California Regional Water Quality Control Board
Santa Ana Region

Linda S. Adams
Secretary for Environmental Protection

3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (951) 782-4130 • FAX (951) 781-6288 • TDD (951) 782-3221
www.waterboards.ca.gov/santaana

Arnold Schwarzenegger
Governor

CORRECTED COPY

November 21, 2007

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Ken Thompson
Ken Thompson, Inc.
P.O. Box 770
Rialto, CA 92376

REVISED ORDER TO SUBMIT A WORK PLAN AND CONDUCT A SOIL AND GROUNDWATER INVESTIGATION IN THE VICINITY OF LAUREL AVENUE AND LOWELL STREET, CITY OF RIALTO, SAN BERNARDINO COUNTY, CALIFORNIA

Dear Mr. Thompson:

As you are aware, perchlorate has been detected in municipal water supply wells in the Rialto and Colton Groundwater Management Zones, downgradient of property that is owned by Ken Thompson, Inc. (KTI). On February 6, 2004, I issued an investigation order to KTI under California Water Code (CWC) Section 13267. The investigation order contained an explanation of the need for the investigation and cited evidence supporting the requirement, as required by Section 13267. That order is enclosed and is incorporated herein by reference. (Enclosure 1)

The investigation order required that KTI conduct an investigation to define the lateral and vertical extent of perchlorate in soil and groundwater at its property in the City of Rialto. KTI's property is defined as three parcels located in the vicinity of Laurel Avenue and Lowell Street in north Rialto. According to San Bernardino County Tax Assessor records (Assessor), KTI purchased Assessor's Parcel Numbers (APN) 0239-192-06-0000 and 0239-192-07-0000 in 1987 (combined in 1998 and currently APN 0239-192-20-0000), APN 0239-192-05-0000 in 1988, and APN 0239-192-11-0000 in 2000. Assessor's office records also indicate that the parcels were previously owned and occupied by Pyrotronics Corporation and subsidiaries (Pyrotronics) from 1973 to the mid-1980's.

In a letter dated July 8, 2005 (Enclosure 2), we advised you that further investigation and cleanup would be necessary at a former Pyrotronics disposal pit located on KTI's property. We further indicated that the Regional Board would pursue other parties to conduct investigation activities, and KTI would not be required to conduct its own investigation at that time.

Since then, various other parties have conducted soil and groundwater investigations, both on and adjacent to KTI's property. The results of these investigations have confirmed the presence of several contaminant source areas on KTI's property. In addition, other areas of KTI's property have been identified as suspected contaminant source areas. The known and suspected source areas on KTI's property are the sites of former disposal activities that were conducted by Goodrich Corporation, Pyrotronics Corporation, Pyro Spectaculars, Inc. and other parties. These findings demonstrate the need for additional investigation on KTI's property.

The evidence shows that Goodrich Corporation, Pyro Spectaculars, Inc., and Pyrotronics have discharged perchlorate and trichloroethylene (TCE) on areas of what is now KTI's property. The evidence that perchlorate and TCE are present in soil on KTI's property, or in groundwater underlying KTI's property, is summarized in the March 30, 2007 Revised Focused Summary Report of Investigation of WCLC Use Areas, 160-Acre Site, Rialto, California, prepared by ENVIRON International Corporation. Excerpts from that report are enclosed. (Enclosure 3) The evidence demonstrates also that perchlorate and TCE at the property are continuing to migrate from the soil into groundwater and are carried downgradient in groundwater. These pollutants are therefore continuing to discharge at KTI's property. As the owner of the affected land, KTI bears legal responsibility under the California Water Code for any perchlorate, or other waste, that is present in soil on its property, or in groundwater underlying its property. This evidence supports the requirement for an investigation, as defined in Section 13267(b)(1) of the CWC. **Therefore, you are hereby directed to conduct a soil and groundwater investigation, in accordance with Section 13267(b)(1) of the CWC.** At a minimum, the soil and groundwater investigation shall include deep soil borings, with soil and groundwater sampling, in the former disposal areas on KTI's property where deep soil investigation has not been conducted previously. This would include Areas 45, 47 and 48, as shown in Figure A3 of the March 30, 2007 Revised Focused Summary Report. The work plan shall also include a proposal for at least two permanent groundwater monitoring wells.

Deadlines

1. A work plan for a soil and groundwater investigation for perchlorate and TCE at KTI's property in the vicinity of Laurel Avenue and Lowell Street in Rialto must be submitted to Regional Board staff no later than **January 15, 2008**. You shall provide

a detailed time schedule for the tasks to be conducted. The work plan, groundwater well design and time schedule will be subject to my approval.

2. The investigation must commence within 30 days of my written approval of the work plan.

3. All analytical results, groundwater measurements, and field information are to be submitted by fax or email to Regional Board staff within 24 hours of being generated, throughout all stages of work, and during all phases of the investigation.

4. The final report for the soil and groundwater investigation, including (at a minimum) the borehole logs, well construction details, groundwater elevation data, and soil and groundwater analytical results, must be submitted to Regional Board staff within 30 days of completing the field work.

The above-required information is necessary to define the extent of perchlorate and TCE pollution at KTI's property and the underlying groundwater. As noted above, ongoing contamination by perchlorate and TCE at KTI's property has seriously affected municipal drinking water supplies. Interim wellhead treatment measures to remove perchlorate and TCE from drinking water have cost the local municipalities millions of dollars to implement. Until perchlorate and TCE pollution can be successfully remediated, local municipalities will continue to incur costs for wellhead treatment. Development of a sound remedy to address perchlorate and TCE pollution requires complete information about the extent of the contamination. The submittal of the above-required information will help define the extent of the perchlorate and TCE pollution at KTI's property and is integral to designing an effective remedy to clean up that pollution. More detailed information is available in the Regional Board's public file on this matter.

Failing to provide the requested report by the required date or falsifying any information in the report is, pursuant to CWC Section 13268, a misdemeanor and may subject you to civil liability of up to five thousand dollars ($5,000.00) for each day in which the violation occurs.

If you wish to meet with us to discuss these requirements, please contact our Assistant Executive Officer, Kurt Berchtold, no later than **December 7, 2007** to arrange a meeting. Mr. Berchtold can be reached at (951) 782-3286; you may also call Robert Holub, Division Manager, at (951) 782-3298.

Any person affected by this action of the Regional Board may petition the State Water Resources Control Board (State Board) to review the action in accordance with Section 13320 of the California Water Code and Title 23, California Code of Regulations, Section 2050. The petition must be received by the State Board within 30 days of the date of this Order. The State Board's website

(http://www.swrcb.ca.gov/wqpetitions/index.html) contains detailed information regarding the petition process. In addition to filing a petition with the State Board, any person affected by this Order may request the Regional Board to reconsider this Order. Such request should be made within 30 days of the date of this Order. Note that even if reconsideration by the Regional Board is sought, filing a petition with the State Board within the 30-day period is necessary to preserve the petitioner's legal rights. If you choose to appeal the Order, be advised that you must comply with the Order while your appeal is being considered.

Sincerely,

for Gerard J. Thibeault
Executive Officer

Enclosures:
1. 13267 letter from Executive Officer dated February 6, 2004
2. Letter from the Executive Officer dated July 8, 2005
3. Excerpts from March 30 2007 Revised Focused Summary Report
4. Mailing List

cc w/out enclosures: Regional Board Members
Erik Spiess, OCC, SWRCB
Jorge Leon, OE, SWRCB
Mailing List

California Regional Water Quality Control Board
Santa Ana Region

Terry Tamminen
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb8
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288

Arnold Schwarzenegger
Governor

February 19, 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Ken Thompson
Ken Thompson, Inc.
P.O. Box 770
Rialto, CA 92376

DATE ERROR - ORIGINAL DIRECTIVE TO SUBMIT A WORK PLAN AND CONDUCT A PERCHLORATE INVESTIGATION IN THE VICINITY OF LAUREL AVENUE AND LOWELL STREET, CITY OF RIALTO, SAN BERNARDINO COUNTY

Dear Mr. Thompson:

On February 6, 2004 I issued a directive under California Water Code Section 13267 that Ken Thompson, Inc. conduct an investigation to define the lateral and vertical extent of perchlorate in soil and groundwater at its property in the vicinity of Laurel Avenue and Lowell Street in North Rialto.

The directive was inadvertently dated February 6, 2003 rather than February 6, 2004. A replacement directive reflecting the correct date is enclosed. Please discard the original letter.

Please be aware that all deadlines contained in the original directive are still valid and must be adhered to in order to avoid further enforcement action.

If you have any questions, please contact Debi Ney, Analyst, at (909) 782-3237, or you may call Ann Sturdivant, Chief of our Spills, Leaks, Investigations and Cleanups Section, at (909) 782-4904.

Sincerely,

Gerard J. Thibeault
Executive Officer

Enclosure:
February 6, 2004 Directive to Submit Work Plan and Conduct Perchlorate Investigation

cc w/out enclosures:
Regional Board Members
Jorge Leon, Office of Chief Counsel, SWRCB
Inland Empire Perchlorate Regulatory Task Force (see mailing list)

DON/Data/SLIC/Rialto perchlorate/13267/Thompson error cover

California Regional Water Quality Control Board
Santa Ana Region

Terry Tamminen
Secretary for Environmental Protection

3737 Main Street, Suite 500, Riverside, California 92501-3339
(909) 782-4130 • Fax (909) 781-6288
http://www.swrcb.ca.gov/rwqcb8

Arnold Schwarzenegger
Governor

February 6, 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Ken Thompson
Ken Thompson, Inc.
P.O. Box 770
Rialto, CA 92376

DIRECTIVE TO SUBMIT A WORK PLAN AND CONDUCT A PERCHLORATE INVESTIGATION IN THE VICINITY OF LAUREL AVENUE AND LOWELL STREET, CITY OF RIALTO, SAN BERNARDINO COUNTY, CALIFORNIA

Dear Mr. Thompson:

Perchlorate has been detected in municipal water supply wells in the Rialto, Colton, and Chino Groundwater Subbasins in San Bernardino County. These water supply wells are located downgradient of property owned by Ken Thompson, Inc., consisting of three parcels located in the vicinity of Laurel Avenue and Lowell Street in North Rialto. According to San Bernardino County Tax Assessor records (Assessor), Ken Thompson, Inc. purchased Assessor's Parcel Numbers (APN) 0239-192-06-0000 and 0239-192-07-0000 in 1987 (combined in 1998 and currently APN 0239-192-20-0000), APN 0239-192-05-0000 in 1988, and APN 0239-192-11-0000 in 2000. Assessor's office records also indicate that the parcels were previously owned and occupied by Pyrotronics Corporation and subsidiaries (Pyrotronics) from 1973 to the mid-1980's.

Evidence indicates that Pyrotronics manufactured, handled, tested and stored fireworks containing perchlorate salts at the property owned by Ken Thompson, Inc. located at Lowell Street and Laurel Avenue, Rialto, California. In addition, City of Rialto records indicate that on-site disposal systems have been used at the site since the property was first occupied for industrial use. Disposal of perchlorate waste in unlined pits and septic systems is suspected to have occurred during occupancy of the property by Pyrotronics and other parties.

This letter sets forth a requirement under California Water Code Section 13267 that Ken Thompson, Inc. conduct an investigation to define the lateral and vertical extent of perchlorate in soil and groundwater at its property in the vicinity of Laurel Avenue and Lowell Street in North Rialto. As required by Section 13267, this letter contains an explanation of the need for the investigation, and cites evidence supporting the requirement.

Background

Perchlorate contamination was first detected in groundwater in the Rialto, Colton, and Chino Groundwater Subbasins in 1997. At that time, the California Department of Health Services (DHS) Action Level (AL) for perchlorate in drinking water was 18 parts per billion (ppb). Two wells contained perchlorate exceeding 18 ppb and were shut down. In January 2002, the DHS lowered the AL to 4 ppb. In response to the reduced AL for perchlorate, the local water purveyors in the Rialto, Colton, and Chino Groundwater Subbasins restricted or eliminated the use of additional production wells with perchlorate concentrations that exceeded 4 ppb. Between 1997 and the present, various suspected perchlorate dischargers, including former and current occupants of the property owned by Ken Thompson, Inc., have been identified.

Requirement for an Investigation

The Santa Ana Regional Water Quality Control Board (Board) has directed staff to issue individual letters under California Water Code Section 13267 to suspected perchlorate dischargers in the Rialto, Colton and Chino Groundwater Subbasins. Several letters similar to this one have already been issued to other suspected dischargers and to the owners of properties where discharges of perchlorate are suspected of having occurred. The Board also expressed a strong desire that suspected perchlorate dischargers work with the local water purveyors to provide a replacement water supply during the loss or limited use of their production wells.

The Need for the Investigation

The Board is charged with the protection of water quality in this Region. We have been working actively with the water purveyors for several years to identify the extent and address the impact of perchlorate contamination on water resources in the Rialto, Colton and Chino Groundwater Subbasins. The water purveyors whose wells have been contaminated with perchlorate now face a state of emergency, and may not be able to provide an adequate water supply to their customers. It is urgent that the sources of the contamination be identified, and the magnitude of the perchlorate plume defined.

Evidence Supporting the Need for the Investigation

Enclosed are the following documents:

1. Well Location Map, showing perchlorate contamination in municipal water supply wells in the vicinity of Rialto, Colton and Fontana, California.

2. Property Ownership Records for APN 0239-192-20-0000; 0239-192-05-000; and 0239-192-11-0000 (obtained from San Bernardino Tax Assessor's Internet Site).
3. Excerpts from Pyrotronics 1985 Hazardous Materials Disclosure Form: includes the use of 25,000+ pounds per month of potassium perchlorate (AP 00521 and continuing).
4. 1979 Fireworks Composition Specifications that include potassium perchlorate (AP 00724 and continuing).
5. Pyrotronics letter regarding use of "pond" for disposal of shells and powders (AP 00456).
6. Pyrotronics letter to San Bernardino County in 1985 regarding filling in the "pond" after burning the remaining solid waste (AP 00640).

Based on the evidence, Pyrotronics and its successors are suspected of having discharged perchlorate on the property. As the owner of the affected land, Ken Thompson, Inc. bears legal liability under California law for any perchlorate, or other waste, that is present in soil on its property, or in groundwater underlying its property. This evidence supports the requirement for an investigation as defined in Section 13267(b)(1) of the California Water Code.

Deadlines

1. A work plan for a soil and groundwater investigation for perchlorate at the property in the vicinity of Laurel Avenue and Lowell Street in Rialto must be submitted to Board staff no later than March 15, 2004. The work plan must include a detailed time schedule for the tasks to be conducted. The work plan and time schedule will be subject to my approval.

2. The investigation must commence within 30 days of my approval of the work plan.

3. All analytical results, groundwater measurements, and field information are to be submitted by fax to Board staff within 24 hours of being generated, throughout all stages of work, and during all phases of the investigation. The office fax number to be used for your data transmittals is (909) 781-6288.

4. The final report for the soil and groundwater investigation, including (at a minimum) the borehole logs, well construction details, groundwater elevation data, and soil and groundwater analytical results, must be submitted to Board staff within 30 days of completing the field work.

Failure to submit the required information by the specified deadline may subject you to administrative civil liability in the amount of up to $1,000 per day, pursuant to Section 13268(a) and (b) of the California Water Code.

Finally, please be aware that the Board has directed staff to explore alternative ways of solving the water supply problem in the Rialto, Colton and Chino Groundwater Subbasins. In addition, consistent with the Board's direction, we have issued and will continue to issue similar directives to a number of other suspected dischargers who have operated in the North Rialto area. Thus, there may be opportunities to cooperate with other entities to implement joint investigations or to propose solutions that would address the water supply problem. In fact, we believe it would be both scientifically effective and economically efficient for the suspected dischargers subject to these directives to jointly pursue the investigation and to explore water supply replacement options. Further, consistent with the Board's direction, we recommend that the joint efforts of the suspected dischargers consider both the characterization of the plume and initiation of water supply replacement or treatment strategies. Board staff has experience managing similar joint investigations and cooperative solutions and we are available to discuss these further with you. If you are interested in discussing alternative options for complying with this directive, please contact us to arrange a meeting or teleconference.

