwater in the Santa Clara – Bouquet and San Francisquito portion of the Eastern Santa Clara River Groundwater Basin as municipal and domestic supply, industrial process supply, industrial service supply, and agricultural supply.

9. The permitted discharge is consistent with the anti-degradation provisions of State Water Resources Control Board Resolution No. 68-16 (Anti-degradation Policy). The discharge may result in some localized temporary exceedance of background concentrations of constituents such as nd concentrations of total organic carbon total organic carbon, chloride, iron, manganese, phosphorus, arsenic, and total dissolved solids (TDS), and certain microorganisms, but this is not anticipated to result in any long-term groundwater degradation.

10. The Regional Board has notified the Discharger 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 on October 24, 2006, heard and considered all comments pertaining to the discharge and to the tentative requirements.

11. This Regional Board has responsibility for preparation of these Waste Discharge Requirements under the California Environmental Quality Act (Public Resources Code section 21000 et seq.) and has conducted an Initial Study (in the format of an expanded Environmental Checklist) in accordance with title 14, California Code of Regulations, section 15063, titled Guidelines for Implementation of the California Environmental Quality Act. Based on the Initial Study, Regional Board prepared a Mitigated Negative Declaration that the project will not have a significant adverse effect on the environment.

12. Copies of the Environmental Checklist and proposed Mitigated Negative Declaration were transmitted to the State Clearing House, all agencies and interested parties. All comments received have been addressed by Regional Board staff. The Regional Board considered all testimony and evidence at a public hearing held on October 24, 2006, at the City of Simi Valley Council Chambers, 2929 Tapo Canyon Road, Simi Valley, California, and good cause was found to approve the Environmental Checklist and adopt a Mitigated Negative Declaration.

13. The Regional Board has reviewed the Initial Study and Mitigated Negative Declaration concerning this Resolution prepared by staff in compliance with the California Environmental Quality Act (Public Resources Code section 21000 et seq.). The Regional Board concurs with the staff findings that a Mitigated Negative Declaration should be adopted. The Initial Study and Mitigated Negative Declaration were circulated for public review and comment.

THEREFORE, BE IT RESOLVED that the Regional Board:

1. Adopts the Environmental Checklist, Initial Study and Mitigated Negative Declaration and directs the Executive Officer to file a Notice of Determination with the State Clearinghouse within 30 days as required by the California Code of Regulations.

2. Directs that a copy of this Resolution shall be forwarded to the State Water Resources Control Board and all interested parties.

3. Directs that the discharge of amendments into the soil and groundwater shall conform with all the requirements, conditions, and provisions set forth in *A. "Discharge Limits" and B. "Discharge Specifications"* of the ORDER NO. R4-2006-0076.

CERTIFICATION

I, Jonathan Bishop, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Los Angeles Region on October 24, 2006.

for David A. Bachorowski, AEO
Jonathan Bishop
Executive Officer

October 24, 2006
Date