Recovery of Regional Board Expenses

California Water Code Section 13365 addresses the billing process for the Board to recover reasonable expenses for overseeing investigation of illegal discharges, contaminated properties, and other unregulated releases that may adversely affect the State's waters. It is the Board's intent to recover such costs for regulatory oversight work conducted in accordance with this order. A description of the Board's procedure for cost recovery for regulatory oversight of investigations and cleanups will be sent to you under separate cover.

If you have any questions about this letter, or if you would like to arrange a meeting or teleconference, please contact Kamron Saremi, Project Engineer, at (909) 782-4303, or you may call Ann Sturdivant, Chief of our Spills, Leaks, Investigations and Cleanups Section, at (909) 782-4904.

Sincerely,

Gerard J. Thibeault
Executive Officer

Enclosures: see next page

1. Well Location Map, showing perchlorate contamination in municipal water supply wells in the vicinity of Rialto, Colton and Fontana, California.
2. Property Ownership Records for APN 0239-192-20-0000; 0239-192-05-000; and 0239-192-11-0000 (obtained from San Bernardino Tax Assessor's Internet Site).
3. Excerpts from Pyrotronics 1985 Hazardous Materials Disclosure Form: includes the use of 25,000+ pounds per month of potassium perchlorate (AP 00521 and continuing).
4. 1979 Fireworks Composition Specifications that include potassium perchlorate (AP 00724 and continuing).
5. Pyrotronics letter regarding use of "pond" for disposal of shells and powders (AP 00456).
6. Pyrotronics letter to San Bernardino County in 1985 regarding filling in the "pond" after burning the remaining solid waste.
7. Mailing List.

cc w/out enclosures:

Regional Board Members
Jorge Leon, Office of Chief Counsel, SWRCB
Inland Empire Perchlorate Regulatory Task Force Members (see mailing list)

DON/Data/SLIC/Rialto perchlorate/13267/Thompson

REVISED FOCUSED SUMMARY REPORT OF INVESTIGATION OF WCLC USE AREAS 160-ACRE SITE RIALTO, CALIFORNIA

Prepared for

Emhart Industries, Inc.
Towson, Maryland

At the Request of

Allen, Matkins, Leck, Gamble, Mallory & Natsis LLP
San Francisco, California

Prepared by

ENVIRON International Corporation
Irvine, California

March 30, 2007

Prepared by:

ENVIRON Corporation
2010 Main Street, Suite 900
Irvine, California 92614
(949) 261-5151

George Linkletter, Ph.D., P.G.
Principal and Senior Vice Presdent

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APPENDICES

Appendix A: Data Summary
Appendix B: Reasons for Additional Sampling at Area 18

EXECUTIVE SUMMARY

ENVIRON International Corporation (ENVIRON), on behalf of Emhart Industries, Inc. (EII), has completed an investigation of shallow soil and soil gas in areas of the property known as the "160-Acre Parcel" ("the 160-Acre Site" or "the Site") in Rialto, California, where historical and current operators and owners are known or suspected to have conducted activities that included, or may have included, the use of perchlorate and/or trichloroethene (TCE). The identification of the areas on the 160-Acre Site included in the investigation was based on review of available relevant documents and deposition testimony, review and analysis of historical aerial photographs, and broad-based requests from both the U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board – Santa Ana Region (RWQCB). The resulting work included the collection and analysis of 730 soil samples and 288 soil gas samples from 48 study areas on the 160-Acre Site. A summary of the data collected by ENVIRON, along with all data collected at the Site and reported by other investigators, is presented in Appendix A.

The focus of this report is on 28 of the 48 study areas that relate to known or suspected historical activities on the approximately 28-acre portion of the 160-Acre Site utilized by West Coast Loading Corporation (WCLC). At 17 of these 28 study areas, WCLC is known or suspected to have used, handled, or stored perchlorate. The presence of perchlorate was detected in three of these 17 study areas. The possible presence of TCE was investigated at 21 of the 28 WCLC study areas where deposition testimony suggested TCE may have been used. No TCE was detected in the WCLC areas investigated. There was no information to support TCE sampling in the remaining seven areas.

In two of the three WCLC study areas, perchlorate was found in low concentrations in two shallow samples (58 ppb in Area 11, 110 ppb in Area 37). No perchlorate was detected below 10 ft in either of these areas. In the third area, Area 18, perchlorate was detected in 32 of 197 soil samples, with the highest concentrations in shallow samples and no detections below 25 ft. Perchlorate has not been detected in the monitoring well located approximately 300 ft downgradient of Area 18 except for an initial detection of 2.2 ppb, which is below the detected concentrations in upgradient well PW-1, well within the background range for perchlorate suggested by the RWQCB (10-15 ppb), and below the state action level and proposed MCL of 6 ppb.

As presented in Appendix A, perchlorate and/or TCE were found in 11 of the remaining study areas at the site, none of which is related to historical WCLC use of these chemicals.

1.0 INTRODUCTION

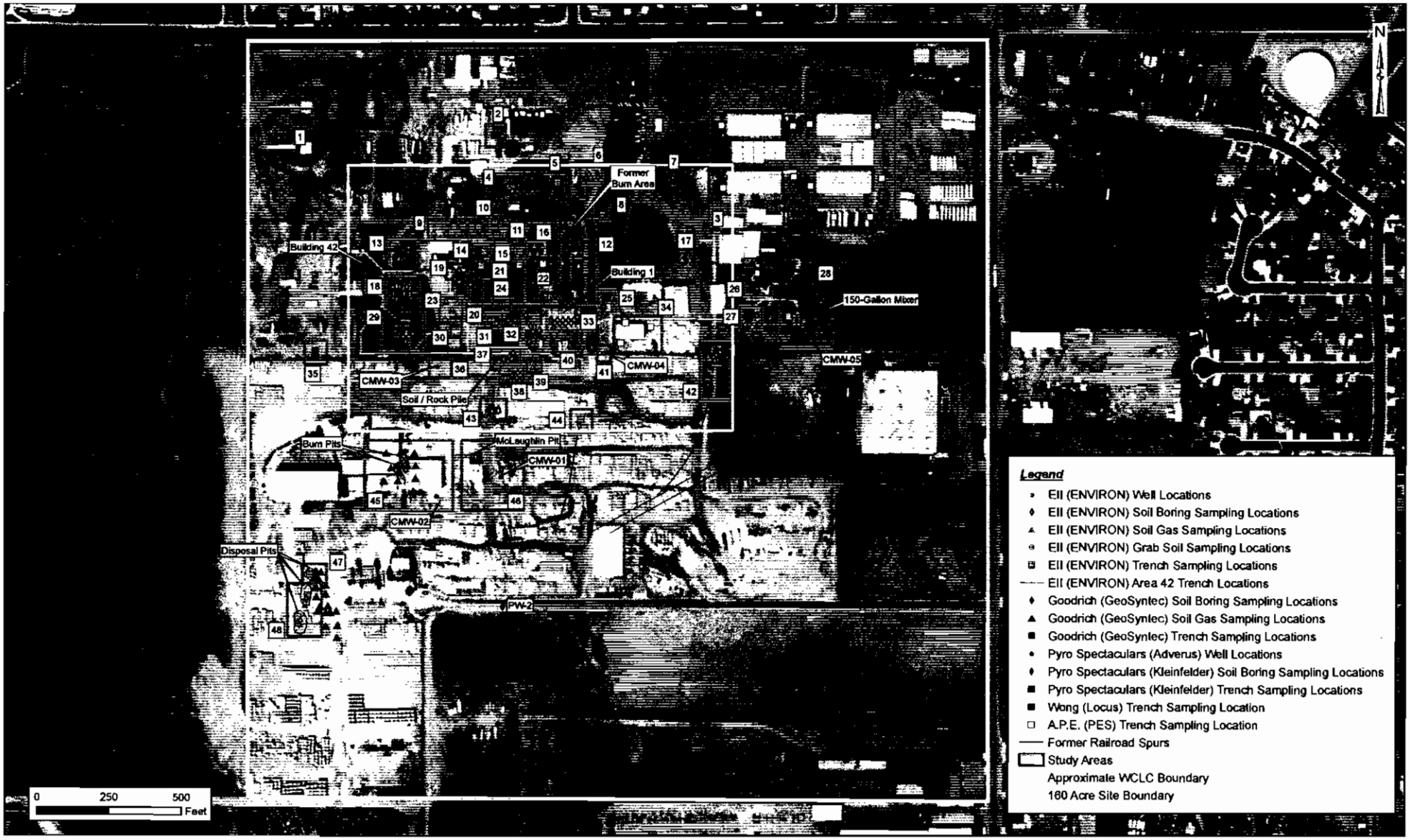
In response to requests from the U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board – Santa Ana Region (RWQCB), ENVIRON International Corporation (ENVIRON) was retained by Allen, Matkins, Leck, Gamble, Mallory & Natsis LLP (Allen Matkins), on behalf of Emhart Industries, Inc. (EII), to complete, among others, the following two primary tasks. The first was to investigate the shallow soil and soil gas in all recognized perchlorate and/or trichloroethene (TCE) historical use areas at the 160-Acre Parcel ("the 160-Acre Site" or "the Site") in Rialto, California, regardless of the entity known or suspected to have carried out such use. To the degree that, in ENVIRON's judgment, earlier work by others had resulted in a reasonable characterization of a given use area, ENVIRON did not duplicate such work. All of the data resulting from ENVIRON's investigations, as well as that collected and reported by other investigators, is summarized in Appendix A. With regard to historical fireworks manufacturing, ENVIRON has only investigated what has come to be known as the McLaughlin Pit area; additional investigation of remaining fireworks manufacturing areas appears to be warranted.

ENVIRON's second task focused on the approximately 28-acre portion of the 160-Acre Site where West Coast Loading Corporation (WCLC) use areas were located and where perchlorate or TCE had earlier been identified in shallow soil or soil gas in the first task. In such areas, ENVIRON was to complete such additional sampling as necessary to bound the volume of impacted soil, both laterally and vertically. In addition, at the specific request of RWQCB, ENVIRON installed and continues to monitor two ground water wells.

ENVIRON's initial work at the Site was conducted in 2004 at the request of, and in consultation with, the USEPA. All subsequent work was conducted as outlined in the 2006 work plan (2006 RI), prepared and submitted jointly by ENVIRON (on behalf of EII) and Adverus (on behalf of PyroSpectaculars), as amended and modified in response to requests from RWQCB staff, or the discovery of relevant new information. All ENVIRON work has been conducted with oversight of the USEPA and/or the RWQCB.

At the time of its initial work in 2004, ENVIRON proposed a number of soil and soil gas sampling locations based on then available information regarding WCLC's historical activities on the Site and ENVIRON's understanding of locations where the USEPA had specific interest. Prior to conducting any of that work, ENVIRON reviewed all proposed sampling locations in the field with USEPA staff and several sampling locations were changed or added at USEPA's request.

Similarly, during preparation of the ENVIRON-Adverus work plan, by which time significantly more relevant information for sampling locations had become available, both the RWQCB and USEPA were asked to review a draft of the work plan and to identify changes or additions that would allow the plan to include all areas at the Site where those agencies had questions or concerns regarding WCLC activities that might have resulted in releases of perchlorate and/or TCE. In addition to the modification of the work plan in response to agency requests during the course of the investigation, numerous additions to the scope of work were made in the field, as contemporaneously documented. Monitoring well locations were selected in consultation with and approval by the RWQCB. The sampling areas and locations of all known samples collected and reported to date are illustrated on Figure 1 (see page 4); cross referencing to previously used designations is provided in Table 1 (see page 5).



ENVIRON

Drafter: DML | Date: 9/28/06 | Revised: 3/19/07

SAMPLE LOCATIONS OF ALL KNOWN INVESTIGATIONS TO DATE

160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410801A

Figure 1

TABLE 1 – Study Area Designations with Sampling Rationale

Area	Designation in Previous Document(s)	Operator	Sampling Rationale
1	Bunker M-11	PS	Storage Area
2	Former Mortar Storage	PS	Former Mortar Storage
3	Buildings 76, 77, 78, 79	A	Storage, Handling and Assembly of Class C Explosives
4	I1, Building 49	W/F	Darkened Area Visible in Historical Aerial Photos / Clarifier
5	M8, Buildings 41,50	W/F/F	Formulating Photoflash Mix / Clarifier / Pyrotechnics Disposal Area
6	P5, Building 20	G	Laboratory where Rocket Propellant Mixes were Formulated for Testing
7	N4A	W	Northernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release
8	M7, Building 15	W	Testing of Flares and Possibly Other Pyrotechnics
9	N2, Buildings 33,28	W	Deposition Testimony of Suspected Trench and Disposal Area
10	M4, Building 48	W	Weighing of Perchlorate
11	M3, Building 47	W,G	Screening and Drying of Perchlorate, Discoloration Visible in Historical Aerial Photos
12	A, Buildings 2,3,4	G/F	Mixing of Ammonium Perchlorate in Small R&D Mixers / Clarifiers
13	M1, Building 40	W	Weighing and Blending of Photoflash, Barrels of Unknown Contents Visible in Historical Aerial Photos
14	M6, Building 28	W/F	Reported Inspection of Potassium Perchlorate / Clarifier
15	P1, Building 12	G	Screening and Drying of Ammonium Perchlorate
16	J1, Building 8	W	Drums and Darkened Surface Soil Visible in Historical Aerial Photos
17	N4B	W	Southernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release
18	M2, Building 42	W	Filling of Photoflash Cartridges, 4/12/1955 Building Explosion, Barrels of Unknown Contents Visible in Historical Aerial Photos
19	N1, Building 34	W	Former Press Building, Discolored Soil and Barrels of Unknown Contents Visible in Historical Aerial Photos
20	P3, Building 31	G/F	100-Gallon Mixer - Mixing of Ammonium Perchlorate / Clarifier
21	M5, Building 30	W/F	Weighing of Perchlorate / Clarifier
22	Former Burn Area	A	Former Burn Area of Pyrotechnics Waste
23	K2, Building 35	W	Former Assembly Shop - Deposition Testimony of Possible TCE Use
24	H1, Building 27	W	Former Scrap Metal Storage Area
25	L4, Building 18	W	Former Maintenance Shop - Deposition Testimony of Possible TCE Use
26	Building 73	F	Clarifier
27	B1, Building 72	P/F	Mixer Building / Clarifier
28	B2	G	150-Gallon Production Mixer Area
29	L3, Building 43	W/F	Deposition Testimony of Former WCLC Employee - Potential Use of Solvents / Clarifier
30	K1, Building 35	W	Former Assembly Shop - Deposition Testimony of Possible TCE Use
31	H2, Building 27	W	Darkened Area Visible in Historical Aerial Photos
32	P2, Building 10	G	Weighing of Ammonium Perchlorate
33	P4/L1, Building 1	G/W	Sidewinder Salvage / Deposition Testimony of Possible Solvent Use
34	Building 51	A	Storage of Class C Explosives
35	Current Mortar Storage	PS	Current Mortar Storage
36	CMW-03	-	Installation of Monitoring Well
37	F1	W	Soil and Rock Pile
38	G2	W	Former Drum Storage Area Visible in Historical Aerial Photos
39	G1	W	Former Drum Storage Area Visible in Historical Aerial Photos
40	N3	W	Former Float Light Storage Area, Identified as a Possible Location for VOC Release
41	CMW-04	-	Installation of Monitoring Well
42	N5B	W	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal - Easternmost Spur
43	E1, Building 26	W	Former Boiler House, Liquid Discharge Visible in Historical Aerial Photos
44	N5A	W	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal - Westernmost Spur
45	C, Burn Pits	G	Historical Aerial Photo Review Shows 2 Pits that, According to Testimony, Appear to Have Been Used for the Burning of Waste
46	C, McLaughlin Pit	P	Historical Aerial Photo Review Shows Impoundment that, According to Records and Testimony, Was Used for Submersion of Pyrotechnic Waste
47	D, Disposal Pit	G	Historical Aerial Photo Review Shows 3 Pits that, According to Testimony, Appear to Have Been Used for Waste Disposal – Northernmost Pit
48	D, Disposal Pits	P	Historical Aerial Photo Review Shows 3 Pits that, According to Testimony, Appear to Have Been Used for Waste Disposal – 2 Southernmost Pits

Notes. [A] = American Promotional Events (APE)
[F] = Fireworks companies
[G] = Goodrich
[P] = Pyrotronics
[PS] = Pyro Spectaculars
[W] = West Coast Loading Corporation (WCLC)

2.0 INVESTIGATION

This report and its appendices make extensive use of tables and figures. To the degree that their size allows, the tables and figures are integrated with the text; larger tables and figures follow the text in each section of the report in which they are first referenced. Prior reports and work plans have included a wide variety of descriptive names or codes to designate various use and study areas at the Site. In an effort to clarify the presentation, in this report, ENVIRON uses a simple, numerical sequence to designate specific areas on the Site.

2.1 Perchlorate Testing in Soil

Table 2 (see page 11) summarizes the sampling rationale, number of samples collected, number of detections and maximum concentrations at each of the WCLC use areas investigated for perchlorate. Figure 2 (see page 12) shows the approximate outline of the historical WCLC boundary, an area consisting of approximately 28 acres, against a 1955 photo base. Figure 3 (see page 13) shows the locations of the areas listed in Table 2 against a 2003 photo base.

As shown by Table 2, perchlorate was detected in 3 of the 17 study areas where WCLC is known or suspected to have used, handled, or stored perchlorate. These study areas are Area 11, 37 and 18.

2.1.1 Area 11

WCLC and Goodrich conducted screening and drying of perchlorate at Area 11. Ten soil samples collected from a 30 ft long trench yielded one detection of perchlorate at approximately 10 feet below ground surface (ft bgs). As shown in Table 3, below, none of the samples below 10 ft contained perchlorate.

TABLE 3 Area 11 – Depth Profile of Maximum Detections

Area	Operator	Depth Interval (ft bgs)	Perchlorate		
			No. of Samples	No. of Detections	Max (ppb)
Area 11 - Building 47	WCLC - Goodrich	0-5	3	0	ND
		5-10	3	1	58
		10-15	4	0	ND
TOTAL			**10**	**1**	

The sampling locations in Area 11 are shown in Figure 3 (see page 13).

2.1.2 Area 37

Area 37 is a soil and rock pile, which was once under the control of WCLC. As shown in Table 4, below, only one of 13 soil samples collected from six borings and one trench in this area and

analyzed for perchlorate contained detectable perchlorate at 110 ppb; none of the samples collected below 6 ft in Area 37 contained perchlorate.

TABLE 4 Area 37 – Depth Profile of Maximum Detections

Area	Operator	Depth Interval (feet bgs)	Perchlorate		
			No. of Samples	No. of Detections	Max (ppb)
Area 37 - Soil/Rock Pile	WCLC - Later Occupants	0-6	6	1	110
		6-10	4	0	ND
		10-15	3	0	ND
TOTAL			**13**	**1**	

The sampling locations in Area 37 are shown in Figure 3 (see page 13).

2.1.3 Area 18

Area 18 was investigated as the location where, according to historical records and testimony, M-112 photoflash cartridges, which contained perchlorate, were filled by WCLC employees from January 1955 to April 12 1955, and from October 1955 to April 1956. This area was investigated in 2006 and again in 2007. The reasons for the additional 2007 study are provided in Appendix B.

Table 5, below, shows the number of samples analyzed, number of detections, and maximum concentration of perchlorate at each selected depth interval, and is as such a worst-case representation of the conditions in this area.

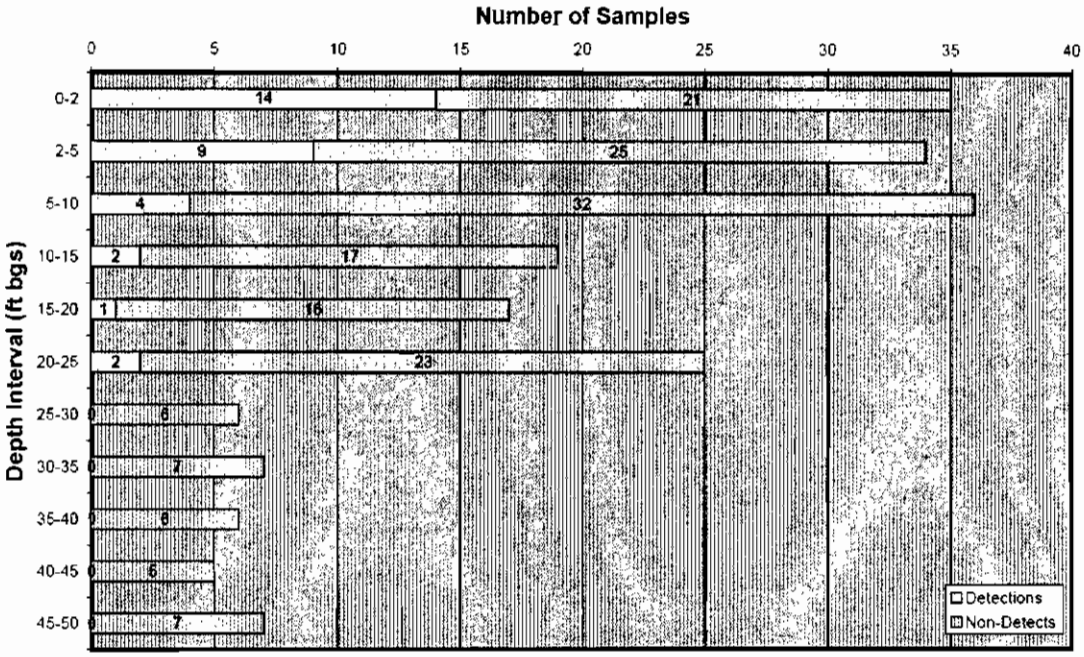
TABLE 5 Area 18 – Depth Profile of Maximum Detections at Building 42

Area	Operator	Depth Interval (ft bgs)	Perchlorate			
			No. of Samples	No. of Detections	No. of Non-Detects	Max (ppb)
Area 18 - Building 42	WCLC	0-2	35	14	21	12,000
		2-5	34	9	25	4,700
		5-10	36	4	32	350
		10-15	19	2	17	76
		15-20	17	1	16	35
		20-25	25	2	23	21
		25-30	6	0	6	ND
		30-35	7	0	7	ND
		35-40	6	0	6	ND
		40-45	5	0	5	ND
		45-50	7	0	7	ND
TOTAL			**197**	**32**	**165**	

Figure 3b (see page 14) shows a detail of Area 18 as depicted in Figure 3; Figure 4 (see page 15) details the sampling locations and related data collected at Building 42.

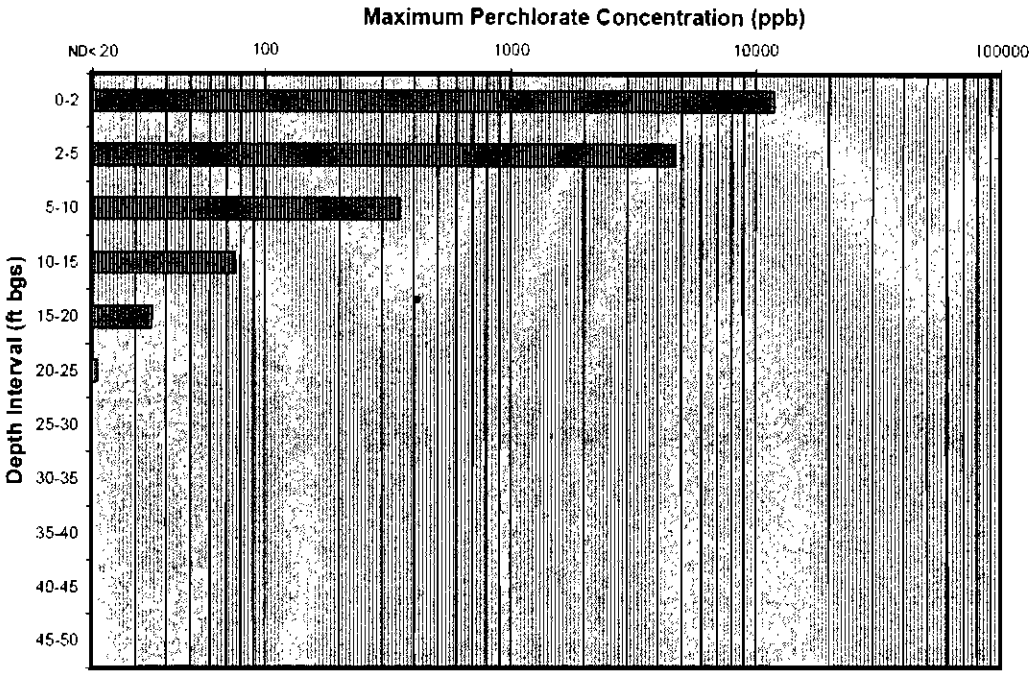
Perchlorate was detected in 32 of the 197 soil samples collected in Area 18. Figure 5, which follows, provides a graphical summary of the number of samples collected and the number of detections and non-detections at the various depth intervals sampled in Area 18. The number of samples containing detectable perchlorate decreased rapidly with depth.

FIGURE 5 - Vertical Distribution of Detections in Area 18



Perchlorate detections in Area 18 ranged from 12,000 ppb to 20 ppb with the highest detections in the shallowest samples (2 ft) and rapidly decreasing concentrations with depth. Deeper soil borings, which extended to 50 ft below the surface, showed no detectable concentrations of perchlorate at depths greater than 25 ft at any location. Figure 6 (see page 9), which follows, is a representation of the data presented in Table 5, showing the profile of maximum concentrations of perchlorate with depth. The data shows that there are fewer detections with depth (Figure 5, above), and that perchlorate concentrations rapidly decrease with depth (Figure 6, page 9).

FIGURE 6 - Soil Profile of Maximum Perchlorate Concentrations in Area 18



Based on all the data collected from Area 18 and presented here, the presence of perchlorate in the soil has been bounded laterally and vertically (see Figure 4, page 15).

2.2 VOC Testing in Soil and Soil Gas

Thirty soil samples from Areas 29, 37, 43 and 44 were analyzed for VOCs. None of these samples contained detectable TCE. At some locations, there were minor detections of other VOCs, such as chloroform (1,200 ppb in Area 44) and acetone (63 ppb in Area 37; 92 ppb in Area 43), as shown in Table 6 on page 16.

A total of 162 soil gas samples were collected and analyzed for VOCs, as provided for in the work plan. Table 6 (see page 16) shows the sampling rationale, number of samples collected, number of detections and maximum VOC concentrations at each of the former WCLC areas investigated for VOCs. Figure 7 (see page 17) shows the locations of the areas listed in Table 6. TCE was not detected in any of the 162 soil gas samples collected for analysis. Only six soil gas samples yielded detections of any VOCs; all of these samples contained m,p-xylenes at low concentrations, with a maximum of 2.4 ppb.

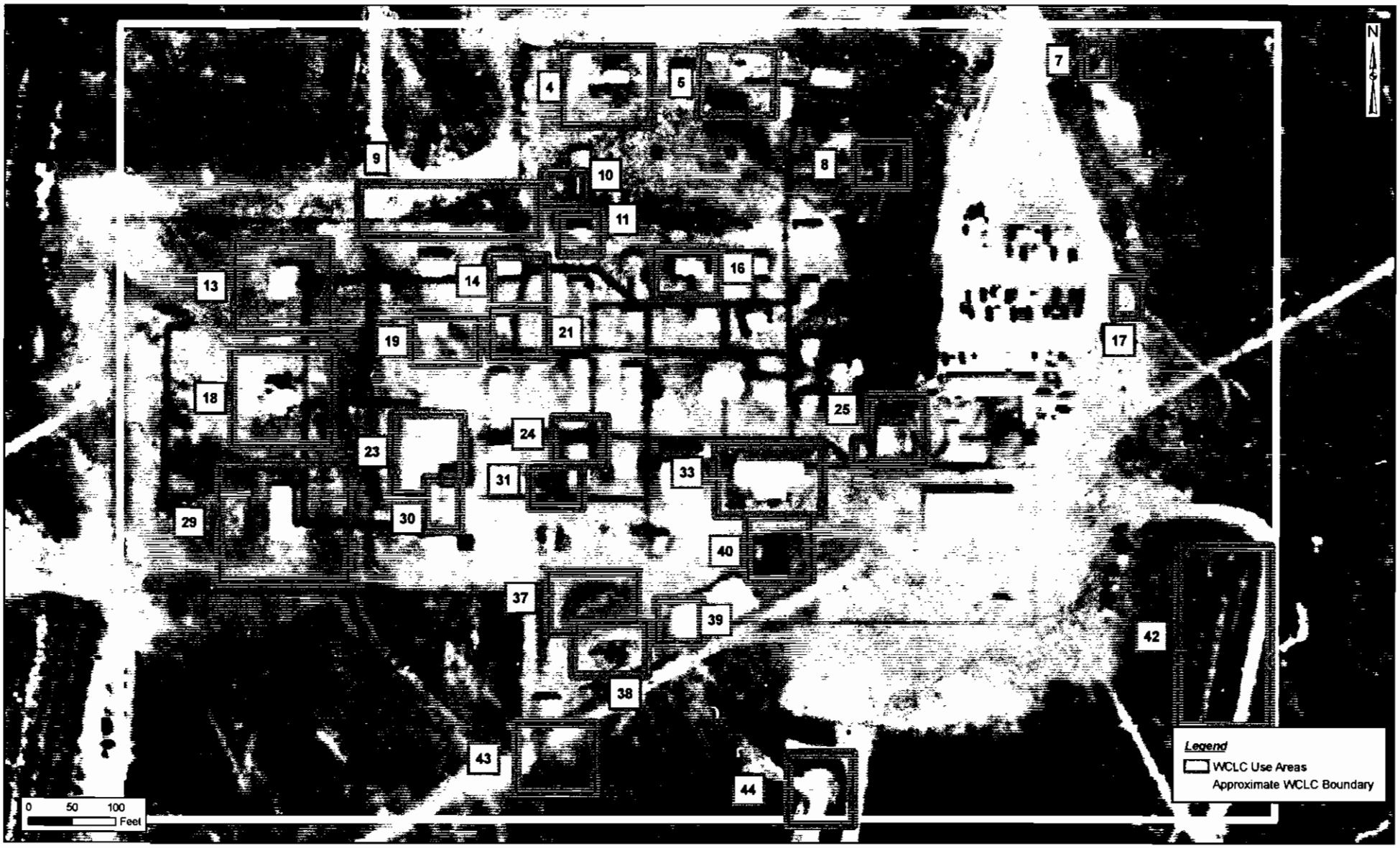
2.3 Ground Water Data

CMW-3 monitors the ground water from the western part of the northern use area, which includes Area 18 where detections of perchlorate up to 12,000 ppb were encountered in the shallow soil at Building 42. CMW-3 is the most immediately downgradient monitoring well of Building 42. The data from this well (Figure 8, page 18) shows no material impact of perchlorate or TCE.

There are nine wells on and immediately adjacent to the Site: PW-1 through PW-4 and CMW-1 through CMW-5. The locations of these are depicted on Figure A9 of Appendix A, at page A-15. A comprehensive presentation of all ground water data is provided in Table A6 of Appendix A, at page A-16.

TABLE 2 – WCLC Perchlorate Data

Area	Previously Used Area Designations / Building No.	Sampling Rationale	Perchlorate		
			No. of Samples	No. of Detections	Max (ppb)
18	M2, Building 42	Filling of Photoflash Cartridges, 4/12/1955 Building Explosion, Barrels of Unknown Contents Visible in Historical Aerial Photos	197	32	12,000
37	F1	Soil and Rock Pile	13	1	110
11	M3, Building 47	Screening & Drying of Perchlorate, Discoloration Visible in Historical Aerial Photos [W,G]	10	1	58
5	M8, Building 41	Formulating Photoflash Mix	3	0	ND
7	N4A	Northernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release	2	0	ND
8	M7, Building 15	Testing of Flares and Possibly Other Pyrotechnics	4	0	ND
9	N2, Buildings 33, 28	Deposition Testimony of Suspected Trench and Disposal Area	9	0	ND
10	M4, Building 48	Weighing of Perchlorate	3	0	ND
13	M1, Building 40	Weighing & Blending of Photoflash, Barrels of Unknown Contents Visible in Historical Aerial Photos	9	0	ND
14	M6, Building 28	Reported Inspection of Potassium Perchlorate	2	0	ND
17	N4B	Southernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release	3	0	ND
19	N1, Building 34	Former Press Building, Discolored Soil and Barrels of Unknown Contents Visible in Historical Aerial Photos	4	0	ND
21	M5, Building 30	Weighing of Perchlorate	2	0	ND
29	L3, Building 43	Deposition Testimony of Former WCLC Employee - Potential Use of Solvents	13	0	ND
42	N5B	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal - Easternmost Spur	10	0	ND
43	E1, Building 26	Former Boiler House, Liquid Discharge Visible in Historical Aerial Photos	17	0	ND
44	N5A	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal - Westernmost Spur	10	0	ND
		TOTAL	**311**	**34**	



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1955 WCLC FACILITY AND USE AREAS

160-ACRE SITE (1955 AERIAL)

Rialto, CA

Contract Number: 0410601A

Figure 2

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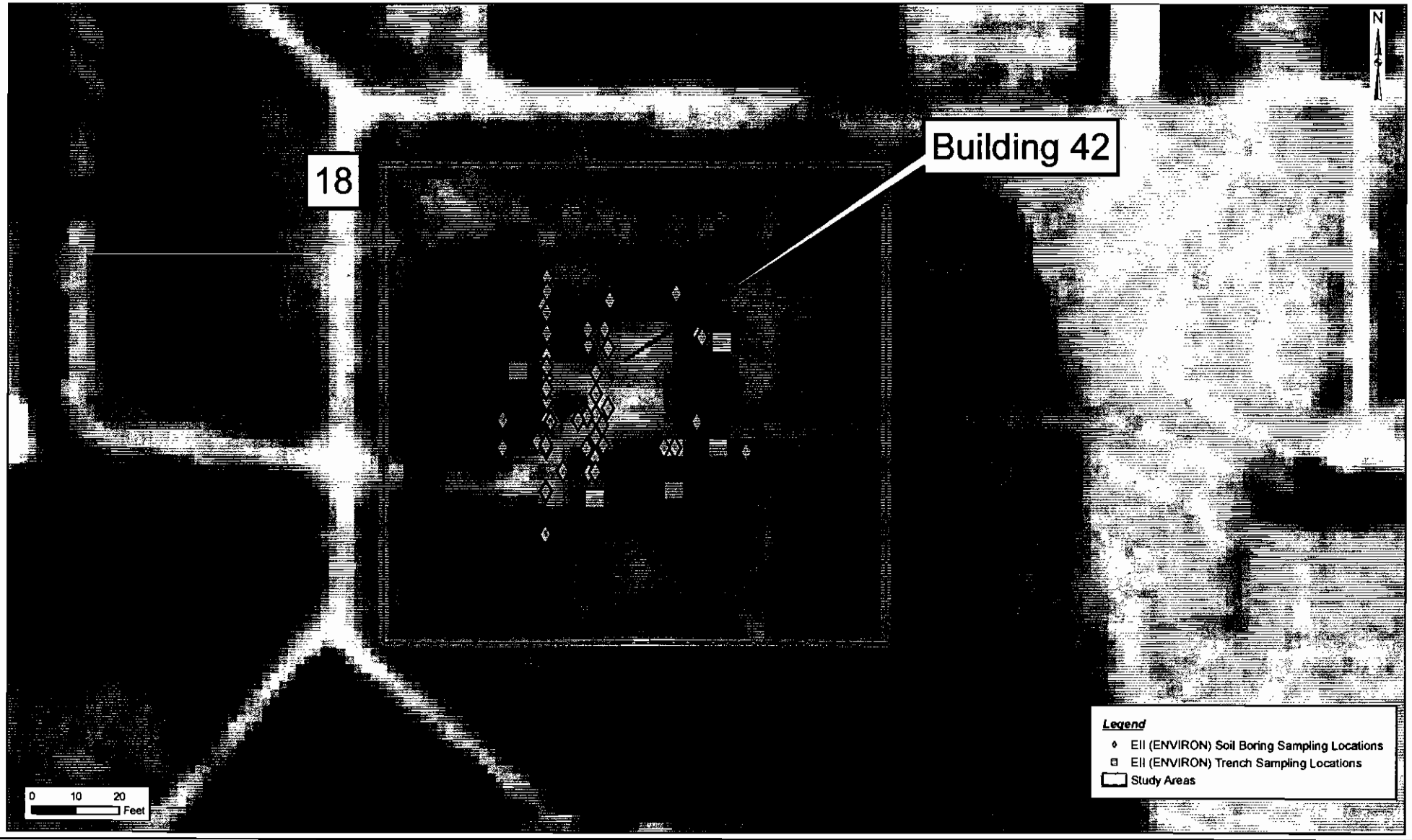
PERCHLORATE SOIL SAMPLING LOCATIONS IN FORMER WCLC USE AREAS

160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410601A

Figure 3



ENVIRON

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DETAIL OF AREA 18 (BUILDING 42)

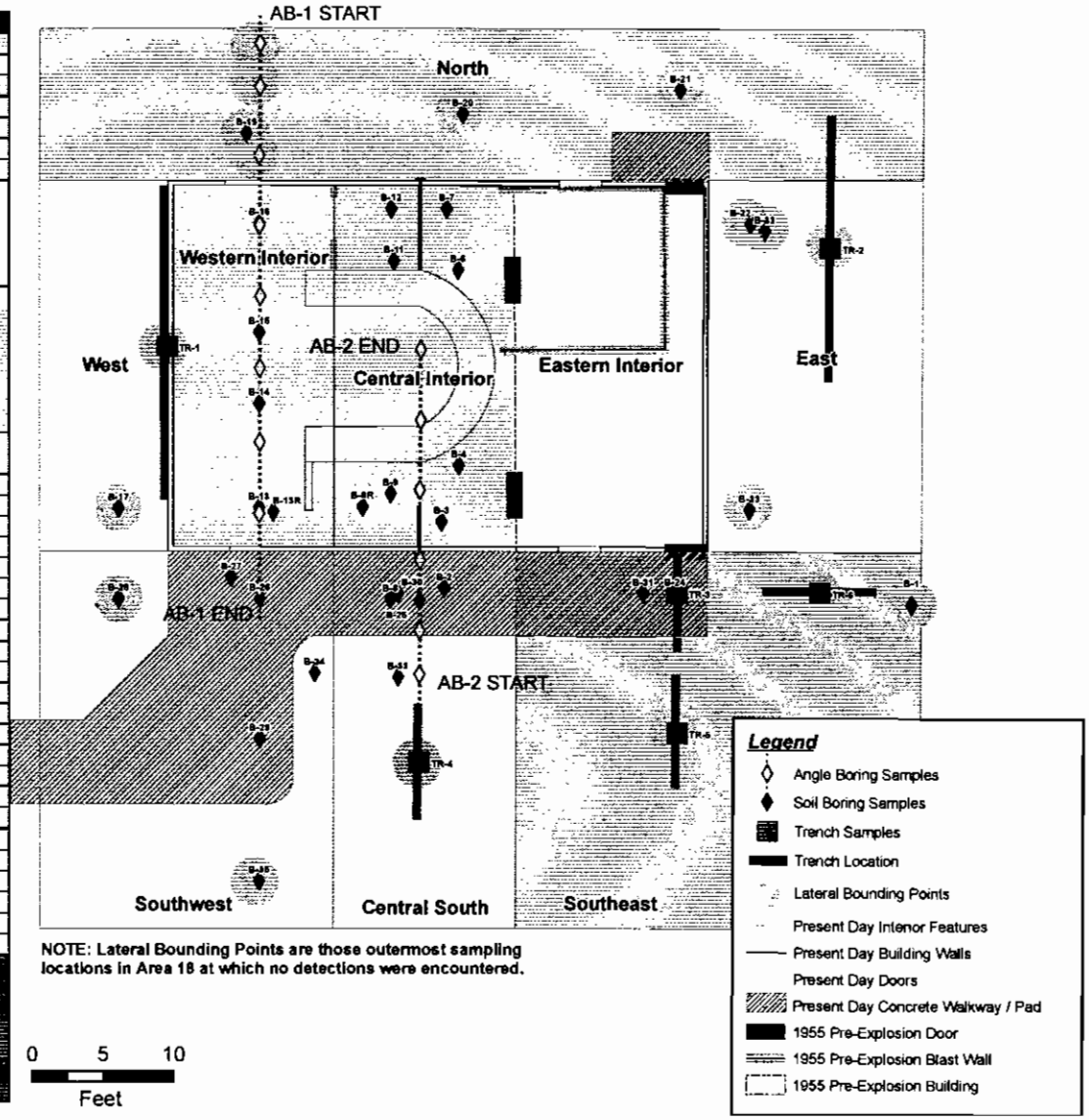
160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410801A

Figure 3b

Area	Covered Locations						Exposed Locations				
North	No Covered Locations in this Area						Depth	B-19	B-20	B-21	AB-1
							2-10	ND(3)	ND(3)	ND(3)	ND(3)
							15-25	ND(1)	ND(1)	ND(1)	-
West	No Covered Locations in this Area						Depth	B-17	TR-1		
							2-5	ND(2)	-		
							10-15	ND	ND(2)		
							20-25	ND	-		
Western Interior	Depth	B-13 (13R)	B-14	B-15	B-16	AB-1	No Exposed Locations in this Area				
	2	160	190	860	1300	-					
	4-5	ND	48	ND	22	-					
	7-10	ND(2)	28	ND	ND	-					
	15-35	-	-	-	-	ND(5)					
Central Interior	Depth	B-12	B-11, B-7, B-6, B-9 (9R)	B-3	B-4	AB-2	No Exposed Locations in this Area				
	2-3	ND	ND(4)	ND(2)	ND	-					
	5	-	ND(4)	-	ND	-					
	8-9	-	-	ND	ND	-					
	15-20	-	-	-	-	ND(2)					
	25	-	-	-	-	21					
Eastern Interior	No Samples						No Exposed Locations in this Area				
East	No Covered Locations in this Area						Depth	B-22, B-32	TR-2	B-23	
							2-5	ND(3)	-	ND(2)	
							10	ND(2)	ND	ND(2)	
							15	ND	ND(2)	-	
							20	ND(2)	-	-	
							25	ND(4)	-	ND(2)	
							30-50	ND(5)	-	-	
Southwest	Depth	B-26, B-27	B-29	AB-1			Depth	B-28	B-34	B-35	
	2	12000	4600	-			2	ND(2)	520/230	ND	
	5	4700	54/49	-			5	ND	55	ND	
	10-11	350	ND	-			10-20	ND(3)	ND(3)	ND(4)	
	15	60	ND	-			25	ND	ND	ND	
	20	35,ND	ND	-			30-50	-	ND(6)	-	
	25	20,ND	ND	-							
	30-35	ND(2)	-	-							
	40	ND	-	ND							
	45-50	ND(3)	-	-							
Central South	Depth	B-25, B-30	B-2	B-8	AB-2		Depth	B-33	AB-2	TR-4	
	2	680	65	510	-		2	290	80	ND	
	5	240	ND	ND	ND		5	130/110	-	ND	
	10	20	ND	73	ND		10-15	ND(2)	-	ND(2)	
	15	76	-	-	-		20-25	ND(2)	-	-	
	20-50	ND(10)	-	-	-						



NOTE: Lateral Bounding Points are those outermost sampling locations in Area 18 at which no detections were encountered.

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BUILDING 42 - SOIL SAMPLING LOCATIONS AND PERCHLORATE DATA

160-ACRE SITE

Rialto, CA

Contract Number: 0410801A

Figure 4

TABLE 6 – WCLC VOC Data

Area	Previously Used Area Designations / Building No.	Sampling Rationale	No. of Samples	TCE		Other VOCs*	
				No. of Detections	Max	No. of Detections	Max
SOIL DATA							
29	L3, Building 43	Deposition Testimony of Former WCLC Employee - Potential Use of Solvents	4	0	ND	0	ND
37	F1	Soil and Rock Pile	11	0	ND	3	63 (Acetone)
43	E1, Building 26	Former Boiler House, Liquid Discharge Visible in Historical Aerial Photos	14	0	ND	2	92 (Acetone)
44	N5A	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal - Westernmost Spur	1	0	ND	6	1200 (Chloroform)
		TOTAL	**30**	**0**	-	**11**	-
Area	**Previously Used Area Designations / Building No.**	**Sampling Rationale**	**No. of Samples**	**TCE**		**Other VOCs***	
				No. of Detections	**Max**	**No. of Detections**	**Max**
SOIL GAS DATA							
30	K1, Building 35	Former Assembly Shop - Deposition Testimony of Possible TCE Use	10	0	ND	4	2.4 (m,p-Xylenes)
43	E1, Building 26	Former Boiler House, Liquid Discharge Visible in Historical Aerial Photos	14	0	ND	1	1.4 (m,p-Xylenes)
29	L3, Building 43	Deposition Testimony of Former WCLC Employee - Potential Use of Solvents	14	0	ND	1	1.2 (m,p-Xylenes)
4	I1, Building 49	Darkened Area Visible in Historical Aerial Photos	8	0	ND	0	ND
7	N4A	Northernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release	2	0	ND	0	ND
9	N2, Buildings 33, 28	Deposition Testimony of Suspected Trench and Disposal Area	6	0	ND	0	ND
13	M1, Building 40	Weighing and Blending of Photoflash, Barrels of Unknown Contents Visible in Historical Aerial Photos	2	0	ND	0	ND
16	J1, Building 8	Drums and Darkened Surface Soil Visible in Historical Aerial Photos	8	0	ND	0	ND
17	N4B	Southernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release	3	0	ND	0	ND
18	M2, Building 42	Filling of Photoflash Cartridges, 4/12/1955 Building Explosion, Barrels of Unknown Contents Visible in Historical Aerial Photos	2	0	ND	0	ND
19	N1, Building 34	Former Press Building, Discolored Soil and Barrels of Unknown Contents Visible in Historical Aerial Photos	2	0	ND	0	ND
23	K2, Building 35	Former Assembly Shop - Deposition Testimony of Possible TCE Use	6	0	ND	0	ND
24	H1, Building 27	Former Scrap Metal Storage Area	8	0	ND	0	ND
25	L4, Building 18	Former Maintenance Shop - Deposition Testimony of Possible TCE Use	6	0	ND	0	ND
31	H2, Building 27	Darkened Area Visible in Historical Aerial Photos	8	0	ND	0	ND
33	L1, Building 1	Deposition Testimony of Possible Solvent Use	13	0	ND	0	ND
37	F1	Soil and Rock Pile	17	0	ND	0	ND
38	G2	Former Drum Storage Area Visible in Historical Aerial Photos	21	0	ND	0	ND
39	G1	Former Drum Storage Area Visible in Historical Aerial Photos	10	0	ND	0	ND
40	N3	Former Float Light Storage Area, Identified as a Possible Location for VOC Release	2	0	ND	0	ND
		TOTAL	**162**	**0**	-	**6**	-

*Only unqualified results are shown

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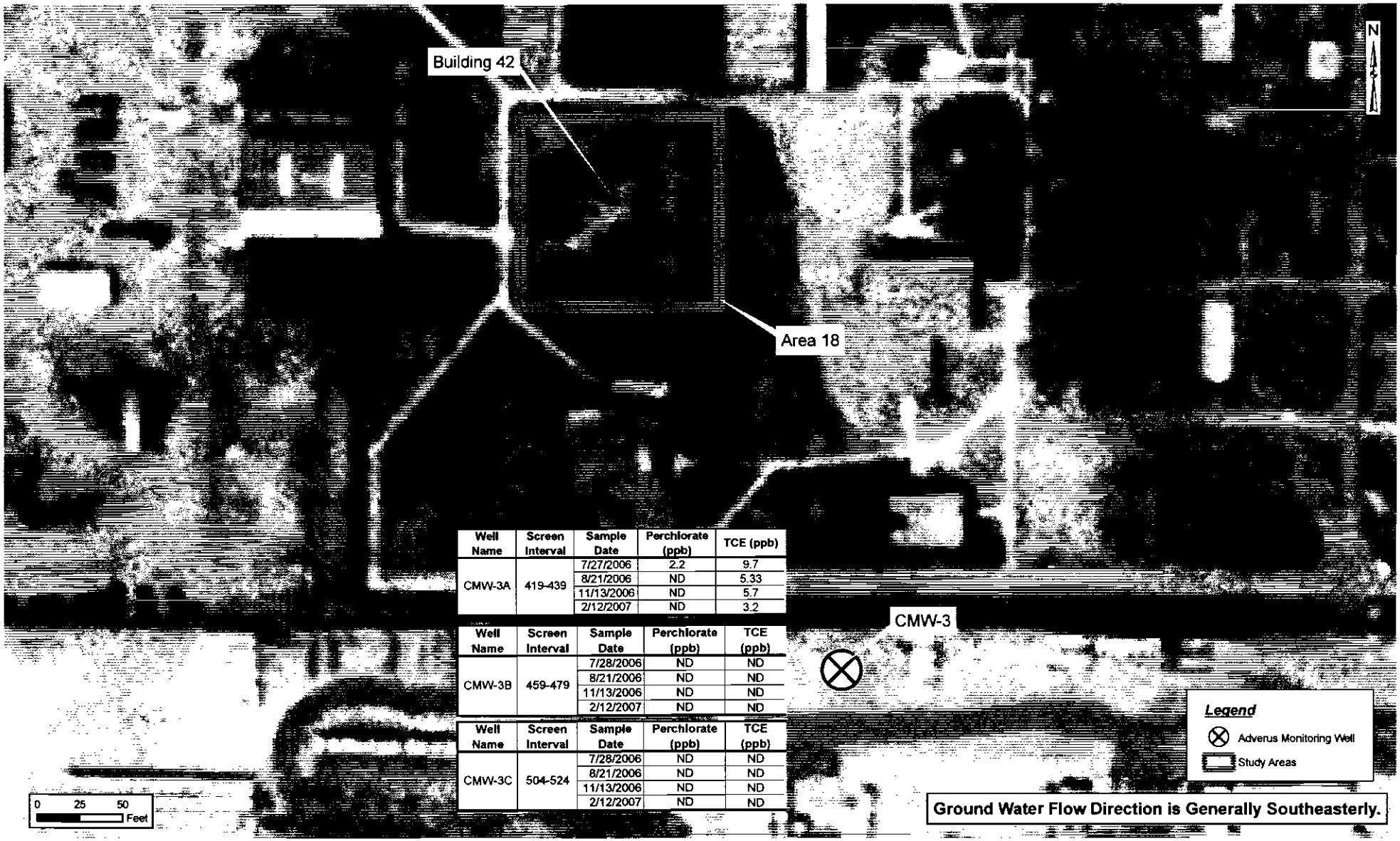
VOC SAMPLING LOCATIONS IN FORMER WCLC USE AREAS

160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410801A

Figure 7



Well Name	Screen Interval	Sample Date	Perchlorate (ppb)	TCE (ppb)
CMW-3A	419-439	7/27/2006	2.2	9.7
		8/21/2006	ND	5.33
		11/13/2006	ND	5.7
		2/12/2007	ND	3.2

Well Name	Screen Interval	Sample Date	Perchlorate (ppb)	TCE (ppb)
CMW-3B	459-479	7/28/2006	ND	ND
		8/21/2006	ND	ND
		11/13/2006	ND	ND
		2/12/2007	ND	ND

Well Name	Screen Interval	Sample Date	Perchlorate (ppb)	TCE (ppb)
CMW-3C	504-524	7/28/2006	ND	ND
		8/21/2006	ND	ND
		11/13/2006	ND	ND
		2/12/2007	ND	ND

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DATA IN WELL DOWNGRADIENT OF AREA 18

160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410801A

Figure 8

3.0 CONCLUSIONS

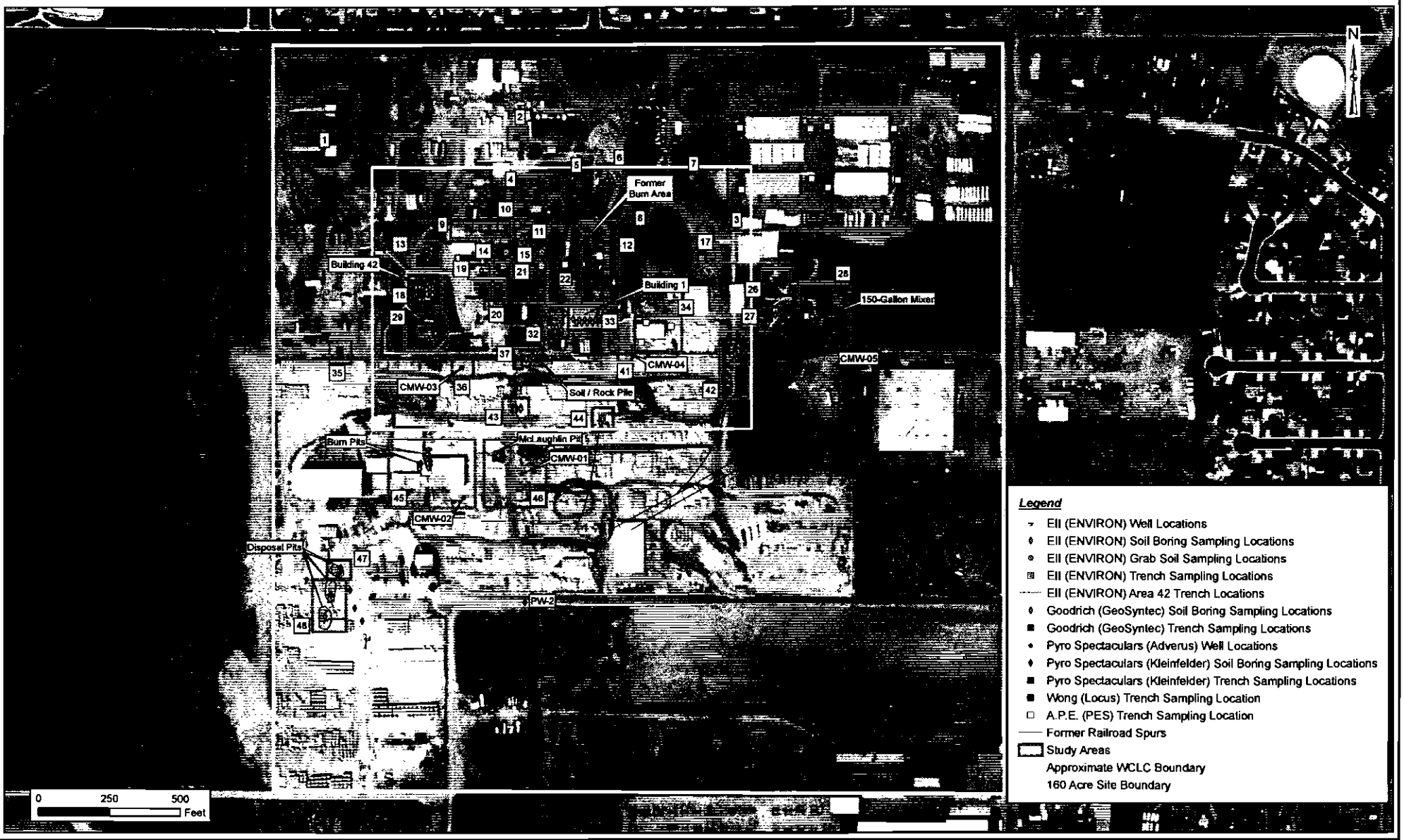
ENVIRON has completed the investigation of shallow soils and soil gas in recognized WCLC use areas where the use of perchlorate and/or TCE is known or suspected; these investigations included all areas where the USEPA or RWQCB requested sampling. Perchlorate was detected in shallow soils in Areas 18, 37, and 11. TCE was not detected in any of the soil or soil gas samples examined for VOCs in former WCLC use areas.

In soil, the three areas with detectable concentrations of perchlorate have all been bounded vertically and laterally, including Area 18 where detections up to 12,000 ppb were found in the shallow soil. Ground water from well CMW-3, which lies approximately 300 ft down gradient of Area 18 has, to date, produced no perchlorate levels in excess of i) the background range as identified by the RWQCB (10-15 ppb), ii) data from the upgradient well, PW-1, and iii) the state action level and proposed MCL of 6 ppb.

APPENDIX A

Appendix A presents a tabular and graphical summary of all soil, soil gas, and ground water data that, to its knowledge, has been collected on the 160-Acre Site. A map of sample locations of all known investigations to date is included in the body of the report as Figure 1. A summary of sampling area designations and the reasons they were sampled is included in the body of the report as Table 1. This Appendix includes the following figures and tables.

Title	Description	Page No.
Figure A1	Map of all soil sampling locations	A-2
Table A1	Area-by-area summary of the number of soil samples analyzed for perchlorate and TCE, the number of detections of perchlorate and TCE, and the maximum concentrations of perchlorate and TCE detected	A-3
Figure A2	Map of soil sampling locations in sampling areas where perchlorate was detected at concentrations >100 ppb	A-4
Table A2	Area-by-area summary of the number of samples analyzed, the number of detections, and the maximum concentration detected for perchlorate and TCE with depth for areas with perchlorate detections >100 ppb	A-5
Figure A3	Detail of a portion of Figure A2 showing details of soil sampling locations in Areas 45, 46, 47, and 48	A-6
Figure A4	Detail of a portion of Figure A2 showing details of soil sampling locations in Area 18	A-7
Figure A5	Detail of a portion of Figure A2 showing soil sampling locations in Areas 22, 33, and 37	A-8
Figure A6	Map showing soil sampling locations in areas where perchlorate was detected at concentrations <100 ppb	A-9
Table A3	Area-by-area summary of the number of samples analyzed, the number of detections, and the maximum concentration detected for perchlorate and TCE for areas where perchlorate was detected at concentrations <100 ppb	A-10
Figure A7	Map showing soil sampling locations in areas where perchlorate was tested for but not detected	A-11
Table A4	Area-by-area summary of the number of samples analyzed, the number of detections, and the maximum concentration detected for perchlorate and TCE for areas where perchlorate was tested for but not detected	A-12
Figure A8	Map showing soil gas sampling locations with VOCs detections posted	A-13
Table A5	Area-by-area summary of the number of soil gas samples collected and analyzed, the number of TCE detections, and the maximum TCE concentration detected	A-14
Figure A9	Map showing the locations of monitoring wells on and immediately adjacent to the Site	A-15
Table A6	Perchlorate and TCE data from monitoring wells on and immediately adjacent to the Site	A-16
References	Reports from which data were obtained	A-17



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SOIL SAMPLING LOCATIONS

160-ACRE SITE (2003 AERIAL)

Rialto, CA

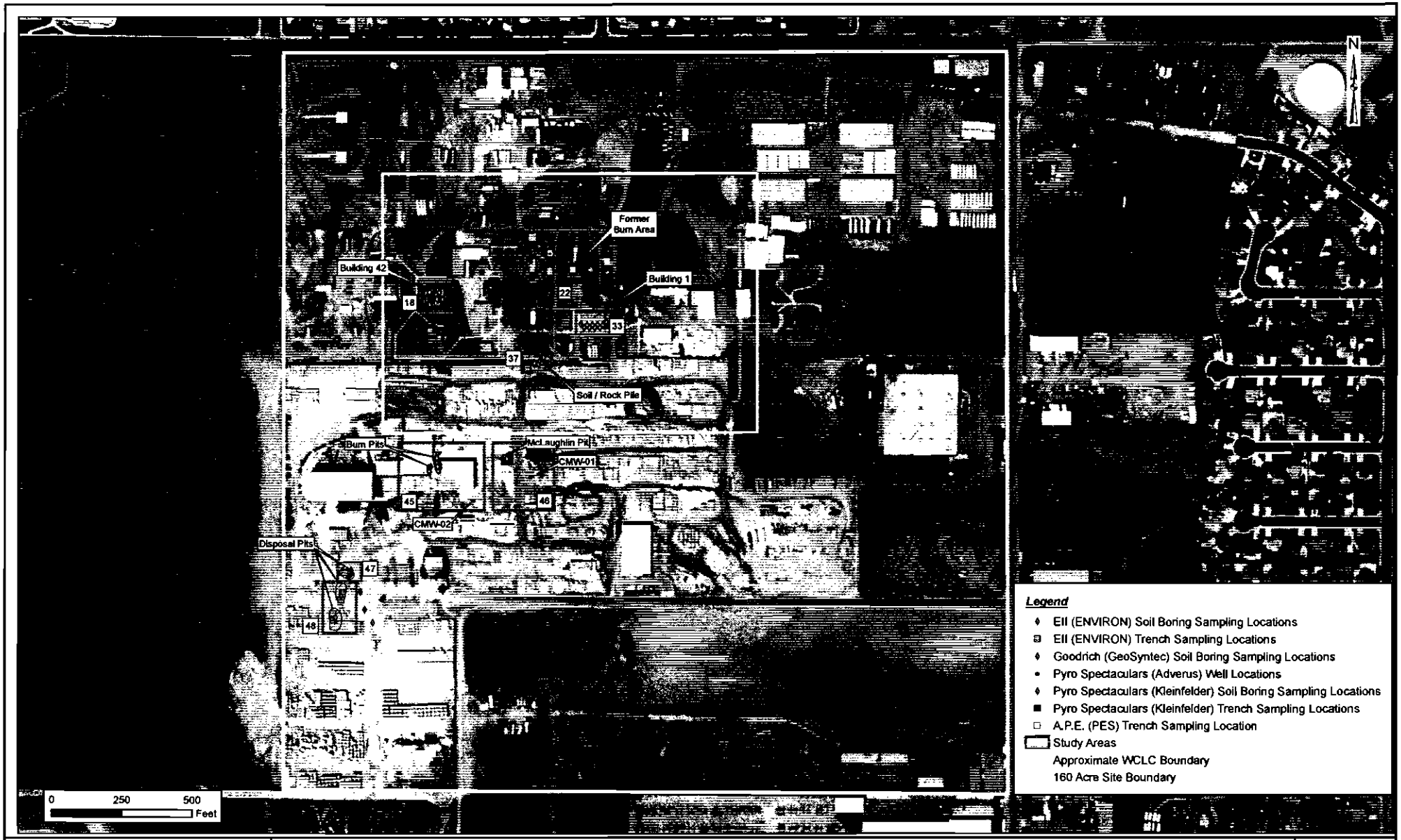
Contract Number: 0410801A

Figure A1

TABLE A1 – Soil Data Overview

Area	Sampling Rationale	Operator	Perchlorate			TCE			Other VOCs*
			Number of Samples	Number of Detections	Maximum (ppb)	Number of Samples	Number of Detections	Maximum (ppb)	
1	Storage Area	PS	3	0	ND	3	0	ND	6.1 ppb (1,2,4-Trimethylbenzene)
2	Former Mortar Storage	PS	3	0	ND	3	0	ND	-
3	Storage, Handling and Assembly of Class C Explosives	A	21	0	ND	0	-	-	-
4	Darkened Area Visible in Historical Aerial Photos/ Clarifier	W/F	5	0	ND	2	0	ND	-
5	Formulating Photoflash Mix / Clarifier / Pyrotechnics Disposal Area	W/F/F	12	0	ND	4	0	ND	-
6	Laboratory where Rocket Propellant Mixes were Formulated for Testing	G	17	0	ND	0	-	-	-
7	Northernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release	W	2	0	ND	0	-	-	-
8	Testing of Flares and Possibly Other Pyrotechnics	W	4	0	ND	0	-	-	-
9	Deposition Testimony of Suspected Trench and Disposal Area	W	9	0	ND	0	-	-	-
10	Weighing of Perchlorate	W	3	0	ND	0	-	-	-
11	Screening and Drying of Perchlorate, Discoloration Visible in Historical Aerial Photos	W,G	10	1	58	0	-	-	-
12	Mixing of Ammonium Perchlorate in Small R&D Mixers / Clarifiers	G/F	16	1	57	4	0	ND	-
13	Weighing and Blending of Photoflash, Barrels of Unknown Contents Visible in Historical Aerial Photos	W	9	0	ND	0	-	-	-
14	Reported Inspection of Potassium Perchlorate / Clarifier	W/F	6	0	ND	2	0	ND	-
15	Screening and Drying of Ammonium Perchlorate	G	5	0	ND	0	-	-	-
17	Southernmost of 2 Former Incinerators, Identified as Possible Location for VOC Release	W	3	0	ND	0	-	-	-
18	Filling of Photoflash Cartridges, 4/12/1955 Building Explosion, Barrels of Unknown Contents Visible in Historical Aerial Photos	W	197	32	12,000	0	-	-	-
19	Former Press Building, Discolored Soil and Barrels of Unknown Contents Visible in Historical Aerial Photos	W	4	0	ND	0	-	-	-
20	100 Gallon Mixer - Mixing of Ammonium Perchlorate / Clarifier	G/F	8	0	ND	2	0	ND	-
21	Weighing of Perchlorate / Clarifier	W/F	6	0	ND	2	0	ND	-
22	Former Burn Area of Pyrotechnics Waste	A	11	6	2,900	0	-	-	-
26	Clarifier	p	4	0	ND	2	0	ND	-
27	Mixer Building / Clarifier	P/F	9	0	ND	2	0	ND	-
28	150-Gallon Production Mixer Area	G	47	4	68	3	0	ND	-
29	Deposition Testimony of Former WCLC Employee - Potential Use of Solvents / Clarifier	W/F	17	0	ND	4	0	ND	-
32	Weighing of Ammonium Perchlorate	G	22	2	54	0	-	-	-
33	Sidewinder Salvage / Deposition Testimony of Possible Solvent Use	G/W	33	19	7,400	0	-	-	-
34	Storage of Class C Explosives	A	7	1	41	0	-	-	-
35	Current Mortar Storage	PS	3	0	ND	3	0	ND	-
36	Installation of Monitoring Well	-	12	1	39	9	0	ND	-
37	Soil and Rock Pile	W	13	1	110	11	0	ND	63 ppb (Acetone), 16 ppb (Acetone), 12 ppb (Acetone)
41	Installation of Monitoring Well	-	5	0	ND	0	-	-	-
42	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal - Easternmost Spur	W	10	0	ND	0	-	-	-
43	Former Boiler House, Liquid Discharge Visible in Historical Aerial Photos	W	17	0	ND	14	0	ND	92 ppb (Acetone), 4 4 ppb (Toluene)
44	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal - Westernmost Spur	W	10	0	ND	1	0	ND	1200 ppb (Chloroform), 830 ppb (p-Cymene), 670 ppb (Styrene), 290 ppb (Propylbenzene), 270 ppb (1-Methylethylbenzene), 180 ppb (Ethylbenzene)
45	Historical Aerial Photo Review Shows 2 Pits that, According to Testimony, Appear to Have Been Used for the Burning of Waste	G	67	34	1,700	47	0	ND	-
46	Historical Aerial Photo Review Shows Impoundment that, According to Records and Testimony, Was Used for Submersion of Pyrotechnic Waste	P	57	49	205,000	31	2	8 7	-
47	Historical Aerial Photo Review Shows 3 Pits that, According to Testimony, Appear to Have Been Used for Waste Disposal -- Northernmost Pit	G	16	12	9,000	8	0	ND	1600 ppb (2-Ethyl-1-hexanol), 52 ppb (2-Ethyl-1-hexanol)
48	Historical Aerial Photo Review Shows 3 Pits that, According to Testimony, Appear to Have Been Used for Waste Disposal – 2 Southernmost Pits	P	27	22	3,900	17	0	ND	2.4 ppb (PCE)
	TOTAL		730	185	-	174	2	-	

Notes: [A] = American Promotional Events, [F] = Fireworks companies, [G] = Goodrich, [P] = Pyrotronics, [PS] = Pyro Spectaculars, [W] = West Coast Loading Corporation



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AREAS WITH PERCHLORATE DETECTIONS IN SOIL >100 PPB

160-ACRE SITE (2003 AERIAL)

Rialto, CA

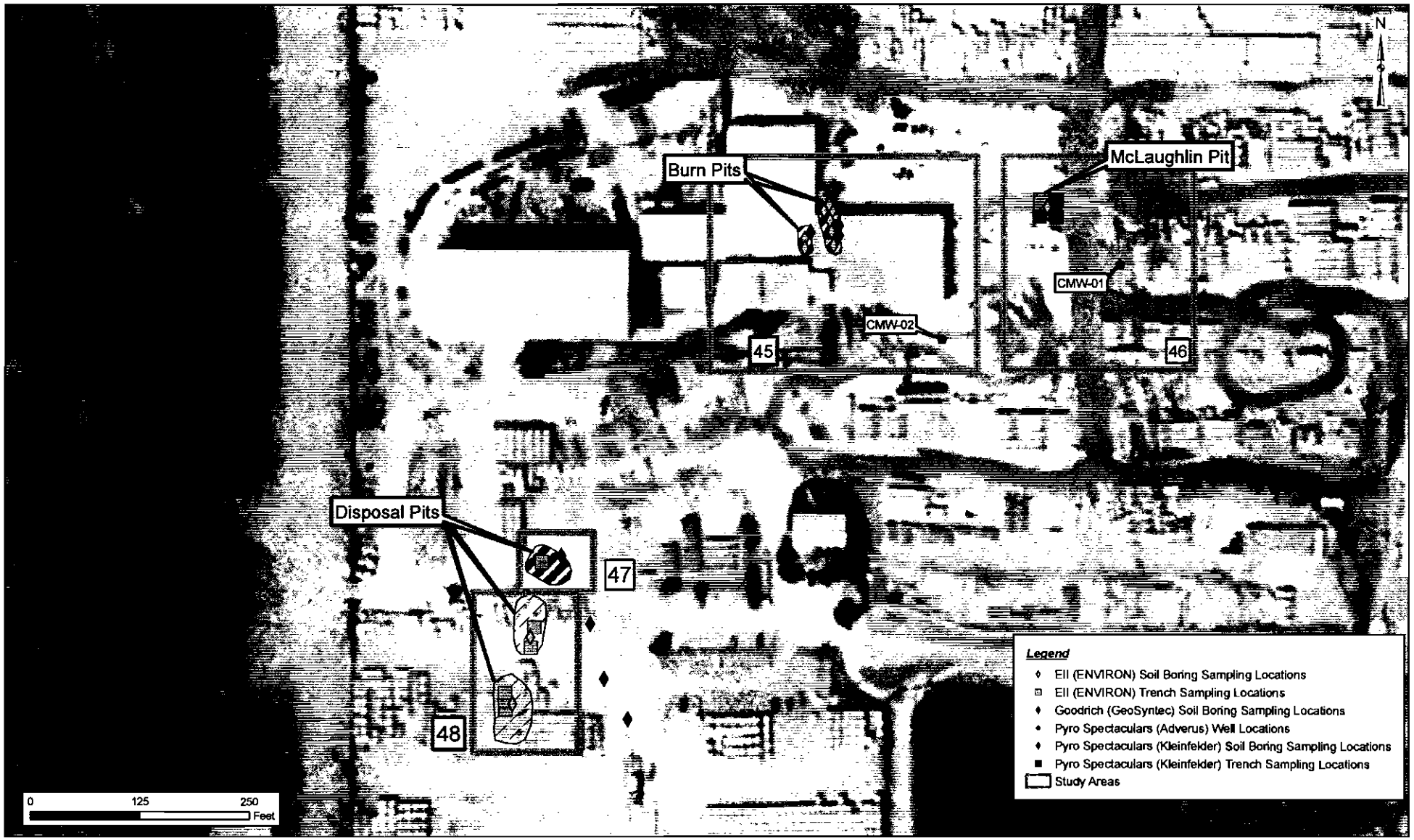
Contract Number: 0410801A

Figure A2

TABLE A2 - Areas with Perchlorate Detections in Soil >100 ppb

Area	Operator	Depth Interval (ft bgs)	Perchlorate (ppb)			TCE (ppb)			Other VOCs*
			No. of Samples	No. of Detections	Max	No. of Samples	No. of Detections	Max	
Area 46 - McLaughlin Pit (Figure A3)	P[1]	0-5	5	3	8,860	0	-	-	-
		5-10	3	2	189,000	1	0	ND	-
		10-20	7	5	205,000	2	0	ND	-
		20-50	3	1	16,000	2	0	ND	-
		50-100	6	6	12,000	2	0	ND	-
		100-200	11	11	24,000	8	0	ND	-
		200-300	11	11	730	8	1	8.7	-
		300-400	9	8	1,900	7	0	ND	-
		400-440	2	2	1,800	1	1	4.5	-
		AREA TOTAL	**57**	**49**		**31**	**2**	-	
Area 18 - Building 42 (Figure A4)	W[2]	0-2	35	14	12,000	0	-	-	-
		2-5	34	9	4,700	0	-	-	-
		5-10	36	4	350	0	-	-	-
		10-15	19	2	76	0	-	-	-
		15-20	17	1	35	0	-	-	-
		20-25	25	2	21	0	-	-	-
		25-30	6	0	ND	0	-	-	-
		30-35	7	0	ND	0	-	-	-
		35-40	6	0	ND	0	-	-	-
		40-45	5	0	ND	0	-	-	-
		45-50	7	0	ND	0	-	-	-
		AREA TOTAL	**197**	**32**	**12,000**	**0**	-	-	
Area 47 - Disposal Pit (Figure A3)	G[3]	0-5	7	3	2,900	5	0	ND	1600 ppb and 52 ppb (2-Ethyl-1-hexanol)
		5-10	8	8	9,000	1	0	ND	-
		10-15	1	1	1,700	1	0	ND	-
		AREA TOTAL	**16**	**12**	**9,000**	**7**	**0**	-	
Area 33 - Building 1 (Figure A5)	G	0-5	6	5	7,400	0	-	-	-
		5-10	9	6	3,300	0	-	-	-
		10-15	5	3	2,100	0	-	-	-
		15-20	4	3	1,800	0	-	-	-
		20-25	9	2	180	0	-	-	-
		AREA TOTAL	**33**	**19**	**7,400**	**0**	-	-	
Area 48 - Disposal Pits (Figure A3)	P	0-5	7	3	310	5	0	ND	2.4 ppb (PCE)
		5-10	8	8	3,900	6	0	ND	-
		10-15	8	8	1,800	6	0	ND	-
		15-20	2	2	170	0	-	-	-
		20-25	2	1	63	0	-		-
		AREA TOTAL	**27**	**22**	**3,900**	**17**	**0**	-	
Area 22 - Former Burn Area (Figure A5)	A[4]	0-2	5	3	2,900	0	-	-	-
		2-8	6	3	290	0	-	-	-
		AREA TOTAL	**11**	**6**	**2,900**	**0**	-	-	
Area 45 - Burn Pits (Figure A3)	G	0-5	8	2	750	3	0	ND	-
		5-10	12	7	720	8	0	ND	-
		10-15	12	9	760	7	0	ND	-
		15-20	8	3	170	6	0	ND	-
		20-25	7	3	64	4	0	ND	-
		25-100	5	4	100	4	0	ND	-
		100-200	4	4	1,700	4	0	ND	-
		200-300	5	2	110	5	0	ND	-
		300-418	6	0	ND	6	0	ND	-
		AREA TOTAL	**67**	**34**	**1,700**	**47**	**0**	-	
Area 37 - Soil/rock pile (Figure A5)	W	0-6	6	1	110	6	0	ND	12 ppb (Acetone)
		6-10	4	0	ND	3	0	ND	16 ppb (Acetone)
		10-15	3	0	ND	2	0	ND	63 ppb (Acetone)
		AREA TOTAL	**13**	**1**	**110**	**11**	**0**	-	
TOTAL			**421**	**126**	-	**115**	**2**	-	**6**

Notes: [1]Pyrotronics, [2]West Coast Loading Corporation, [3]Goodrich, [4]American Promotional Events
*Only unqualified results are shown



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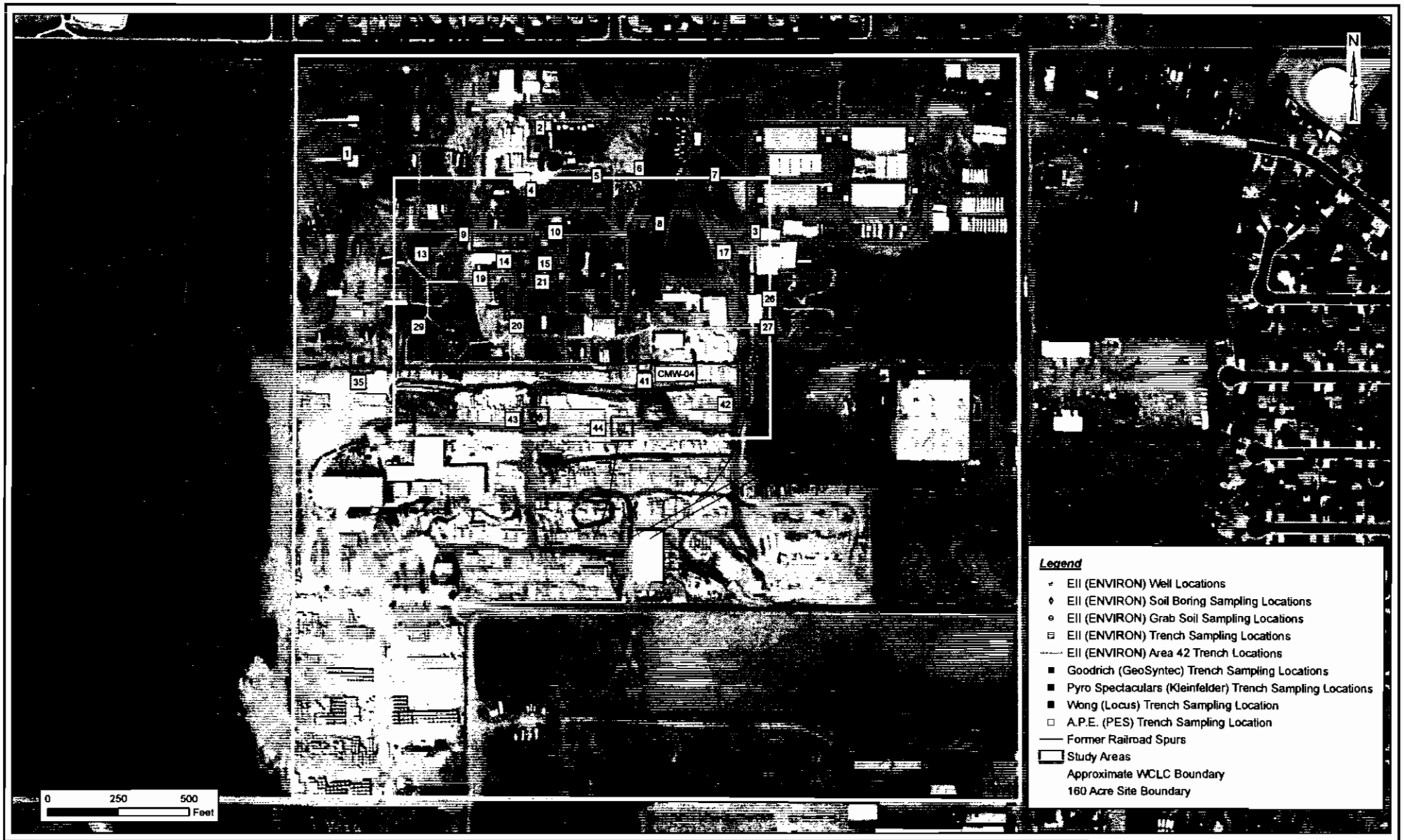
DETAIL OF AREAS 45, 46, 47, AND 48

160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410801A

Figure **A3**



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AREAS WITH NO PERCHLORATE DETECTIONS IN SOIL

160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410801A

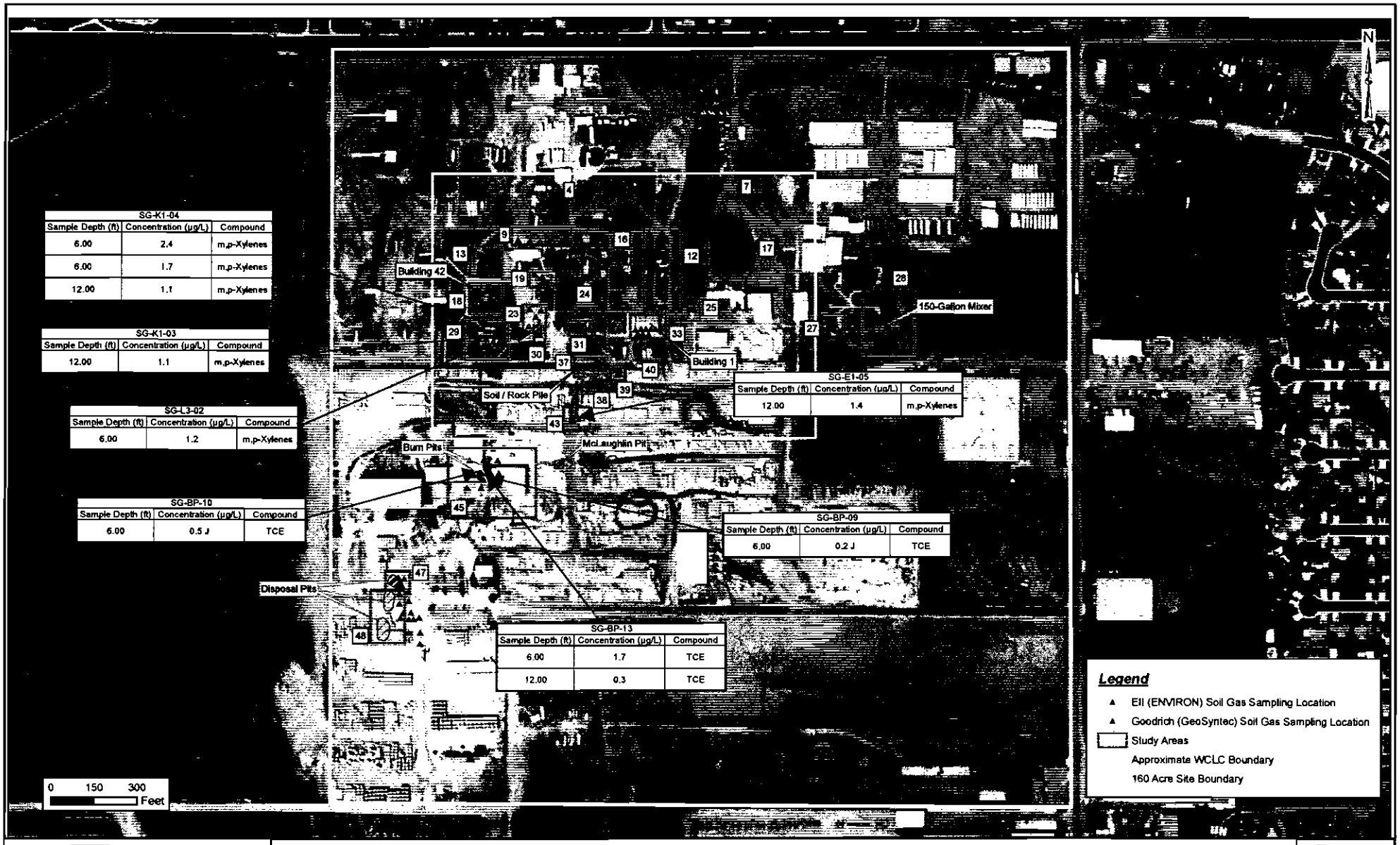
Figure A7

TABLE A4 - Areas with No Perchlorate Detections in Soil

Area	Sampling Rationale	Operator	Perchlorate		TCE		Other VOCs*
			No. of Samples	No. of Detections	No. of Samples	No. of Detections	
1	Storage Area	PS[1]	3	0	3	0	-
2	Former Mortar Storage	PS	3	0	3	0	6.1 ppb (1,2,4-Trimethylbenzene)
3	Storage, Handling and Assembly of Class C Explosives	A[2]	21	0	0	-	-
4	Clarifier	F[3]	5	0	2	0	-
5	Formulating Photoflash Mix / Clarifier / Pyrotechnics Disposal Area	W[4] / F / F	12	0	4	0	-
6	Laboratory where Rocket Propellant Mixes were Formulated for Testing	G[5]	17	0	0	-	-
7, 17	2 Former Incinerators, Identified as Possible Locations for VOC Release	W	5	0	0	-	-
8	Testing of Flares and Possibly Other Pyrotechnics	W	4	0	0	-	-
9	Deposition Testimony of Suspected Trench and Disposal Area	W	9	0	0	-	-
10	Weighing of Perchlorate	W	3	0	0	-	-
13	Weighing and Blending of Photoflash, Barrels of Unknown Contents Visible in Historical Aerial Photos	W	9	0	0	-	-
14	Reported Inspection of Potassium Perchlorate / Clarifier	W / F	6	0	2	0	-
15	Screening and Drying of Ammonium Perchlorate	G	5	0	0	-	-
19	Former Press Building, Discolored Soil and Barrels of Unknown Contents Visible in Historical Aerial Photos	W	4	0	0	-	-
20	100 Gallon Mixer - Mixing of Ammonium Perchlorate / Clarifier	G / F	8	0	2	0	-
21	Weighing of Perchlorate / Clarifier	W / F	6	0	2	0	-
26	Clarifier	F	4	0	2	0	-
27	Mixer Building / Clarifier	P[6] / F	9	0	2	0	-
29	Deposition Testimony of Former WCLC Employee - Potential Use of Solvents / Clarifier	W / F	17	0	4	0	-
35	Current Mortar Storage	PS	3	0	3	0	-
41	Installation of Monitoring Well	-	5	0	0	-	-
42, 44	Historical Aerial Photo Review Shows Former Railroad Spurs that Appear to Have Been Used for Waste Disposal	W	20	0	1	0	1200 ppb (Chloroform), 830 ppb (p-Cymene), 670 ppb (Styrene), 290 ppb (Propylbenzene), 270 ppb (1-Methylethylbenzene), 180 ppb (Ethylbenzene)
43	Former Boiler House, Liquid Discharge Visible in Historical Aerial Photos	W	17	0	14	0	92 ppb (Acetone), 4.4 ppb (Toluene)
	TOTAL		**195**	**0**	**44**	**0**	

Notes: [1]Pyro Spectaculars, [2]APE, [3]Fireworks companies, [4]WCLC, [5]Goodrich, [6]Pyrotronics

* Only unqualified results are shown



SG-K1-04		
Sample Depth (ft)	Concentration (µg/L)	Compound
6.00	2.4	m,p-Xylenes
6.00	1.7	m,p-Xylenes
12.00	1.1	m,p-Xylenes

SG-K1-03		
Sample Depth (ft)	Concentration (µg/L)	Compound
12.00	1.1	m,p-Xylenes

SG-L3-02		
Sample Depth (ft)	Concentration (µg/L)	Compound
6.00	1.2	m,p-Xylenes

SG-BP-10		
Sample Depth (ft)	Concentration (µg/L)	Compound
6.00	0.5 J	TCE

SG-E1-05		
Sample Depth (ft)	Concentration (µg/L)	Compound
12.00	1.4	m,p-Xylenes

SG-BP-09		
Sample Depth (ft)	Concentration (µg/L)	Compound
6.00	0.2 J	TCE

SG-BP-13		
Sample Depth (ft)	Concentration (µg/L)	Compound
6.00	1.7	TCE
12.00	0.3	TCE

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SOIL GAS SAMPLING LOCATIONS AND DETECTIONS

160-ACRE SITE (2003 AERIAL)

Rialto, CA

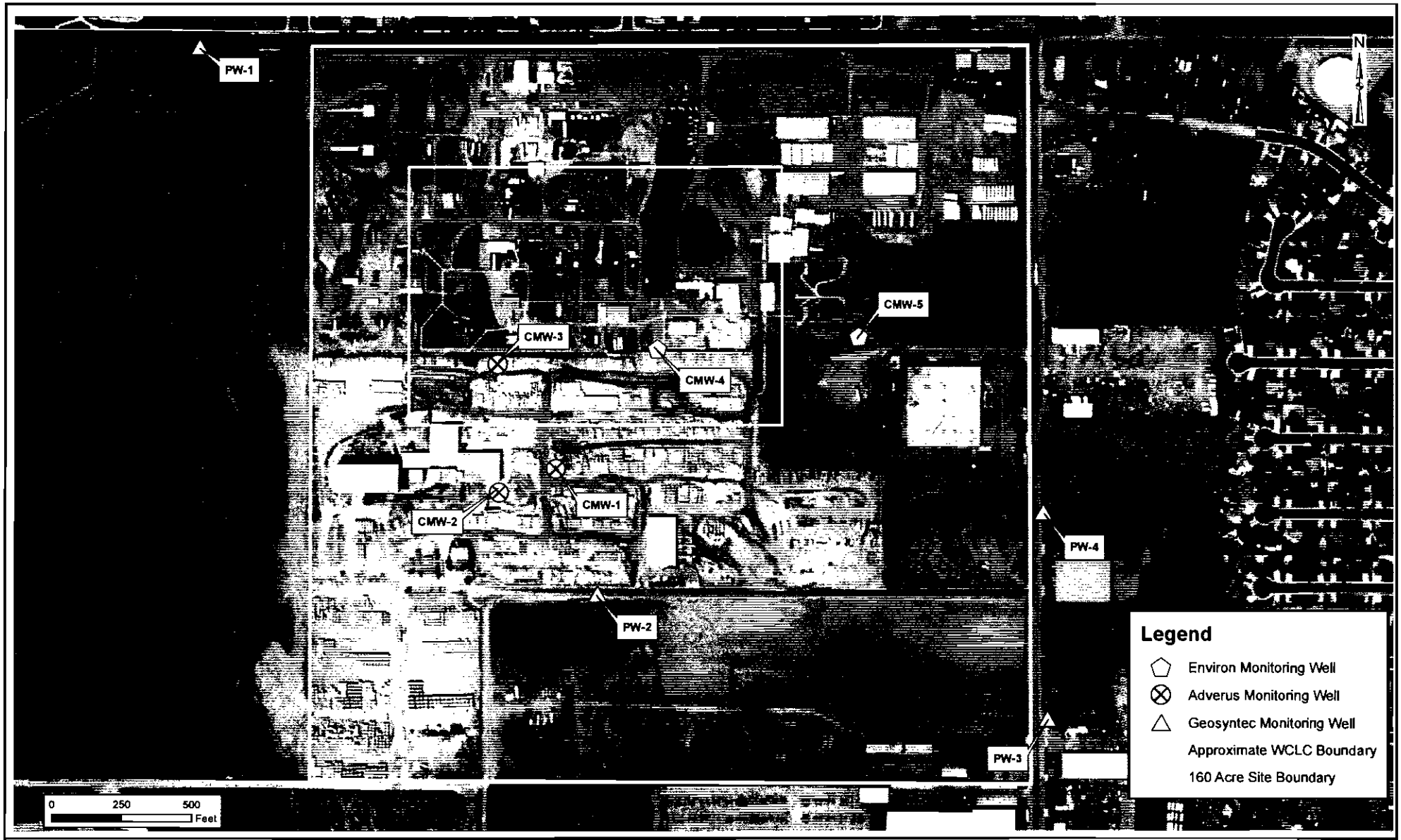
Contract Number: 0410801A

Figure A8

TABLE A5 - Soil Gas Data

Area	Sampling Rationale	Operator	TCE			Other VOCs*
			No. of Samples	No. of Detections	Max (ppb)	
4	Darkened Area Visible in Historical Aerial Photos	W[1]	8	0	ND	-
7, 17	2 Former Incinerators, Identified as Possible Locations for VOC Release	W	5	0	ND	-
9	Deposition Testimony of Suspected Trench & Disposal Area	W	6	0	ND	-
12	Mixing of Ammonium Perchlorate in Small R&D Mixers	G[2]	40	0	ND	-
13	Weighing and Blending of Photoflash, Barrels of Unknown Contents Visible in Historical Aerial Photos	W	2	0	ND	-
16	Drums and Darkened Surface Soil Visible in Historical Aerial Photos	W	8	0	ND	-
18	Filling of Photoflash Cartridges, 4/12/1955 Building Explosion, Barrels of Unknown Contents Visible in Historical Aerial Photos	W	2	0	ND	-
19	Former Press Building, Discolored Soil and Barrels of Unknown Contents Visible in Historical Aerial Photos	W	2	0	ND	-
23	Former Assembly Shop - Deposition Testimony of Possible TCE Use	W	8	0	ND	-
24	Former Scrap Metal Storage Area	W	8	0	ND	-
25	Former Maintenance Shop - Deposition Testimony of Possible TCE Use	W	6	0	ND	-
27	Mixer Building	P[3]	4	0	ND	-
28	150-Gallon Production Mixer Area	G	28	0	ND	-
29	Deposition Testimony of Former WCLC Employee - Potential Use of Solvents	W	14	0	ND	1.2 ppb (m,p-Xylenes)
30	Former Assembly Shop - Deposition Testimony of Possible TCE Use	W	10	0	ND	1.1 ppb, 1.1 ppb, 1.7 ppb and 2.4 ppb (m,p-Xylenes)
31	Darkened Area Visible in Historical Aerial Photos	W	8	0	ND	-
33	Deposition Testimony of Possible Solvent Use	W	13	0	ND	-
37	Soil and Rock Pile	W	17	0	ND	-
38	Former Drum Storage Area Visible in Historical Aerial Photos	W	21	0	ND	-
39	Former Drum Storage Area Visible in Historical Aerial Photos	W	10	0	ND	-
40	Former Float Light Storage Area, Identified as a Possible Location for VOC Release	W	2	0	ND	-
43	Former Boiler House, Liquid Discharge Visible in Historical Aerial Photos	W	14	0	ND	1.4 ppb (m,p-Xylenes)
45	Historical Aerial Photo Review Shows 2 Pits that, According to Testimony, Appear to Have Been Used for the Burning of Waste	G	33	4	1.7	-
47, 48	Historical Aerial Photo Review Shows 3 Pits that, According to Testimony, Appear to Have Been Used for Waste Disposal	G,P	19	0	ND	-
	TOTAL		288	4	-	6

Notes: [1]West Coast Loading, [2]Goodrich, [3]Pyrotronics
* Only unqualified results are shown



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MONITORING WELL LOCATIONS

160-ACRE SITE (2003 AERIAL)

Rialto, CA

Contract Number: 0410801A

Figure A9

TABLE A6 – Ground Water Data

Well Name	Screen Interval (ft bgs)	Sample Date	Perchlorate (ppb)	TCE (ppb)
PW-1	440-480	10/28/2004	ND	ND
		11/30/2004	ND	ND
		12/28/2004	ND	ND
		12/28/2004	ND	ND
		1/26/2005	ND	ND
		4/19/2005	ND	ND
		7/28/2005	ND	ND
		10/29/2005	6.3	ND
		1/4/2006	1.6	ND
		4/3/2006	ND	ND
		7/5/2006	ND	ND
		8/30/2006	ND	ND
		11/17/2006	ND	ND
PW-2	455-495	10/27/2004	40	49
		11/29/2004	57	60
		12/27/2004	73	62
		1/25/2005	47	45
		4/18/2005	53	49
		7/27/2005	43	42
		10/29/2005	730	36
		1/6/2006	3,500	110
		4/5/2006	10,000	390
		6/5/2006	5,000	420
		7/7/2006	3,600	250
		9/1/2006	3,600	310
		11/21/2006	1,300	180
PW-3	456-496	10/28/2004	46	8.9
		11/30/2004	67	12
		12/28/2004	63	15
		1/25/2005	28	7.4
		4/19/2005	27	10
		7/28/2005	44	14
		10/29/2005	88	52
		1/5/2006	60	36
		4/7/2006	80	48
		7/6/2006	77	52
		8/30/2006	110	110
		11/21/2006	200	82

Well Name	Screen Interval (ft bgs)	Sample Date	Perchlorate (ppb)	TCE (ppb)
PW-4	470-510	10/29/2004	1.1	1.4
		12/1/2004	1.5	2
		12/29/2004	0.95	1.4
		1/24/2005	2.7	4.3
		4/20/2005	2.5	2.4
		7/29/2005	4	4.4
		10/29/2005	5.1	3.4
		1/5/2006	5.5	2.7
		4/6/2006	4.6	3.8
		7/6/2006	1.7	0.55
		8/31/2006	1.6	0.76
		11/17/2006	1.1	0.4
CMW-1	CMW-1A 428-448	7/28/2006	1,500	150
		8/22/2006	770	87.6
		11/14/2006	730	87
		2/14/2007	710	69
	CMW-1B 470-490	7/28/2006	63	8.0
		8/22/2006	41	6.69
		11/15/2006	14	ND
		2/14/2007	8.5	ND
	CMW-1C 513-533	7/28/2006	9.3	ND
		8/22/2006	5.8	1.89
		11/30/2006	2.1	ND
		2/14/2007	ND	ND
CMW-2	CMW-2A 432-452	7/26/2006	97	480
		8/23/2006	80	356
		11/14/2006	73	1,500
		2/13/2007	110	180
	CMW-2B 471-491	7/27/2006	23	22
		8/23/2006	20	17.7
		11/14/2006	18	12
		2/13/2007	12	8
	CMW-2C 511-531	7/27/2006	3.4	3.3
		8/23/2006	3.1	4.35
		11/14/2006	2.6	2.1
		2/13/2007	2.6	2

Well Name	Screen Interval (ft bgs)	Sample Date	Perchlorate (ppb)	TCE (ppb)
CMW-3	CMW-3A 419-439	7/27/2006	2.2	9.7
		8/21/2006	ND	5.33
		11/13/2006	ND	5.7
		2/12/2007	ND	3.2
	CMW-3B 459-479	7/28/2006	ND	ND
		8/21/2006	ND	ND
		11/13/2006	ND	ND
		2/12/2007	ND	ND
	CMW-3C 504-524	7/28/2006	ND	ND
		8/21/2006	ND	ND
		11/13/2006	ND	ND
		2/12/2007	ND	ND
CMW-4	CMW-4A 400-440	10/13/2006	16	40
		11/13/2006	24	17
		2/13/2007	34	8.5
	CMW-4B 455-475	10/13/2006	ND	1
		11/13/2006	ND	1.2
		2/13/2007	ND	ND
	CMW-4C 490-510	10/13/2006	ND	ND
		11/13/2006	ND	ND
		2/14/2007	ND	ND
CMW-5	CMW-5A 400-440	10/5/2006	170	45
		11/14/2006	270	53
		2/12/2007	370	100
	CMW-5B 460-480	10/5/2006	61	33
		11/14/2006	71	47
		2/13/2007	92	76
	CMW-5C 500-520	10/5/2006	99	13
		11/14/2006	170	21
		2/13/2007	180	26

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Name: Amig Bruce
E-Mail Address: bruce.amig@goodrich.com
Office Phone Number:
Department:

Name: Araiza, Anthony(Butch)
E-Mail Address: butch@wvwd.org
Office Phone Number:
Department:

Name: Arano Wendy
E-Mail Address: warano@dtsc.ca.gov
Office Phone Number:
Department:

Name: Augustini, Senior Counsel Michael
E-Mail Address: michael.augustini@usdoj.gov
Office Phone Number:
Department:

Name: Ayers Ken
E-Mail Address: kayers@da.co.san-bernardino.ca.us
Office Phone Number:
Department:

Name: Baker Karen
E-Mail Address: kbaker@dtsc.ca.gov
Office Phone Number:
Department:

Name: Benson, Michele
E-Mail Address: benson.michele@epa.gov
Office Phone Number:
Department:

Name: Bledsoe, Mike
E-Mail Address: mbledsoe@ciwmb.ca.gov
Office Phone Number:
Department:

Name: Bloomfield, Thomas
E-Mail Address: tbloomfield@thegallaghergroup.com
Office Phone Number:
Department:

Name: Brathwaite, Sam
E-Mail Address: sam@adverus.com
Office Phone Number:
Department:

Name: Brown Gary
E-Mail Address: gbrown@pyrospectaculars.com
Office Phone Number:
Department:

Name: Brown, Christine
E-Mail Address: CBrown@dtsc.ca.gov
Office Phone Number:
Department:

Name: Bunker, James
E-Mail Address: jbunker@environcorp.com
Office Phone Number:
Department:

Name: Bures, Matthew
E-Mail Address: MBures@dlflawyers.com
Office Phone Number:
Department:

Name: c. prokop
E-Mail Address: cprokop@dominionenv.net
Office Phone Number:
Department:

Name: Carrigan, Cris
E-Mail Address: ccarrigan@mmblaw.com.
Office Phone Number:
Department:

Name: Casadevall, Bill
E-Mail Address: bcasadevall@dbstephens.com
Office Phone Number:
Department:

Name: Cash CEI, REA Bruce E.
E-Mail Address: cashbe@unitedstrategies.com
Office Phone Number:
Department:

Name: Cobb, Esq. Ted
E-Mail Address: TCobb@waterboards.ca.gov
Office Phone Number: (916) 341-5171
Department: OCC

Name: Collins, Heather
E-Mail Address: hcollin2@dhs.ca.gov
Office Phone Number:
Department:

Name: Coon, Esq. Arthur F.
E-Mail Address: AFC@MSandR.com
Office Phone Number:
Department:

Name: Cowden Jerry
E-Mail Address: jcowden@ktircp.com
Office Phone Number:
Department:

Name: Crowley, Tom
E-Mail Address: tcrowley@wvwd.org
Office Phone Number: 909-875-1804
Department:

Name: Davis, Joseph
E-Mail Address: jdavis@rialto.k12.ca.us
Office Phone Number: 909-820-7700
Department:

Name: Diaz, Davin
E-Mail Address: davin.d@ccaej.org
Office Phone Number:
Department:

Name: Dintzer, Jeffrey
E-Mail Address: jdintzer@gibsondunn.com
Office Phone Number:
Department:

Name: Dongell, Esq. Richard A.
E-Mail Address: rdongell@dflawyers.com
Office Phone Number:
Department:

Name: Duchesneau , Pete
E-Mail Address: pduchesneau@manatt.com
Office Phone Number:
Department:

Name: Eagans, Gerald
E-Mail Address: geagans@redwineandsherrill.com
Office Phone Number:
Department:

Name: Elie, Steve
E-Mail Address: S.Elie@MPGLAW.com
Office Phone Number:
Department:

Name: Farrell, Michael
E-Mail Address: mfarrell@allenmatkins.com
Office Phone Number: 213-622-5555
Department:

Name: Flores, Marie
E-Mail Address: mflores@lif.org
Office Phone Number:
Department:

Name: Fox, Peter
E-Mail Address: pfox@ci.rialto.ca.us
Office Phone Number:
Department:

Name: Fraser, Eric
E-Mail Address: efraser@ci.colton.ca.us
Office Phone Number:
Department:

Name: Fudacz, Fred
E-Mail Address: FFudacz@Nossaman.com
Office Phone Number:
Department:

Name: Goulart Scott
E-Mail Address: Scott.Goulart@Aerojet.com
Office Phone Number:
Department:

Name: Groveman, Barry
E-Mail Address: bgroveman@earthlink.net
Office Phone Number:
Department:

Name: Hadersbeck, Patty
E-Mail Address: phadersb@rialto.k12.ca.us
Office Phone Number:
Department:

Name: Hiete, Ryan
E-Mail Address: r.hiete@mpglaw.com
Office Phone Number:
Department:

Name: Hunsucker, Philip
E-Mail Address: philip.hunsucker@resolutionlawgroup.com
Office Phone Number:
Department:

Name: Hunt Matthew
E-Mail Address: mhunt@lorgeo.com
Office Phone Number:
Department:

Name: Hunt, Bill
E-Mail Address: huntesi@cox.net
Office Phone Number:
Department:

Name: Hvidsten William
E-Mail Address: William.Hvidsten@Aerojet.com
Office Phone Number:
Department:

Name: Jahagisdar, Sujatha
E-Mail Address: sujatha@environmentcalifornia.org
Office Phone Number: 213-251-3688
Department:

Name: Jocks, Robert
E-Mail Address: rjocks@cc.co.san-bernardino.ca.us
Office Phone Number:
Department:

Name: Johnson, Christopher
E-Mail Address: CJohnson@dlflawyers.com
Office Phone Number:
Department:

Name: Kippen, Daniel S.
E-Mail Address: DKippen@vctlaw.com
Office Phone Number:
Department:

Name: Lardiere Eric G.
E-Mail Address: elardiere@wkr.com
Office Phone Number:
Department:

Name: Leon, Jorge
E-Mail Address: JLeon@waterboards.ca.gov
Office Phone Number: (916) 341-5180
Department: Office of Enforcement

Name: Linkletter, George
E-Mail Address: GLinkletter@environcorp.com
Office Phone Number:
Department:

Name: Logan, Francis
E-Mail Address: smt@tragerlaw.com
Office Phone Number:
Department:

Name: Luesebrink, Marc
E-Mail Address: mluesebrink@manatt.com
Office Phone Number: 310-312-4261
Department:

Name: Macedo, Julie
E-Mail Address: julie.macedo@pillsburylaw.com
Office Phone Number:
Department:

Name: McCardle William
E-Mail Address: mvogel@murphypowder.com
Office Phone Number:
Department:

Name: McCarthy, Sean
E-Mail Address: smccarth@dhs.ca.gov
Office Phone Number:
Department:

Name: McGraw, Mike
E-Mail Address: mjmcgraw@fontanawater.com
Office Phone Number:
Department:

Name: Meeder, James
E-Mail Address: jmeeder@allenmatkins.com
Office Phone Number:
Department:

Name: Mig, T.
E-Mail Address: timg@thegallaghergroup.com
Office Phone Number:
Department:

Name: Miner, Mick
E-Mail Address: lmminer@fontanawater.com
Office Phone Number: 909-841-0590
Department:

Name: Misquez, Jan
E-Mail Address: jan.m@ccaej.org
Office Phone Number: 909-381-8883
Department:

Name: Moyer, Craig
E-Mail Address: cmoyer@manatt.com
Office Phone Number:
Department:

Name: Mroz, Erik
E-Mail Address: emroz@reslawgrp.com
Office Phone Number:
Department:

Name: Mtakahashi@manatt.com
E-Mail Address: MTakahashi@manatt.com
Office Phone Number:
Department:

Name: Murphy, Ralph
E-Mail Address: ramurphy@geo-logic.com
Office Phone Number:
Department:

Name: Newman Penny
E-Mail Address: newman.p@ccaej.org
Office Phone Number:
Department:

Name: Owen, Bob
E-Mail Address: bowen@raolaw.com
Office Phone Number: 909-890-9027
Department:

Name: Owens, Brad
E-Mail Address: brad.w.owens@lmco.com
Office Phone Number:
Department:

Name: Page, Bob
E-Mail Address: bpage@sbcounty.gov
Office Phone Number: 909-387-4565
Department:

Name: Paul Duane G.
E-Mail Address: Dpaul@geomatrix.com
Office Phone Number:
Department:

Name: Peck
E-Mail Address: peck@thegallaghergroup.com
Office Phone Number:
Department:

Name: Pesick, Jason SBSUN
E-Mail Address: jason.pesick@sbsun.com
Office Phone Number:
Department:

Name: Peterson James
E-Mail Address: james_peterson@feinstein.senate.gov
Office Phone Number:
Department:

Name: Praskins.Wayne
E-Mail Address: praskins.wayne@epamail.epa.gov
Office Phone Number:
Department:

Name: Refkin
E-Mail Address: refkin@thegallaghergroup.com
Office Phone Number:
Department:

Name: Rohrer, Jon
E-Mail Address: jrohrer@aquiver.com
Office Phone Number:
Department:

Name: Sakai, Danielle
E-Mail Address: DGSakai@bbklaw.com
Office Phone Number:
Department:

Name: Schmitt, Karen
E-Mail Address: KSchmitt@GeoSyntec.com
Office Phone Number:
Department:

Name: Smith Roxanne
E-Mail Address: rsmith@lgcgeo.com
Office Phone Number:
Department:

Name: Sommer, Scott
E-Mail Address: scott.sommer@pillsburylaw.com
Office Phone Number:
Department:

Name: Soto Tom
E-Mail Address: tsoto@psenterprises.com
Office Phone Number:
Department:

Name: Souza James
E-Mail Address: jsouza@pyrospectaculars.com
Office Phone Number:
Department:

Name: Sowinski, Michael
E-Mail Address: Michael.Sowinski@dpra.com
Office Phone Number:
Department:

Name: Spiess, Erik
E-Mail Address: ESpiess@waterboards.ca.gov
Office Phone Number: (916) 341-5167
Department: OCC

Name: Steenhaut, Nicholas
E-Mail Address: NSteenhaut@environcorp.com
Office Phone Number:
Department:

Name: Tanaka, Gene
E-Mail Address: Gtanaka@bbklaw.com
Office Phone Number:
Department:

Name: Tavetian, Gary
E-Mail Address: gary.tavetian@doj.gov
Office Phone Number:
Department:

Name: Thompson Ken
E-Mail Address: kmtkti@aol.com
Office Phone Number:
Department:

Name: tjryan@sgvwater.com
E-Mail Address: tjryan@sgvwater.com
Office Phone Number:
Department:

Name: Trager, Susan
E-Mail Address: smt@tragerlaw.com
Office Phone Number:
Department:

Name: Trout Tad
E-Mail Address: troutt@tntfireworks.com
Office Phone Number:
Department:

Name: Trujillo Mike
E-Mail Address: mike.trujillo@mail.house.gov
Office Phone Number:
Department:

Name: Ulibarri, Anna
E-Mail Address: aulibarr@rialto.k12.ca.us
Office Phone Number: 909-421-7555
Department:

Name: Valdes, Todd
E-Mail Address: todd.valdes@doj.ca.gov
Office Phone Number:
Department:

Name: Van Vlear, John
E-Mail Address: VV@vctlaw.com
Office Phone Number:
Department:

Name: Vanderkar, Donald
E-Mail Address: dpvanderkar@foothill.net
Office Phone Number:
Department:

Name: Vasquez, Betty
E-Mail Address: seekers2@msn.com
Office Phone Number: 909-808-0424
Department:

Name: Vasquez, Frances
E-Mail Address: fvasquez@sbcounty.gov
Office Phone Number:
Department:

Name: Vavricka, Emily
E-Mail Address: Emily.Vavricka@dpra.com
Office Phone Number:
Department:

Name: Washbuin, Simon
E-Mail Address: simon.w@ccaej.org
Office Phone Number: 909-381-8883
Department:

Name: Weinstock, Henry
E-Mail Address: Hweinstock@Nossaman.com
Office Phone Number:
Department:

Name: Whitehead Mike
E-Mail Address: mlwhitehead@sgvwater.com
Office Phone Number:
Department:

Name: Wilson Matthew
E-Mail Address: wilsonm@tntfireworks.com
Office Phone Number:
Department:

Name: Wochnick Michael
E-Mail Address: mwochnic@ciwmb.ca.gov
Office Phone Number:
Department:

Name: Wulfman, Peter
E-Mail Address: pwulfman@swm.sbcounty.gov
Office Phone Number:
Department:

Name: Wyatt, Robert
E-Mail Address: rwyatt@allenmatkins.com
Office Phone Number:
Department:

Name: Wyels, Philip
E-Mail Address: PWyels@waterboards.ca.gov
Office Phone Number: (916) 341-5178
Department: OCC

Name: Yabuno Glen
E-Mail Address: gyabuno@da.sbcounty.gov
Office Phone Number:
Department:

Name: Young Robert
E-Mail Address: rkyoung@fontanawater.com
Office Phone Number:
Department:

Name: Yue Aaron
E-Mail Address: ayue@dtsc.ca.gov
Office Phone Number:
Department:

Name: Zagon, Brian
E-Mail Address: bzagon@reslawgrp.com
Office Phone Number:
Department:

Name: Zambelli Dana Beth
E-Mail Address: dwzif@aol.com
Office Phone Number:
Department: