RADIAN INTERNATIONAL LLC

PN 67515815.1000
DCN 98.67515815.01

FINAL

LOCKHEED MARTIN BEAUMONT BURN PIT AREA REMEDIATION SYSTEM EVALUATION

Prepared for:

Lockheed Martin Corporate Environment,
Safety, and Health Program Office
2550 N. Hollywood Way, 3rd Floor
Burbank, California 91505-1055

Prepared by:

Radian International LLC
16845 Von Karman, Suite 100
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24 September 1998

Lockheed Martin Corporation - Environment, Safety & Health
Burbank Program Office
2550 North Hollywood Way, 3rd Floor Burbank, CA 91505-1055
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LOCKHEED MARTIN

FEDERAL EXPRESS
RNH0998/354 WBS #40

September 24, 1998

Mr. Oussama Issa
Site Mitigation Branch
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

Subject: **Lockheed Beaumont No. 1 Site – Burn Pit Area Remediation System Evaluation**

Reference: **Lockheed Beaumont No. 1 Site - Final Operation and Maintenance Agreement, and Remedial Action Certification (Docket No. H.S.A. 93/94-025)**

Dear Mr. Issa:

Please find enclosed the *Lockheed Martin Beaumont Burn Pit Area Remediation System Evaluation* report prepared by Radian International. The report details system performance, analytical data and pulsed operations.

Lockheed Martin Corporation believes that the Catox system has remediated soil vapors in the burn pit area to the maximum extent possible. We would like to schedule a meeting to discuss the report and request that the catox unit be shutdown pending the required five-year review in 1999.

If you have any questions regarding the information contained herein, please do not hesitate to contact Mr. Stephen Spaulding at (818) 847-0577.

Sincerely,

for

R. N. Helgerson
Director

Enclosure as noted

RNH:SSS:gc

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Executive Summary

Lockheed Martin has operated soil vapor and groundwater remediation systems at the Beaumont site since early 1994. Soil vapor extraction (SVE) and groundwater extraction by the high vacuum two-phase extraction method (TPE) are performed in the Burn Pit Area of the site. Groundwater extraction using conventional pumping methods is conducted in the Rocket Motor Production Area of the site. In the 4 years of operation, the systems have performed well, and volatile organic compounds (VOCs) in soil vapors have been significantly reduced. In the Burn Pit Area, total soil vapor concentrations have been reduced from more than 147,800 parts per billion by volume (ppbv) (April 1994) to 1,370 ppbv or less (July 1998).

In response to the reduction in soil vapors, Lockheed Martin has performed pulsed operations of the SVE system. The results of the pulsed operations have shown that soil vapors in all but two wells monitored remain at or near levels recorded after the most recent system shutdown.

An evaluation of the SVE and TPE remediation system operations was performed to determine if the SVE system could be turned off while still meeting the original goals of the remediation. To help in this evaluation, the California Regional Water Quality Control Board (RWQCB) Interim Site Assessment and Cleanup Guidebook (May 1996) was used as a reference. The RWQCB provides five requirements to be considered when evaluating a site, where targeted cleanup levels cannot be attained, for shutdown of SVE operation. A listing of how Lockheed Martin has satisfied the criteria is given below.

1) **Reduce overall VOC concentrations at all extraction and monitoring points as compared to the baseline level.** There has been an average 99.6% reduction in total VOC concentrations at the extraction and monitoring points since vapor extraction began.

2) **Verify that concentrations reached an "asymptotic level" – in which concentration gradually decreases to a constant level – by monitoring concentration rebounds after extraction shutdowns.** A plot of the concentration of the extracted soil vapor over time shows that SVE system influent concentrations reached a near asymptotic level by January 1995.

3) **Check if there is reduction of concentrations in soil matrix samples at selected "fine-grained horizons" in the vadose zone.** Soil samples taken during the pre-remediation studies in the burn pit area did not locate high concentrations of contaminants. As a result, there are no soil matrix samples available for pre and post remediation comparison.

4) **Apply "transport modeling" to show that any residual contaminants will not pose further threat to groundwater quality.** Groundwater quality will not be compromised by SVE system shutdown as elevated total VOC levels in groundwater are still being recovered and groundwater extraction is still occurring.

5) **Implement groundwater monitoring if contaminants exceeding target-screening levels are to be left in the vadose zone.** Groundwater and soil vapor monitoring at the site continues on a regular basis.

Based on the above, continued vapor extraction is not thought necessary. Our recommendation is to turn off the SVE system and monitor soil vapors on a regular basis.

1.0 Introduction

Lockheed Martin has several treatment systems in place at its former Test Facility located in Beaumont, California (Figure 1-1). Volatile organic compound (VOC) levels in soil and groundwater have been reduced significantly since soil vapor and groundwater extraction and treatment systems were installed in April 1994.

The original remediation strategy focused on: the Burn Pit Area (BPA) and the Rocket Motor Production Area (RMPA). In the BPA, where the most contaminated soil vapors and groundwater were present, a high vacuum two-phase vapor and groundwater extraction (TPE) system, and a conventional soil vapor extraction (SVE) system were installed. At the RMPA, contaminated groundwater has been extracted using a conventional pumping method and air stripping treatment. Since the observed groundwater movement is from the BPA toward the downgradient RMPA, the groundwater extraction system at the RMPA captures contaminated groundwater not recovered in the BPA. A process diagram for the existing remediation systems is shown on Figure 1-2.

The remediation effort has been closely monitored during the last four years, and significant reductions in soil vapor and groundwater concentrations have been achieved. In particular, the highest total VOC concentrations in soil vapor at the wells with the highest concentrations in the BPA have declined as much as 145,000 ppbv since the initial soil vapor samples were collected. As a result, shutdown of this part of the overall remediation system is being considered and is evaluated in this report. In preparation for shutdown, Lockheed Martin has performed several pulsed operations on the SVE system. The SVE system was turned off and soil vapor concentrations in shallow wells monitored to determine if concentrations would rise indicating further soil vapor recovery may be required.

The effectiveness of these systems was evaluated to support the argument that the overall remediation effort can be reduced. Information from numerous reports and sources has been reviewed for this analysis. These reports and sources are:

- *Lockheed Propulsion Company Beaumont Test Facilities Hydrogeologic Study* (Radian, December 1992);
- *Lockheed Propulsion Company Beaumont Test Facilities Remediation System 6-Month Evaluation – Final* (Radian, May 1995);

- *Lockheed Beaumont No. 1 August 1997 Vapor Sampling Report* (Radian, September 1997);
- *NPDES Annual Reports for the Lockheed Propulsion Company, Beaumont Test Facilities* (1994, 1995, 1996, and 1997); and
- Conversations with Lockheed Martin personnel.

1.1 Site Background

The site history, including remedial investigation, initial contaminated soil removal, and remedial action planning, is described in several reports presented to the California Department of Toxic Substances Control (DTSC) and the RWQCB. Prior to January 1993, a soil vapor contaminant plume existed in alluvium and the Mt. Eden Formation beneath the BPA. Soil vapor contaminant concentrations increased with depth. This plume contained chlorinated VOCs; primarily 1,1-dichloroethene (DCE), trichloroethene (TCE), and 1,1,1-trichloroethane (TCA). The highest concentrations were found in the weathered, upper portion of the Mt. Eden Formation beneath the BPA where concentrations of total VOCs ranged up to 2,000,000 parts per billion by volume (ppbv). The most concentrated soil vapor contamination in the alluvium occurred immediately above the contact with the underlying Mt. Eden Formation.

A narrow groundwater plume containing these same contaminants was identified in the alluvial aquifer below the soil vapor plume. Again, the highest concentrations of VOCs were found in water samples from the weathered Mt. Eden Formation beneath the BPA at concentrations above 10,000 micrograms per liter (µg/l). Groundwater data indicate that the groundwater migrates from the BPA northwest toward the RMPA.

1.2 Current Treatment System Descriptions

Soil vapor and groundwater are extracted from the BPA using six TPE (i.e., vapor and groundwater) wells and five SVE wells (Figure 1-3). The soil vapor is treated by catalytic oxidation and the groundwater is treated with liquid-phase carbon. Groundwater also is extracted from, and treated at, the RMPA. Groundwater from two extraction wells is pumped through an air stripper and re-injected through five injection wells. Each of the two systems is summarized below.

1.2.1 Burn Pit Area System

Two-phase and conventional vapor extraction wells were installed to extract contaminated groundwater and soil vapor. The six two-phase, high-vacuum extraction wells (flow rate of 3-5 scfm/well) are screened in the low-permeability Mt. Eden formation that underlies the alluvium. The five conventional soil vapor extraction wells (flow rate of 30-60

scfm/well) are installed above the Mt. Eden/alluvium contact and screened in the high-permeability alluvium. The BPA well locations are shown on Figure 1-3.

The two-phase extraction wells (EWs) are connected to a high-vacuum pump and the SVE wells (VEWs) are connected to a low-vacuum pump. The vapor from each system is sent through a knockout pot to remove entrained water, then collected in a manifold and fed to the treatment unit.

A CatOX™ unit that was designed to treat vapor concentrations on average of 350,000 ppbv total VOCs (with a maximum influent concentration of 2,000,000 ppbv) treats the vapor with an average destruction efficiency of 95 percent. The soil vapor is heated using a heat exchanger and an electrical heater to achieve the desired temperature in the catalytic reactors.

The water from the vapor streams is separated from the stream in liquid knockout pots and is pumped to two skid-mounted liquid-phase carbon units, each containing 5,000 pounds of carbon, for treatment. The treated water is then injected back into the ground.

1.2.2 Rocket Motor Production Area System

Groundwater from the RMPA is extracted from the alluvium using conventional groundwater extraction wells. This extracted water is passed through an air stripper to remove the VOCs and the air is passed through vapor-phase carbon for treatment of the off gas. The air stripper system is designed to process up to 185 gpm of contaminated water. Routine sampling of the influent and effluent is conducted to verify the stripping performance of the unit. Contaminants from the air stripper off gas are absorbed in three 5,000 pound, skid-mounted vapor-phase carbon units.

There are two groundwater extraction wells in the RMPA. Well EW-1 was designed to pump at 50-80 gpm and well EW-2 at 10-15 gpm. These wells are screened in the alluvium from approximately 10 feet above the water table to an estimated depth of 40 to 50 feet below the water table.

All treated water is injected into the aquifer through two injection well fields with a combined design capacity of 75-150 gpm. Design flow to Gallery 1 (i.e., wells IW-1 and –2) is 30-60 gpm, and design flow to Gallery 2 (i.e., wells IW-3, -4, and –5) is 45-90 gpm.

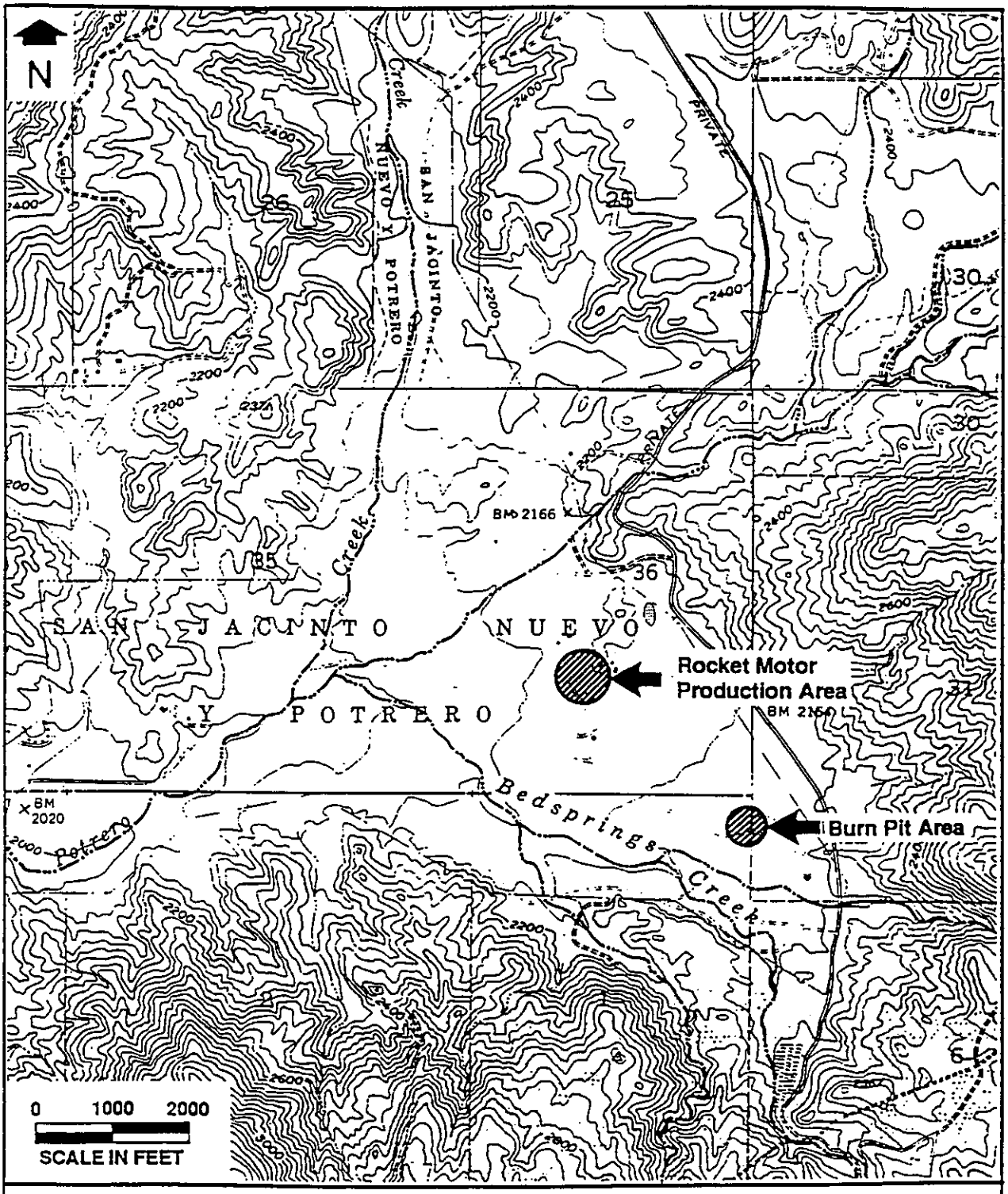

Figure 1-1. Lockheed Beaumont Test Facilities Location Map

REFERENCE: U.S.G.S. Beaumont, CA 7.5 Minute Quadrangle Map (1953, photorevised 1988)
U.S.G.S. San Jacinto, CA 7.5 Minute Quadrangle Map (1953, photorevised 1979)

VMG 8/11/02

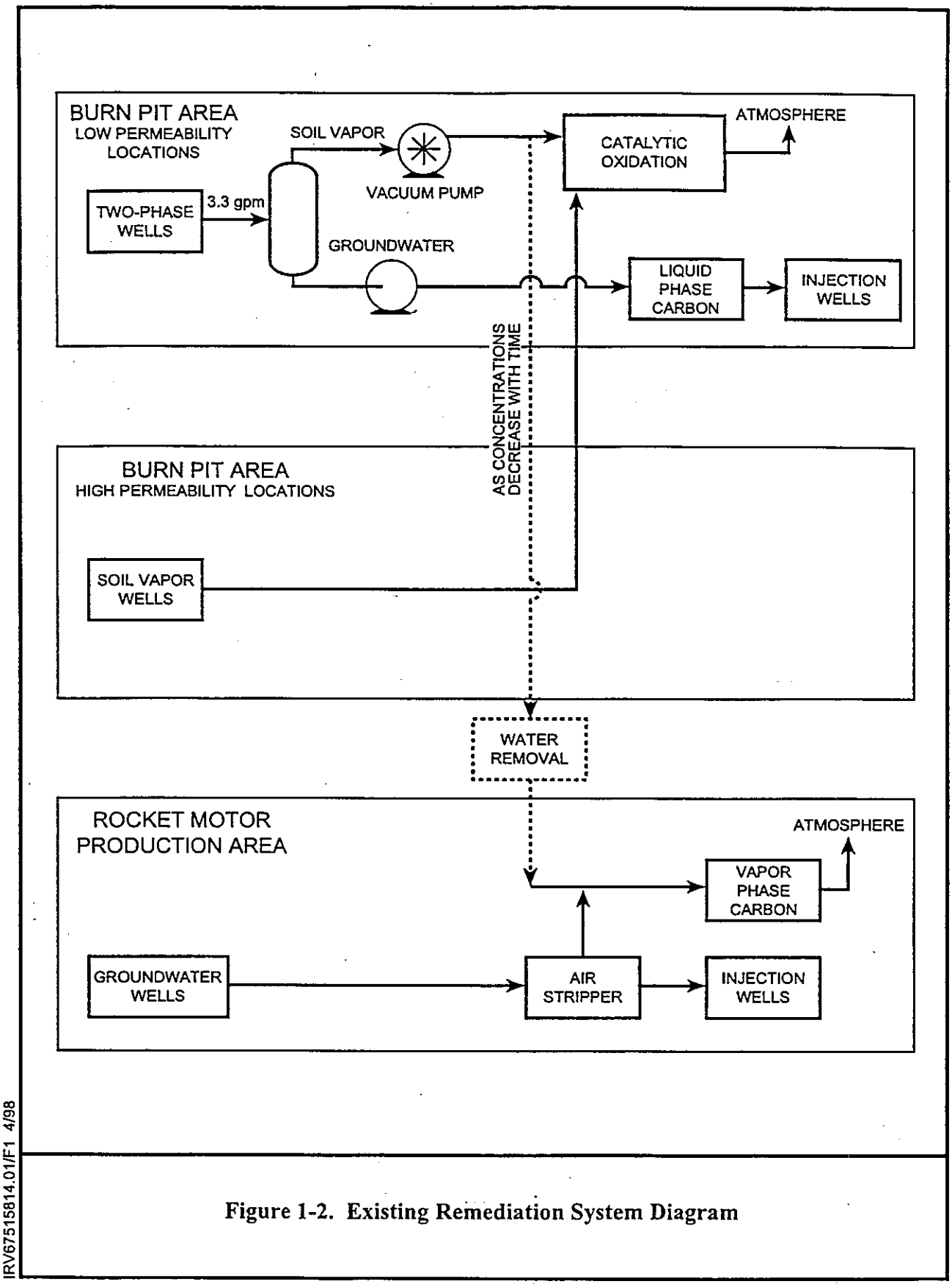

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Figure 1-2. Existing Remediation System Diagram

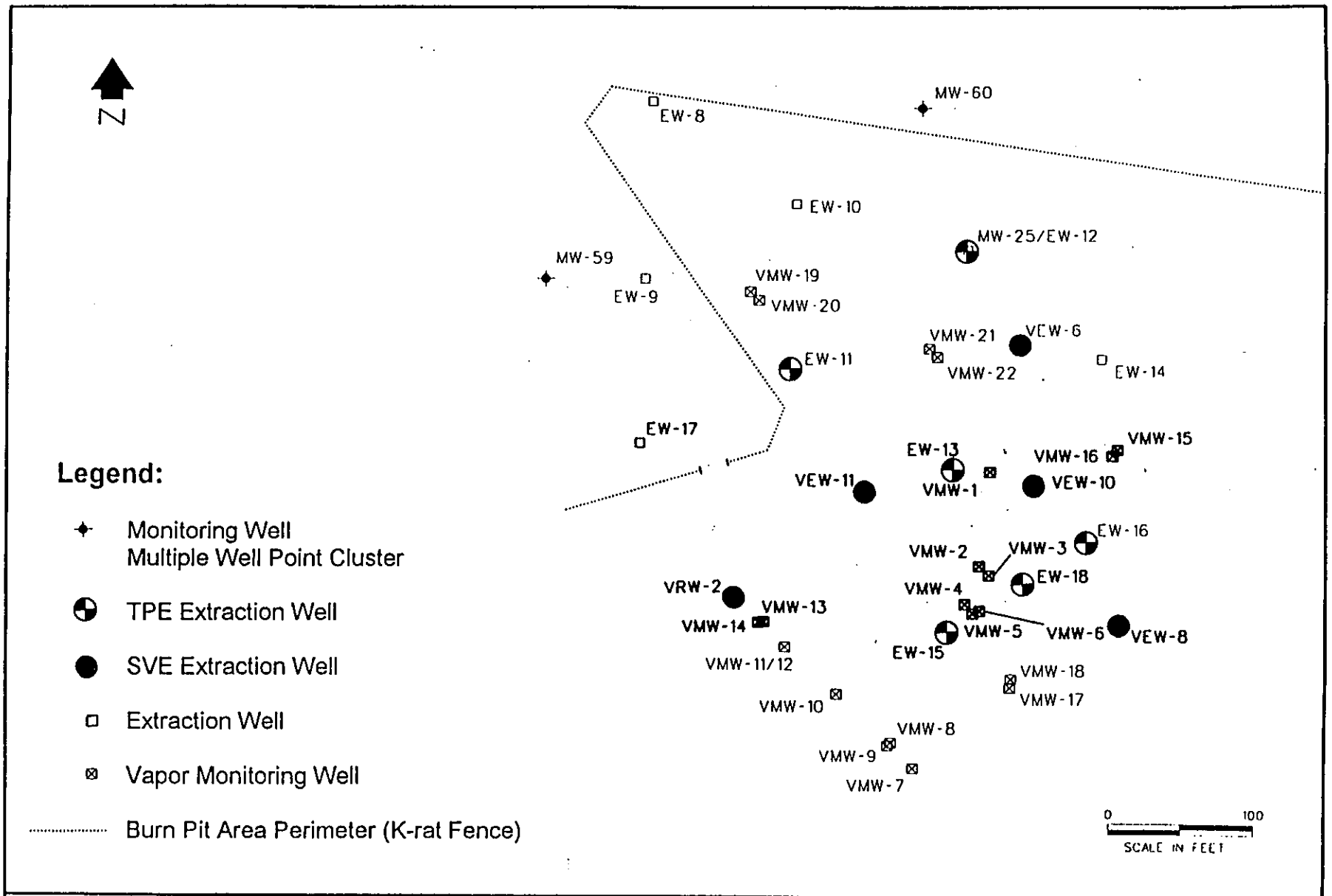

Figure 1-3. Burn Pit Area Site Map

2.0 Treatment System Effectiveness - BPA

The efficiency of the BPA remediation system at removing VOCs from soil is addressed below. Soil vapor samples have been collected regularly since the system was installed in 1994. These sample results and the trends in VOC concentrations they represent are summarized in this section. Appendix A presents field monitoring data and laboratory results for the 1998 pulse testing. Appendix B presents the field data sheets for the 1998 pulse testing.

2.1 Effectiveness of Soil Vapor Removal

Soil vapor sample results between April 1991 and August 1998 indicate an average reduction of more than 99.6% total VOCs removed by soil vapor extraction in the BPA (Table 2-1). The progression in reductions of VOC concentrations between December 1994 and August 1997 can be seen on Figures 2-1, 2-2, and 2-3. A graphic representation of the dramatic decline over time of total VOCs at the wells with the highest total VOC concentrations is shown on Figure 2-4. Soil vapor concentrations have been reduced from peak concentrations of more than 147,000 parts per billion volume (ppbv) to approximately 1,370 ppbv in July 1998. Concentrations in numerous wells have dropped to non-detect levels. Well VMW-3, which had the highest concentration of total VOCs in 1994 (147,000 ppbv), was reduced to a low concentration of 520 ppbv in 1997.

A plot of the concentration of the extracted soil vapor over time shows that SVE system influent concentrations reached a near asymptotic level by January 1995, six months after the system was started. Based on these results, pulsed operation of the system was started in September of 1997. Several pulsed operations have been performed. A graphic display showing the reduction and partial rebound of total VOC concentrations at VEW-6 and VEW-11 recorded using an organic vapor analyzer (OVA) is shown on Figure 2-5. The reduction of rebound potential in the two wells is also shown.

In addition to the VOC concentrations shown on Figure 2-5, vapor readings were taken in several key wells during each of the pulse tests. The pulsed operations have shown that in all but two of the wells monitored, soil vapor concentrations did not rise significantly after the system was turned off. This strongly suggests that the source of the soil vapors has been remediated almost completely. The total VOC results from VEW-11 have shown a slight rebound in total VOC concentrations after several pulse tests. This corresponds to a reading of approximately 830 ppbv total VOCs in the most recent pulse test in July 1998 (see Appendix A data). OVA sample data show that as soon as the SVE system is started, the total VOC levels diminish dramatically.

The SVE system has reduced soil vapor concentrations to very low, non-rebounding levels. As a result, further continuous vapor extraction is not thought necessary.

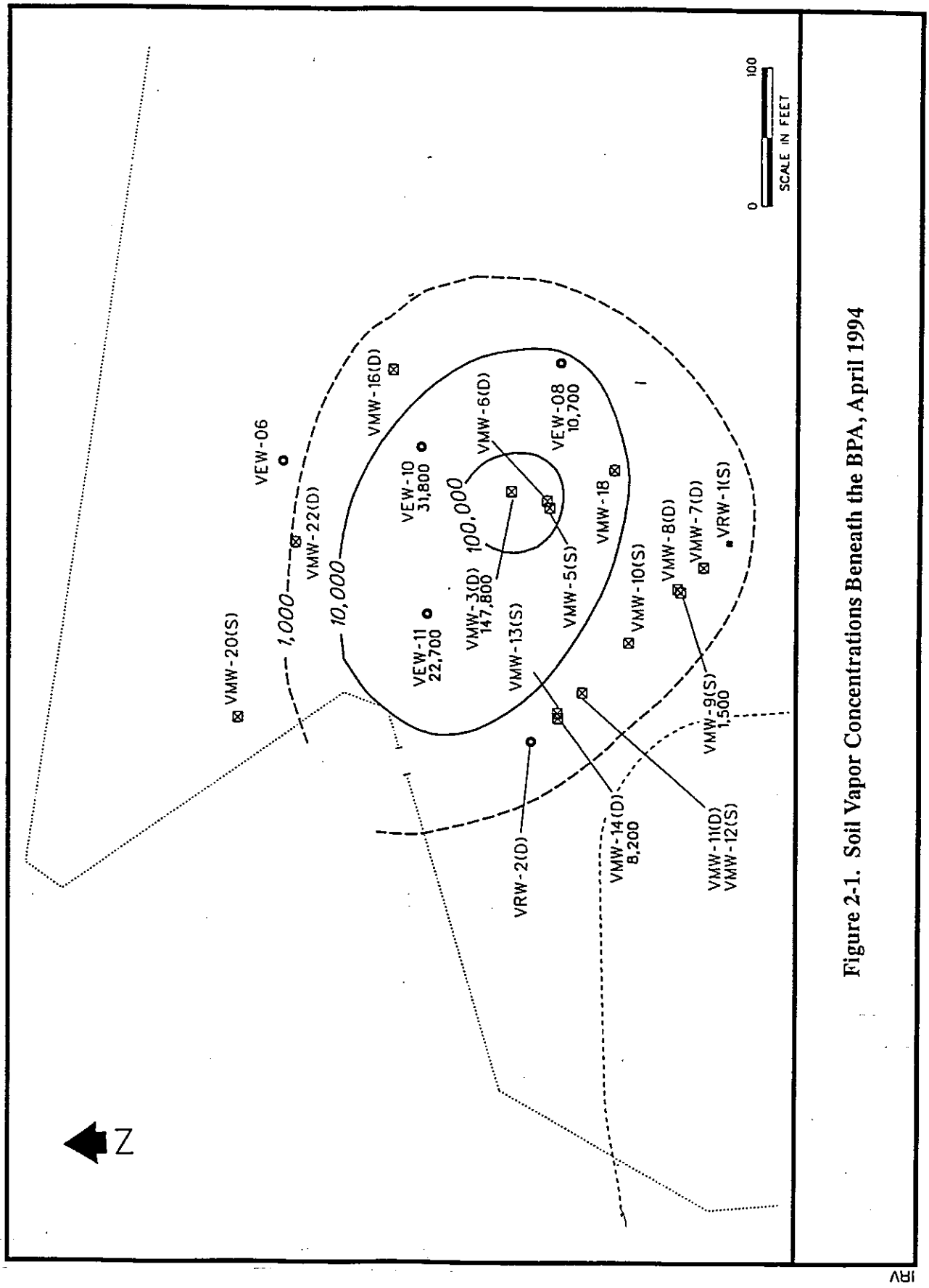

Figure 2-1. Soil Vapor Concentrations Beneath the BPA, April 1994

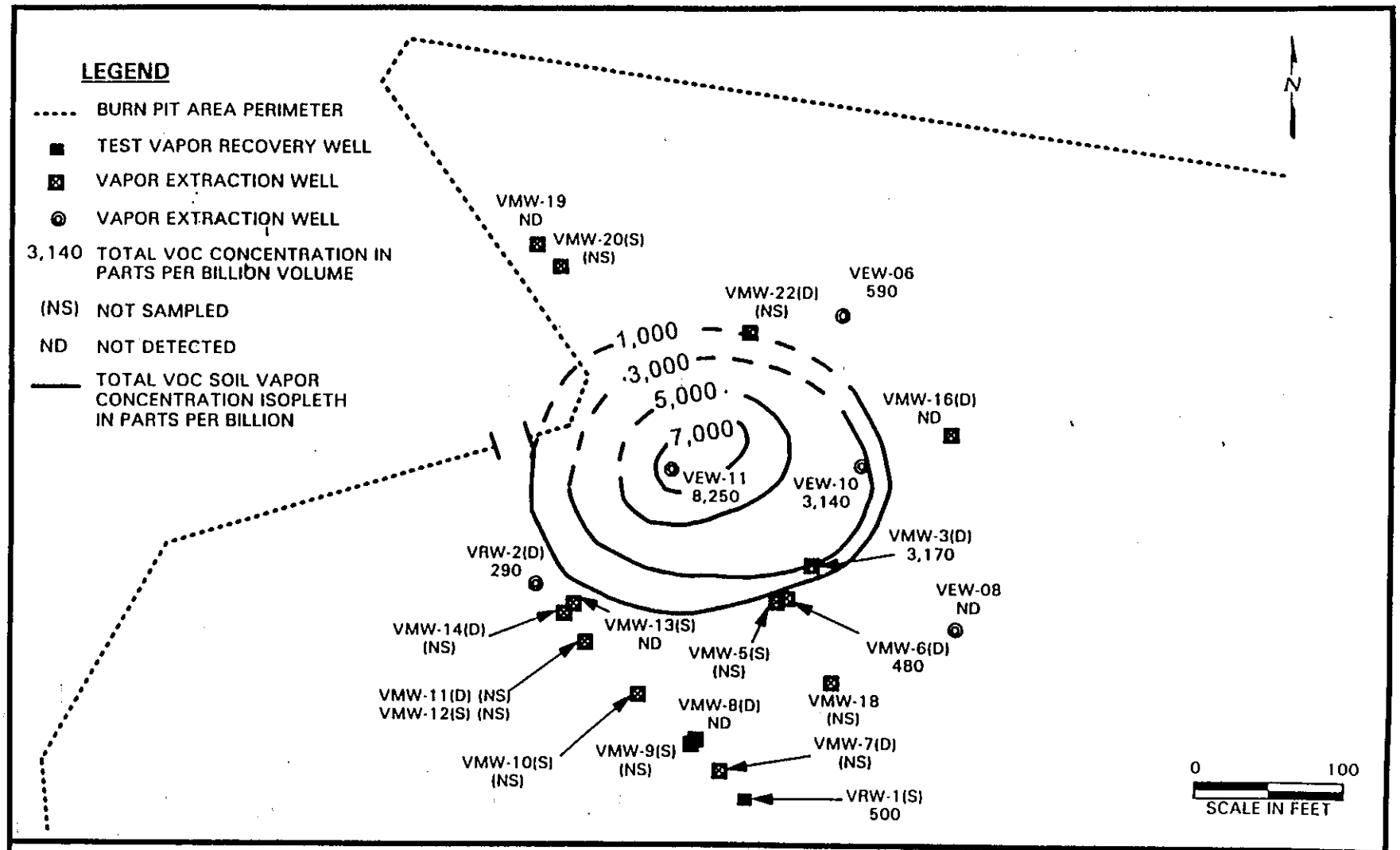

Figure 2-2. Soil Vapor Concentrations Beneath the BPA, June 1996

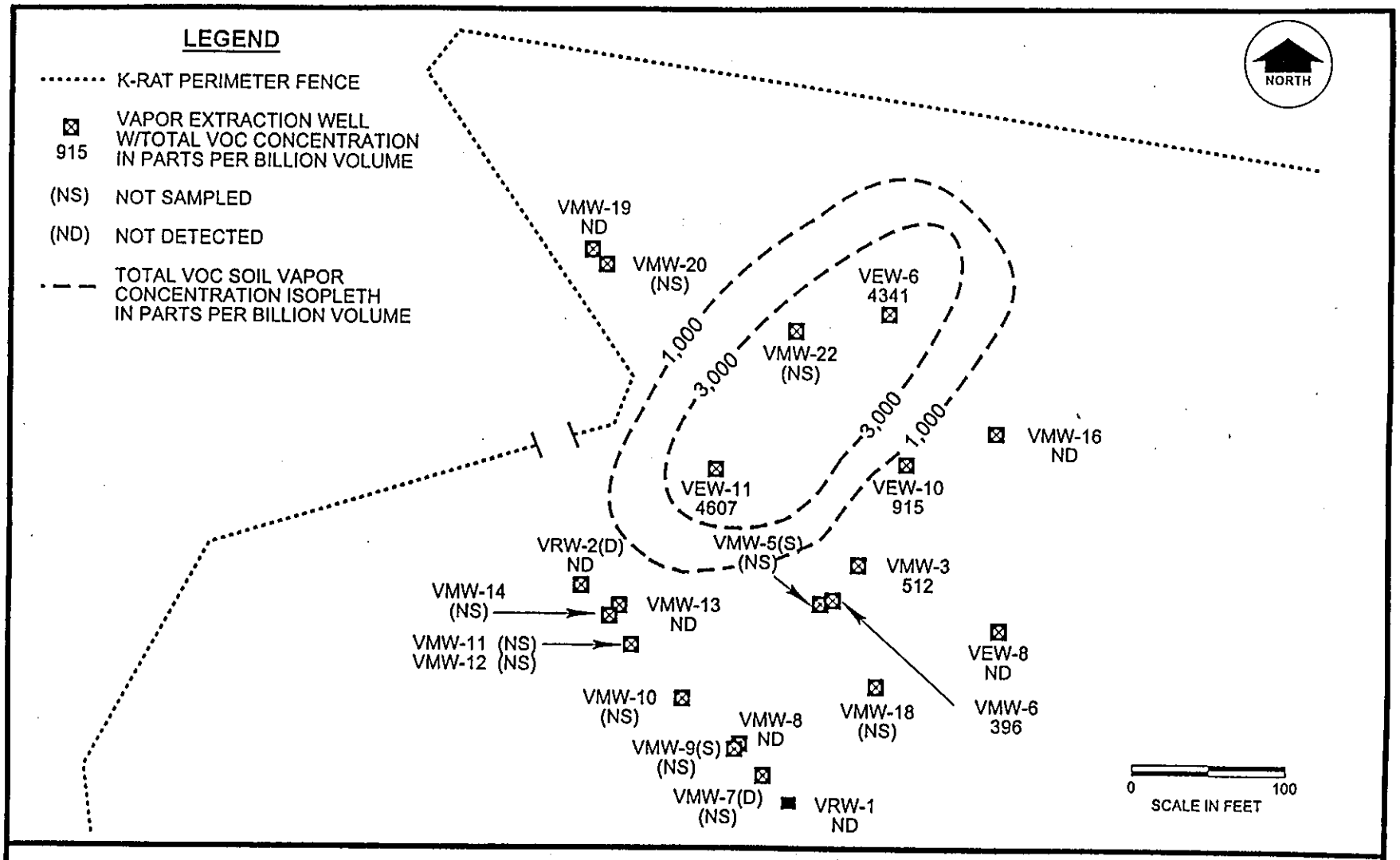

Figure 2-3. Soil Vapor Concentrations Beneath the BPA, August 1997

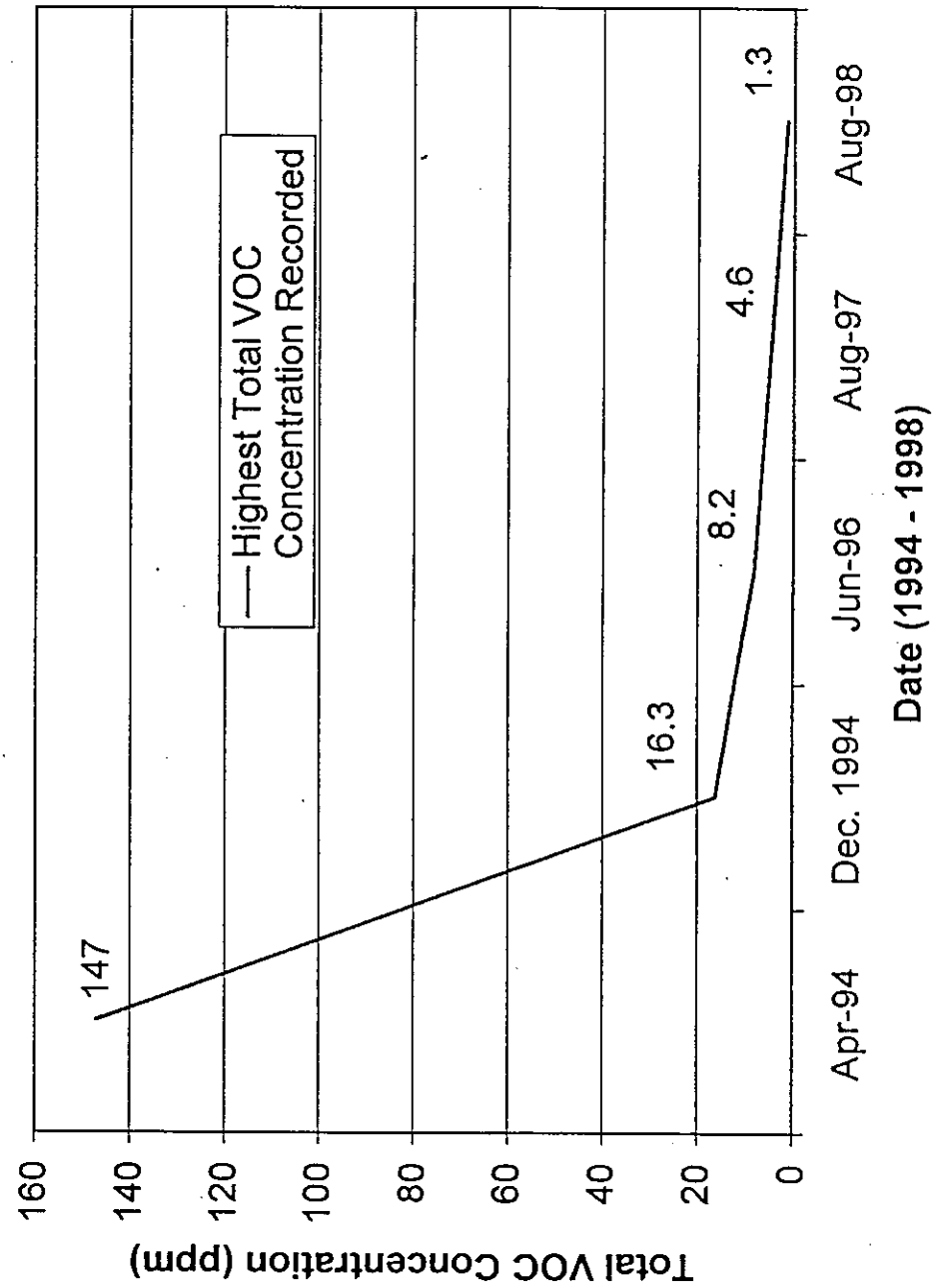

Figure 2-4. Reduction of Total VOCs at BPA Over Time

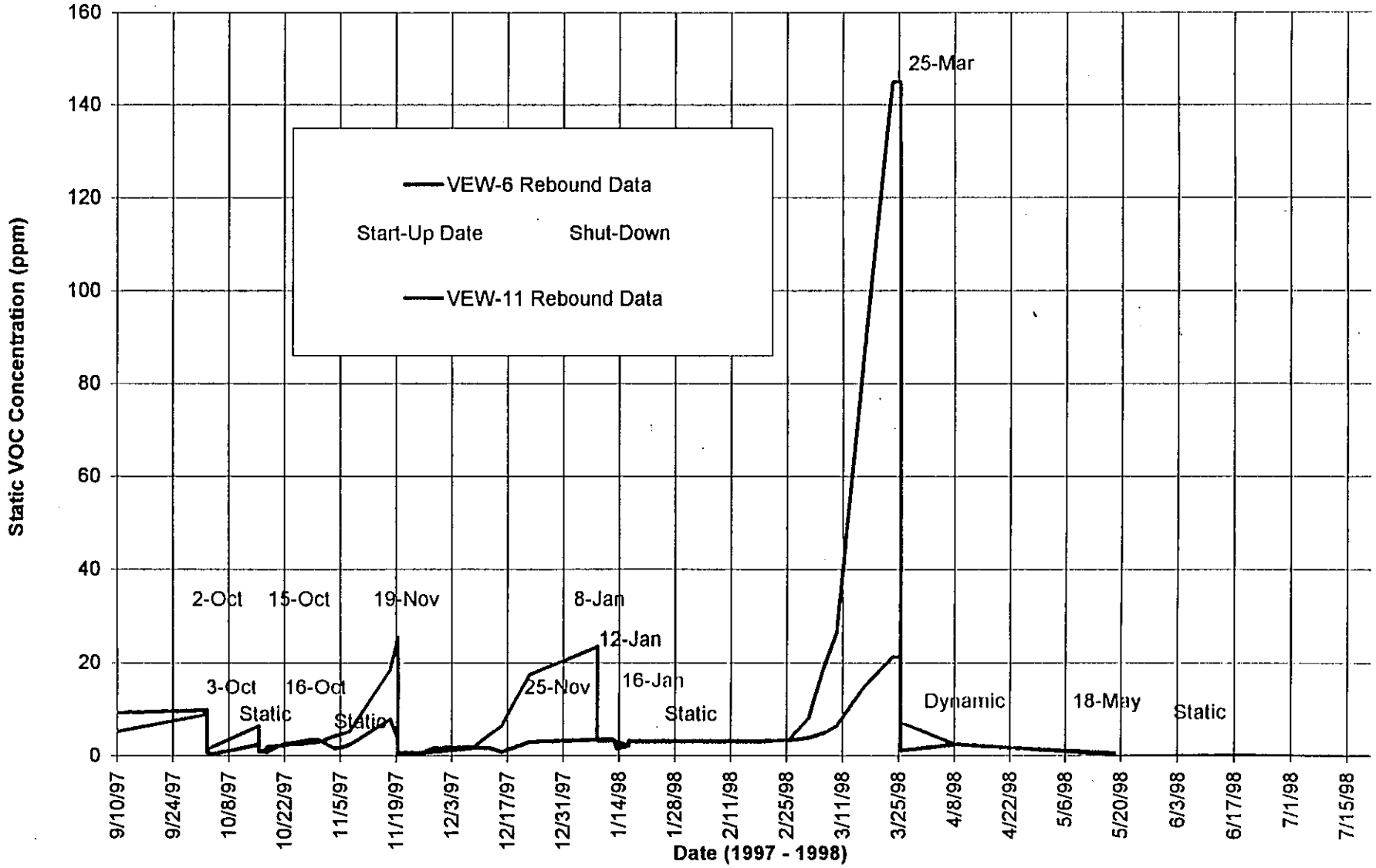

Figure 2-5. Rebound Data for Wells VEW-6 and VEW-11

Table 2-1. Total VOC Reduction Observed in Vapor Extraction and Monitoring Wells

Well ID	First Recorded Vapor Sample Result (ppbv)[1]	Most Recent Vapor Sample Result (ppbv)	Percent Reduction
VEW[2]-6	2,510 (Dec 94)	439 (July 98)	83
VEW-8	10,700 (Apr 94)	ND (Aug 97)	>99
VEW-10	31,800 (Apr 94)	1,374 (July 98)	96
VEW-11	22,700 (Apr 94)	826 (July 98)	96
VMW[3]-3	147,800 (Apr 94)	ND (Aug 97)	>99
VMW-6	5,910 (Dec 94)	ND (Aug 97)	>99
VMW-8	390 (Dec 94)	ND (Aug 97)	>99
VMW-13	1,260 (Dec 94)	ND (Aug 97)	>99
VMW-16	6,120 (Dec 94)	ND (Aug 97)	>99
VRW[4]-1	90 (Dec 94)	ND (Aug 97)	>99
VRW-2	ND (Dec 94)	33 (July 98)	*
VRW-3[5]	818 (Aug 97)	N/A	>99

1 parts per billion by volume
2 Vapor Extraction Well – located in Alluvium and Mt. Eden Formation
3 Vapor Monitoring Well – Alluvium well
4 Vapor Recovery Well – Alluvium well
5 Mt. Eden Well

ND Not Detected above laboratory method detection limit
N/A Not Applicable

3.0 Evaluation and Conclusions

Since soil vapor removal has proved better than 99.6% effective for the BPA, it is clear that changes can be made to reduce the remediation effort at the BPA. An evaluation of the system was performed based upon the guidelines for VOC-impacted sites found in the RWQCB Interim Site Assessment and Cleanup Guidebook (i.e., Chapter 5). The RWQCB Cleanup Guide states: "If the targeted cleanup levels cannot be attained, the Regional Board staff will use one or more of the following performance criteria or additional requirements to clear the site from further vadose zone remediation by vapor extraction."

The list below presents each of the RWQCB's performance criteria and indicates how each has been met.

1) **Reduce overall VOC concentrations at all extraction and monitoring points as compared to the baseline level.**

   The sample data collected from the numerous monitoring wells over the last four years shows a dramatic decrease in total VOC levels in each of the wells sampled (Table 2-1). This decrease is emphasized when comparing the "baseline" isopleth concentrations for April 1994, shortly after the system began operation (Figure 2-1) to those for August 1997 (Figure 2-3), and to the 1998 pulse data (see the graph shown on Figure 2-4). Concentrations as high as 147,000 ppbv are now on the order of 1,000 ppbv or much less. Many of the wells are now at non-detect (less than approximately 10 ppbv) concentrations for total VOCs.

2) **Verify that concentrations reached an "asymptotic level" – in which concentration gradually decreases to a constant level – by monitoring concentration rebounds after extraction shutdowns.**

   The decrease in total VOC concentrations illustrated on Figure 2-4 indicates that an asymptotic level was reached more than three years ago, in mid-1995. Continued operation of the SVE system has shown very low vapor concentrations extracted from wells. The concentration of the SVE inlet stream has consistently been less than 1 part per million using a field organic vapor monitor (OVM).

3) **Check if there is reduction of concentrations in soil matrix samples at selected "fine-grained horizons" in the vadose zone.**

   During installation of the wells, only a few fine-grained horizons were identified at depth in each well, but lithology-specific soil samples were not collected for analysis. As a result, detailed baseline soil information is not available. The very high percentage drop in soil vapor concentrations provides evidence that contaminant concentrations in soil have been significantly reduced as a result of the remediation activities in the BPA.

4) **Apply "transport modeling" to show that any residual contaminants will not pose further threat to groundwater quality.**

Results from the ongoing groundwater monitoring program indicate that the quality of the groundwater beneath the BPA is already compromised. Therefore, any residual soil vapors in the formations do not pose any additional threat to, or will impact, the groundwater. Existing contaminated groundwater beneath the BPA is contained by the downgradient groundwater extraction system in the RMPA.

5) **Implement groundwater monitoring if contaminants exceeding target-screening levels are to be left in the vadose zone.**

Groundwater and soil vapor monitoring events have been occurring since Fall 1994. These regularly scheduled sampling events will continue in the future, and a monitoring plan is already in place.

Specific conclusions are:

- Soil vapor concentrations have been reduced by more than 99.6 percent.
- The operation of the SVE and TPE systems over the past four years has reduced the soil vapor concentrations dramatically. Considering that soil vapor concentrations have been reduced by more than 99.6% and based on RWQCB criteria, continued vapor extraction is not considered efficient or necessary.

4.0 Recommendations

Based on the results of the pulse testing and evaluation of data collected since 1994, it is clear that soil vapors have been largely remediated in the BPA. As a result, Radian recommends shutting down the SVE system. We also propose the following:

- Key extraction wells in the BPA should continue to be monitored quarterly for one year with vapor samples being analyzed by a laboratory. If future monitoring results show significant increases, soil vapors at the SVE wells should be periodically extracted using the SVE system. However, should concentrations remain at relatively low levels, additional SVE operation should be stopped and the SVE equipment removed.

- Groundwater monitoring, which is being conducted as a separate program, should continue.

- The data collected during the proposed shutdown period will be summarized in the five-year 1999 project review.

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Appendix A

Laboratory Analyses Results and Field Monitoring Results

Laboratory, OVA, and OVM Vapor Monitoring Results
Vapor Extraction System Pulsed Operation Monitoring
Lockheed Beaumont Facility No. 1, 1998

VEW-6

	18-May									
Laboratory Results	Dynamic	Static	19-May	27-May	3-Jun	10-Jun	17-Jun	1-Jul	15-Jul	29-Jul
Acetone	4.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	72.0
1,1-Dichloroethene	390	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	247.0
1,2-Dichloroethene	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Methylene Chloride	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
1,1,2-Trichloro-1,2,2-Trifluroethane	8.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7.0
1,1-Dichloroethane	1.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
1,1,1-Trichloroethane	34.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	30.8
Carbon Tetrachloride	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Trichloroethene	113	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	82.5
Toluene	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Tetrachloroethene	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Laboratory VOC Total (ppbv)	553.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	439.3
Field OVA (ppm)	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Field OVM (ppm)	<1[a]	<1	<1	<1	0.6	0.0	0.2	0.0	<1	0.0

[a] - OVM reading of 0 is interpreted as <1 because OVM rounds down (e.g., .6 is displayed as 0).

Lab Contaminant in blue

VEW-10

	18-May									
Laboratory Results	Dynamic	Static	19-May	27-May	3-Jun	10-Jun	17-Jun	1-Jul	15-Jul	29-Jul
Acetone	5.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	13
1,1-Dichloroethene	113	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	479
1,2-Dichloroethene	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.0
Methylene Chloride	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
1,1,2-Trichloro-1,2,2-Trifluroethane	4.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	9.4
1,1-Dichloroethane	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5.8
1,1,1-Trichloroethane	278	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	570
1,1,2-Trichloroethane	8.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	38.8
1,2-Dichloroethane	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	14
2-Butanone	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	12.9
Carbon Tetrachloride	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Trichloroethene	42.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	224
Toluene	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Tetrachloroethene	2.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.9
Laboratory VOC Total (ppbv)	454.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1373.8
Field OVA (ppm)	0.0	0.0	0.0	1.7	1.8	2.2	1.8	1.4	0.6	1.1
Field OVM (ppm)	<1[a]	<1	<1	<1	1.1	0.6	0.8	0.4	<1	2.1

[a] - OVM reading of 0 is interpreted as <1 because OVM rounds down (e.g., .6 is displayed as 0).

Lab Contaminant in blue

Note: OVA Cleaned after 27 May sampling event. OVM readings between 27-May and 15-July are considered representative. Readings for 15 July are not considered representative because OVM lamp may be dirty.

d:\clients\lasc\vapdata.xls

Vapor Extraction System Pulsed Operation Monitoring
Lockheed Beaumont Facility No. 1, 1998 (Page 2)

VEW-11

Laboratory Results	18-May Dynamic	18-May Static	19-May	27-May	3-Jun	10-Jun	17-Jun	1-Jul	16-Jul	29-Jul
Chloromethane	ND	1.4	n/a	1.8	ND	ND	ND	n/a	ND	ND
Acetone	4.1	12.2	n/a	6.6	27.2	10.8	ND	n/a	191.0	48.1
1,1-Dichloroethene	1110	ND	n/a	ND	ND	25.9	208	n/a	303	425
1,2-Dichloroethene	9.1	ND	n/a	ND	ND	ND	ND	n/a	ND	ND
1,1-Dicloroethane	ND	ND	ND	ND	ND	ND	ND	n/a	2.3	7.3
1,2-Dicloroethane	ND	ND	ND	ND	ND	ND	ND	n/a	1.4	ND
Methylene Chloride	ND	ND	n/a	ND	ND	ND	ND	n/a		ND
2-Butanone	ND	5.4	n/a	ND	ND	3.4	ND	n/a	11.1	13.9
1,1,1-Trichloroethane	52.4	ND	n/a	ND	ND	1.8	12.3	n/a	21	52.2
Carbon Tetrachloride	2.8	ND	n/a	ND	ND	ND	ND	n/a	1.3	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	n/a	1.4	ND
Trichloroethene	396	ND	n/a	ND	ND	13.2	86	n/a	161	270
Toluene	ND	ND	n/a	ND	ND	ND	ND	n/a	ND	ND
Tetrachloroethene	5.3	ND	n/a	ND	ND	ND	ND	n/a	3.4	3.3
Vinyl Acetate	ND	ND	n/a	ND	ND	ND	ND	n/a	ND	6.5
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	1.7	ND	n/a	ND	ND
Hexachloro-1,3-Butadiene	ND	ND	ND	ND	ND	1.2	ND	n/a	ND	ND
Laboratory VOC Total (ppbv)	1579.7	19.0	0.0	8.4	27.2	58.0	306.3	n/a	696.9	826.3
Field OVA (ppm)	0.8	0.0	0.2	0.2	0.5	0.0	0.3	1.3	0.0	0.7
Field OVM (ppm)	1	<1[a]	<1	<1	0.4	0.8	1.0	1.0	<1	2.2

[a] - OVM reading of 0 is interpreted as <1 because OVM rounds down (e.g., .6 is displayed as 0).

Lab contaminant in blue

VRW-2

Laboratory Results	18-May Dynamic	18-May Static	19-May	27-May	3-Jun	10-Jun	17-Jun	1-Jul	16-Jul	29-Jul
Chloromethane	1.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4.0
Acetone	7.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	13.9
1,1-Dichloroethene	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
1,2-Dichloroethene	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Methylene Chloride	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
2-Butanone	10.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15.4
1,1,1-Trichloroethane	2.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Carbon Tetrachloride	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Trichloroethene	2.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Toluene	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Tetrachloroethene	ND	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ND
Laboratory VOC Total (ppbv)	27.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33.3
Field OVA (ppm)	0.0	0.0	0.6	0.6	0.6	1.0	0.2	NA[b]	0.0	0.0
Field OVM (ppm)	<1[a]	<1	<1	<1	<1	0.0	0.0	0.0	0.0	0.0

[a] - OVM reading of 0 is interpreted as <1 because OVM rounds down (e.g., .6 is displayed as 0).

Lab contaminant in blue

[b] - Instrument went down.

RADIAN CORPORATION
16845 Von Karman Ave, Suite 100, Irvine CA 92714
(714) 261-8611, FAX (714) 261-6505

CHAIN-OF-CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY

TASK OR SUB TASK NAME (one per form): VAPOR PULSE TEST

CONTRACT NAME: LOCKHEED BEAUMONT

CHARGE NUMBER: 67515815.1000

RADIAN CONTACT: GEORGE MCKELVEY

LABORATORY NAME & ADDRESS: CAL SCIENCE LABORATORIES
GARDEN GROVE, CA

CONTACT: BILL CHRISTENSEN

PHONE: (714) 895-5494

SHIPPING AIRBILL: DELIVERY BY RADIAN

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	UNIT QUANTITY	START PRESERVATIVE PSI	FINAL PSI	MATRIX CODE	TYPE CODE	TYPE OF ANALYSIS: TO14 / 8260							QC	LOCATION	DEPTH	QC CODE
LM98-07-002	7/29/98	1236	TMW	1	CANISTER	27	6	Vpr	GR	X								VEW-11	CEL-0961	
LM98-07-003	7/29/98	13:28	TMW	1	CANISTER	27	6	Vpr	GR	X								VEW-6	CEL-0967	
LM98-07-004	7/29/98	1419	TMW	1	CANISTER	26	6	Vpr	GR	X								VEW-10	CEL-0910	
LM98-07-005	7/29/98	1510	TMW	1	CANISTER	26	6	Vpr	GR	X								VRW-2	CEL-0902	

SAMPLE CONDITION UPON RELEASE BY RADIAN:

SPECIAL INSTRUCTIONS:

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	7/30/98	12:30		7/30/98	12:30
Paul Brandt	7/30/98	13:10		7/30/98	~~12:30~~ 13:10
	/ /	:		/ /	:

DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN-OF-CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

WHITE - DATA MANAGEMENT / GOLDENROD- SAMPLE CONTROL / PINK - CUSTODY RECORD / YELLOW - LABORATORY

THE INFORMATION IN THIS SECTION WILL NOT BE AVAILABLE TO THE LABORATORY

(Remove this section from laboratory copies)

SAMPLING COMMENTS:

SAMPLES COLLECTED FOLLOWING 40 MIN PURGE TIME AT EACH LOCATION.

RADIAN CORPORATION
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CHAIN-OF-CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY

1 / 1

TASK OR SUB TASK NAME (one per form): Low Vacuum Pulse Testing - Event 8	CONTRACT NAME: Lockheed Martin - Beaumont
CHARGE NUMBER: 6751515.4245.2000	RADIAN CONTACT: George McAlvey

LABORATORY NAME & ADDRESS: CalScience Environmental Laboratories, Inc.
7440 Lincoln Way Garden Grove CA 92641
CONTACT: Bill Christensen PHONE: (714) 895-5494
SHIPPING AIRBILL: Radian Delivery

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	CANTD ~~UNIT~~ QUANTITY	START PSI ~~PRESERVATIVE~~	FINAL PSI	MATRIX CODE	TYPE CODE	TYPE OF ANALYSIS: TO14-8260							QC	LOCATION	DEPTH	QC CODE
LM98-07-001	7-15-98	1110	GM	1	CB $50	30	6	VA	GR	X								VEW-11		

SAMPLE CONDITION UPON RELEASE BY RADIAN: Valves Tight.

SPECIAL INSTRUCTIONS: Normal TAT

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	7/16/98	10:00		7/16/98	10:00
	/ /	:		/ /	:
	/ /	:		/ /	:

DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN-OF-CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

THE INFORMATION IN THIS SECTION WILL NOT BE AVAILABLE TO THE LABORATORY

(Remove this section from laboratory copies)

SAMPLING COMMENTS:

WHITE - DATA MANAGEMENT / GOLDENROD- SAMPLE CONTROL / PINK - CUSTODY RECORD / YELLOW - LABORATORY

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CHAIN-OF-CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY

1/1

TASK OR SUB TASK NAME (one per form): LOW VACUUM PULSE TESTING - EVENT 7

CONTRACT NAME: LOCKHEED MARTIN - BEAUMONT

CHARGE NUMBER: 675 | SB15, 4745, 7000

RADIAN CONTACT: GEORGE MCKENNEY

LABORATORY NAME & ADDRESS: CALSCIENCE ENVIRONMENTAL LABORATORIES, INC. 7440 LINCOLN WAY GARDEN GROVE, CA 92641

CONTACT: BILL CHRISTENSEN

PHONE: (714) 895-5494

SHIPPING AIRBILL: RADIAN DELIVERY

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	CAL ID UNIT QUANTITY	OPEN PSI PRESERVATIVE	CLOSE PSI	MATRIX CODE	TYPE CODE	TYPE OF ANALYSIS: TO-14 8260	QC	LOCATION	DEPTH	QC CODE
LM98-06-0041	6-17-98	1000	TMW	1	CEL DØ-29	-28.5	10	VA	GR	X		VEN-11		

SAMPLE CONDITION UPON RELEASE BY RADIAN: VALVE TIGHT

SPECIAL INSTRUCTIONS:

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	6/17/98	16:30		6/17/98	16:30
	6/18/98	09:25		6/18/98	09:25
	/ /	:		/ /	:

DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN-OF-CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

THE INFORMATION IN THIS SECTION WILL NOT BE AVAILABLE TO THE LABORATORY

(Remove this section from laboratory copies)

SAMPLING COMMENTS:

CANISTER ID

CEL - DØ29

WHITE - DATA MANAGEMENT / GOLDENROD- SAMPLE CONTROL / PINK - CUSTODY RECORD / YELLOW - LABORATORY

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USE A BALLPOINT PEN AND PRESS FIRMLY

1/1

TASK OR SUB TASK NAME (one per form): Low Vacuum Pulse Testing - Event 6	CONTRACT NAME: Lockheed-Martin Beaumont
CHARGE NUMBER: 67575815.4245.2000	RADIAN CONTACT: George McKinney
LABORATORY NAME & ADDRESS: Calscience Environmental Laboratories, Inc. 7440 Lincoln Way Garden Grove CA 92641	
CONTACT: Bill Chamnsit	PHONE: (714) 895-5494
SHIPPING AIRBILL: Radian Driver	

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	CANISTER ID NUMBER / FLOW CONTROLLER ID NUMBER / QUANTITY	OPEN PSI / PRESERVATIVE	CLOSE PSI	MATRIX CODE	TYPE CODE	TYPE OF ANALYSIS: TO-14 (PZA)							QC
LMB-06-002	6/10/98	1200	MW	1	CEL 0946	26	08	VA	GR	X							
LMB-06-003	6/10/98	1204	MW	1	CEL 0956	26	10	VA	GR	X							

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CHAIN-OF-CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY

1/1

TASK OR SUB TASK NAME (one per form): LOW VACUUM PULSE TESTING - EVENTS

CONTRACT NAME: LOCKHEED-MARTIN BEAUMONT

CHARGE NUMBER: 675/5815.4245.2000

RADIAN CONTACT: GEORGE McKELVEY

LABORATORY NAME & ADDRESS: CALSCIENCE ENVIRONMENTAL LABORATORIES, INC. 7440 LINCOLN WAY GARDEN GROVE, CA 92641

CONTACT: BILL CHRISTENSEN

PHONE (714) 895-5494

SHIPPING AIRBILL: RADIAN DELIVERY

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	UNIT QUANTITY	PRESERVATIVE	MATRIX CODE	TYPE CODE	TYPE OF ANALYSIS: TO-14 (GC/MS)	QC	LOCATION	DEPTH	QC CODE
LM98-06-001	6/3/98	1120	GM	1	CELD043	27 psi / 10 psi	VA	GR	X		VEW-11		

SAMPLE CONDITION UPON RELEASE BY RADIAN: BOTH VALVES TIGHT

SPECIAL INSTRUCTIONS: NORMAL TAT

RELEASED BY	DATE	TIME
[signature]	6/15/98	10:00
	/ /	:
	/ /	:

RECEIVED BY	DATE	TIME
	/ /	:
	/ /	:
[signature]	06/16/98	10:00

DISPOSAL CONFIRMED BY	DATE	TIME
	/ /	:

CHAIN-OF-CUSTODY RETURNED BY	DATE	TIME
	/ /	:

THE INFORMATION IN THIS SECTION WILL NOT BE AVAILABLE TO THE LABORATORY

(Remove this section from laboratory copies)

SAMPLING COMMENTS:

WHITE - DATA MANAGEMENT / GOLDENROD - SAMPLE CONTROL / PINK - CUSTODY RECORD / YELLOW - LABORATORY

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CHAIN-OF-CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY

1/1

TASK OR SUB TASK NAME (one per form): LOW VACUUM PULSE TESTING

CONTRACT NAME: LOCKHEED - MARTIN BEAUMONT

CHARGE NUMBER: 675/5815.4245.2600

RADIAN CONTACT: GEORGE MIKELVEY

LABORATORY NAME & ADDRESS: CALSCIENCE ENVIRONMENTAL LABORATORIES, INC.
7440 LINCOLN WAY. GARDEN GROVE, CA 92641

CONTACT: BILL CHRISTENSON

PHONE (714) 895-5494

SHIPPING AIRBILL: RADIAN DELIVERY

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	CANISTER # UNIT QUANTITY	PRESERVATIVE	MATRIX CODE	TYPE CODE	TO-14 (6260)	QC	LOCATION	DEPTH	QC CODE
LMMB-05-006	5-27-98	1210	GSM	1	CELD1023	—	VA	GR			VEW-11		

TYPE OF ANALYSIS

THE INFORMATION IN THIS SECTION WILL NOT BE AVAILABLE TO THE LABORATORY

(Remove this section from laboratory copies)

SAMPLE CONDITION UPON RELEASE BY RADIAN: CANISTER PRESSURE = 10 PSI

SPECIAL INSTRUCTIONS: NORMAL TAT

SAMPLING COMMENTS:

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	5/28/98	09:55		5/28/98	09:55
	/ /	:		/ /	:
	/ /	:		/ /	:
DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN-OF-CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

WHITE - DATA MANAGEMENT / GOLDENROD- SAMPLE CONTROL / PINK - CUSTODY RECORD / YELLOW - LABORATORY

RADIAN CORPORATION
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CHAIN-OF-CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY

1/1

TASK OR SUB TASK NAME (one per form): LOW VACUUM PULSE TESTING

CONTRACT NAME: LOCKHEED-MARTIN BEAUMONT

CHARGE NUMBER: 68515815.4245.2000

RADIAN CONTACT: GEORGE McKelvey

LABORATORY NAME & ADDRESS: CALSCIENCE ENVIRONMENTAL LABORATORIES, INC. 7440 LINCOLN WAY, GARDEN GROVE, CA 92641

CONTACT: BILL CHRISTENSEN

PHONE: (714) 895-5494

SHIPPING AIRBILL: RADIAN DELIVERY

TYPE OF ANALYSIS: TO14-8260

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	CANISTER # UNIT QUANTITY	Begin PSI PRESERVATIVE	Closed PSI	MATRIX CODE	TYPE CODE	QC	LOCATION	DEPTH	QC CODE
LMAB-05-001	5-18-98	1005	GSM	1	CELD033	28	6	VA	GR	X	VEW-11		
LMAB-05-002		1020		1	CELD025	26	6			X	VEW-6		
LMAB-05-003		1047		1	CELD024	27	6			X	VEW-10		
LMAB-05-004		1058		1	CELD018	28	7			X	VRW-2		
LMAB-05-005	↓	1515	↓	1	CELD007	26	6	↓	↓	X	VBW-11		

SAMPLE CONDITION UPON RELEASE BY RADIAN: CANISTER VALVES TIGHT

SPECIAL INSTRUCTIONS:

THE INFORMATION IN THIS SECTION WILL NOT BE AVAILABLE TO THE LABORATORY

(Remove this section from laboratory copies)

SAMPLING COMMENTS:

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[signature]	5/19/98	10:00		/ /	:
	/ /	:		/ /	:
	/ /	:	[signature]	05/19/98	10:00

DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN-OF-CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

WHITE - DATA MANAGEMENT / GOLDENROD - SAMPLE CONTROL / PINK - CUSTODY RECORD / YELLOW - LABORATORY

Calscience Environmental Laboratories, Inc.

June 24, 1998

George McKelvey
RADIAN International, LLC
16845 Von Karman Avenue, Suite 100
Irvine, CA 92606

Subject: **Calscience Work Order Number: 98-06-0492**
Client Reference: Lockheed Martin/Beaumont

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 06/18/98 and analyzed in accordance with the attached chain-of-custody.

The results in this analytical report are limited to the samples tested, and any reproduction of this report must be made in its entirety.

If you have any questions regarding this report, require sampling supplies or field services, or information on our analytical services, please feel free to call me at (714) 895-5494.

Sincerely,

Calscience Environmental
Laboratories, Inc.
William H. Christensen
Deliverables Manager

Steven L. Lane
Laboratory Director

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed Martin/Beaumont		
Work Order Number:	98-06-0492		
QC Batch ID:	980618	Date Collected:	06/17/98
Matrix:	Air	Date Received:	06/18/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/19/98

Client Sample Number: **LM98-06-004**
Lab Sample Number: 98-06-0492-1

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	2.3		ppb (v/v)
Chloromethane	ND	2.3		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	9.3		ppb (v/v)
Vinyl Chloride	ND	2.3		ppb (v/v)
Bromomethane	ND	2.3		ppb (v/v)
Chloroethane	ND	2.3		ppb (v/v)
Acetonitrile	ND	4.7		ppb (v/v)
Trichlorofluoromethane	ND	2.3		ppb (v/v)
Acetone	ND	4.7		ppb (v/v)
1,1-Dichloroethene	208	2.3		ppb (v/v)
Methylene Chloride	ND	9.3		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	4.7		ppb (v/v)
Carbon Disulfide	ND	2.3		ppb (v/v)
t-1,2-Dichloroethene	ND	2.3		ppb (v/v)
1,1-Dichloroethane	ND	2.3		ppb (v/v)
Vinyl Acetate	ND	4.7		ppb (v/v)
2-Butanone	ND	4.7		ppb (v/v)
c-1,2-Dichloroethene	ND	2.3		ppb (v/v)
Chloroform	ND	2.3		ppb (v/v)
1,2-Dichloroethane	ND	2.3		ppb (v/v)
1,1,1-Trichloroethane	12.3	2.3		ppb (v/v)
Benzene	ND	2.3		ppb (v/v)
Carbon Tetrachloride	ND	2.3		ppb (v/v)
1,2-Dichloropropane	ND	2.3		ppb (v/v)
Bromodichloromethane	ND	2.3		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	4.7		ppb (v/v)
c-1,3-Dichloropropene	ND	2.3		ppb (v/v)
t-1,3-Dichloropropene	ND	2.3		ppb (v/v)
1,1,2-Trichloroethane	ND	2.3		ppb (v/v)
Toluene	ND	2.3		ppb (v/v)
2-Hexanone	ND	4.7		ppb (v/v)
4-Methyl-2-Pentanone	ND	4.7		ppb (v/v)
Dibromochloromethane	ND	2.3		ppb (v/v)
1,2-Dibromoethane	ND	2.3		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed Martin/Beaumont		
Work Order Number:	98-06-0492		
QC Batch ID:	980618	Date Collected:	06/17/98
Matrix:	Air	Date Received:	06/18/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/19/98

Client Sample Number: **LM98-06-004**
Lab Sample Number: 98-06-0492-1

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	86.0	2.3		ppb (v/v)
Tetrachloroethene	ND	2.3		ppb (v/v)
Chlorobenzene	ND	2.3		ppb (v/v)
Ethylbenzene	ND	2.3		ppb (v/v)
Bromoform	ND	2.3		ppb (v/v)
Styrene	ND	4.7		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	2.3		ppb (v/v)
Xylenes (total)	ND	7.0		ppb (v/v)
4-Ethyltoluene	ND	2.3		ppb (v/v)
1,3,5-Trimethylbenzene	ND	2.3		ppb (v/v)
1,2,4-Trimethylbenzene	ND	2.3		ppb (v/v)
Benzyl Chloride	ND	2.3		ppb (v/v)
1,3-Dichlorobenzene	ND	2.3		ppb (v/v)
1,4-Dichlorobenzene	ND	2.3		ppb (v/v)
1,2-Dichlorobenzene	ND	2.3		ppb (v/v)
1,2,4-Trichlorobenzene	ND	2.3		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	2.3		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed Martin/Beaumont		
Work Order Number:	98-06-0492		
QC Batch ID:	980618	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/18/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-458

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.5		ppb (v/v)
Chloromethane	ND	0.5		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	2.0		ppb (v/v)
Vinyl Chloride	ND	0.5		ppb (v/v)
Bromomethane	ND	0.5		ppb (v/v)
Chloroethane	ND	0.5		ppb (v/v)
Acetonitrile	ND	1.0		ppb (v/v)
Trichlorofluoromethane	ND	0.5		ppb (v/v)
Acetone	ND	1.0		ppb (v/v)
1,1-Dichloroethene	ND	0.5		ppb (v/v)
Methylene Chloride	ND	2.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0		ppb (v/v)
Carbon Disulfide	ND	0.5		ppb (v/v)
t-1,2-Dichloroethene	ND	0.5		ppb (v/v)
1,1-Dichloroethane	ND	0.5		ppb (v/v)
Vinyl Acetate	ND	1.0		ppb (v/v)
2-Butanone	ND	1.0		ppb (v/v)
c-1,2-Dichloroethene	ND	0.5		ppb (v/v)
Chloroform	ND	0.5		ppb (v/v)
1,2-Dichloroethane	ND	0.5		ppb (v/v)
1,1,1-Trichloroethane	ND	0.5		ppb (v/v)
Benzene	ND	0.5		ppb (v/v)
Carbon Tetrachloride	ND	0.5		ppb (v/v)
1,2-Dichloropropane	ND	0.5		ppb (v/v)
Bromodichloromethane	ND	0.5		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.0		ppb (v/v)
c-1,3-Dichloropropene	ND	0.5		ppb (v/v)
t-1,3-Dichloropropene	ND	0.5		ppb (v/v)
1,1,2-Trichloroethane	ND	0.5		ppb (v/v)
Toluene	ND	0.5		ppb (v/v)
2-Hexanone	ND	1.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.0		ppb (v/v)
Dibromochloromethane	ND	0.5		ppb (v/v)
1,2-Dibromoethane	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed Martin/Beaumont		
Work Order Number:	98-06-0492		
QC Batch ID:	980618	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/18/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-458

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	0.5		ppb (v/v)
Tetrachloroethene	ND	0.5		ppb (v/v)
Chlorobenzene	ND	0.5		ppb (v/v)
Ethylbenzene	ND	0.5		ppb (v/v)
Bromoform	ND	0.5		ppb (v/v)
Styrene	ND	1.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.5		ppb (v/v)
Xylenes (total)	ND	1.5		ppb (v/v)
4-Ethyltoluene	ND	0.5		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.5		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.5		ppb (v/v)
Benzyl Chloride	ND	0.5		ppb (v/v)
1,3-Dichlorobenzene	ND	0.5		ppb (v/v)
1,4-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.5		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

EPA TO-14 Full List

LCS/LCSD Batch Number:	980618	Instrument:	GC/MS E
Matrix:	Air	Date Extracted:	N/A
Method:	EPA TO-14	Date Analyzed:	06/18/98

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	82	82	60-140	0	0-30	
1,2-Dichloroethane	112	114	60-140	1	0-30	
Benzene	97	98	60-140	1	0-30	
Carbon Tetrachloride	117	119	60-140	1	0-30	
1,2-Dichloropropane	100	101	60-140	0	0-30	
c-1,3-Dichloropropene	105	104	60-140	0	0-30	
1,1,2-Trichloroethane	113	114	60-140	0	0-30	
1,2-Dibromoethane	120	121	60-140	0	0-30	
Trichloroethene	126	128	60-140	1	0-30	
Tetrachloroethene	119	120	60-140	0	0-30	
Bromoform	122	123	60-140	0	0-30	
1,4-Dichlorobenzene	121	120	60-140	0	0-30	
1,2-Dichlorobenzene	125	125	60-140	0	0-30	

Calscience Environmental Laboratories, Inc.

GLOSSARY OF TERMS AND QUALIFIERS

Work Order Number: 98-06-0492

Qualifier	Definition
ND	Not detected at indicated reporting limit.

Calscience Environmental Laboratories, Inc.

May 26, 1998

George McKelvey
RADIAN International, LLC
16845 Von Karman Avenue, Suite 100
Irvine, CA 92606

Subject: **Calscience Work Order Number: 98-05-0515**
Client Reference: Low Vacuum Pulse Testing

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 05/19/98 and analyzed in accordance with the attached chain-of-custody.

The results in this analytical report are limited to the samples tested, and any reproduction of this report must be made in its entirety.

If you have any questions regarding this report, require sampling supplies or field services, or information on our analytical services, please feel free to call me at (714) 895-5494.

Sincerely,

Calscience Environmental
Laboratories, Inc.
William H. Christensen
Deliverables Manager

Steven L. Lane
Laboratory Director

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **LM98-05-001**
Lab Sample Number: 98-05-0515-1

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.8		ppb (v/v)
Chloromethane	ND	1.8		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	7.4		ppb (v/v)
Vinyl Chloride	ND	1.8		ppb (v/v)
Bromomethane	ND	1.8		ppb (v/v)
Chloroethane	ND	1.8		ppb (v/v)
Acetonitrile	ND	3.7		ppb (v/v)
Trichlorofluoromethane	ND	1.8		ppb (v/v)
Acetone	4.1	3.7		ppb (v/v)
1,1-Dichloroethene	1110	18		ppb (v/v)
Methylene Chloride	ND	7.4		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	3.7		ppb (v/v)
Carbon Disulfide	ND	1.8		ppb (v/v)
t-1,2-Dichloroethene	ND	1.8		ppb (v/v)
1,1-Dichloroethane	9.1	1.8		ppb (v/v)
Vinyl Acetate	ND	3.7		ppb (v/v)
2-Butanone	ND	3.7		ppb (v/v)
c-1,2-Dichloroethene	ND	1.8		ppb (v/v)
Chloroform	ND	1.8		ppb (v/v)
1,2-Dichloroethane	ND	1.8		ppb (v/v)
1,1,1-Trichloroethane	52.4	1.8		ppb (v/v)
Benzene	ND	1.8		ppb (v/v)
Carbon Tetrachloride	2.8	1.8		ppb (v/v)
1,2-Dichloropropane	ND	1.8		ppb (v/v)
Bromodichloromethane	ND	1.8		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	3.7		ppb (v/v)
c-1,3-Dichloropropene	ND	1.8		ppb (v/v)
t-1,3-Dichloropropene	ND	1.8		ppb (v/v)
1,1,2-Trichloroethane	ND	1.8		ppb (v/v)
Toluene	ND	1.8		ppb (v/v)
2-Hexanone	ND	3.7		ppb (v/v)
4-Methyl-2-Pentanone	ND	3.7		ppb (v/v)
Dibromochloromethane	ND	1.8		ppb (v/v)
1,2-Dibromoethane	ND	1.8		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **LM98-05-001**
Lab Sample Number: 98-05-0515-1

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	396	18		ppb (v/v)
Tetrachloroethene	5.3	1.8		ppb (v/v)
Chlorobenzene	ND	1.8		ppb (v/v)
Ethylbenzene	ND	1.8		ppb (v/v)
p/m-Xylene	ND	3.7		ppb (v/v)
Bromoform	ND	1.8		ppb (v/v)
Styrene	ND	3.7		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.8		ppb (v/v)
o-Xylene	ND	1.8		ppb (v/v)
4-Ethyltoluene	ND	1.8		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.8		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.8		ppb (v/v)
Benzyl Chloride	ND	1.8		ppb (v/v)
1,3-Dichlorobenzene	ND	1.8		ppb (v/v)
1,4-Dichlorobenzene	ND	1.8		ppb (v/v)
1,2-Dichlorobenzene	ND	1.8		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.8		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.8		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **LM98-05-002**
Lab Sample Number: 98-05-0515-2

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.9		ppb (v/v)
Chloromethane	ND	0.9		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	3.8		ppb (v/v)
Vinyl Chloride	ND	0.9		ppb (v/v)
Bromomethane	ND	0.9		ppb (v/v)
Chloroethane	ND	0.9		ppb (v/v)
Acetonitrile	ND	1.9		ppb (v/v)
Trichlorofluoromethane	ND	0.9		ppb (v/v)
Acetone	4.5	1.9		ppb (v/v)
1,1-Dichloroethene	390	8		ppb (v/v)
Methylene Chloride	ND	3.8		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	8.4	1.9		ppb (v/v)
Carbon Disulfide	ND	0.9		ppb (v/v)
t-1,2-Dichloroethene	ND	0.9		ppb (v/v)
1,1-Dichloroethane	1.2	0.9		ppb (v/v)
Vinyl Acetate	ND	1.9		ppb (v/v)
2-Butanone	ND	1.9		ppb (v/v)
c-1,2-Dichloroethene	ND	0.9		ppb (v/v)
Chloroform	ND	0.9		ppb (v/v)
1,2-Dichloroethane	ND	0.9		ppb (v/v)
1,1,1-Trichloroethane	34.7	0.9		ppb (v/v)
Benzene	ND	0.9		ppb (v/v)
Carbon Tetrachloride	ND	0.9		ppb (v/v)
1,2-Dichloropropane	ND	0.9		ppb (v/v)
Bromodichloromethane	ND	0.9		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.9		ppb (v/v)
c-1,3-Dichloropropene	ND	0.9		ppb (v/v)
t-1,3-Dichloropropene	ND	0.9		ppb (v/v)
1,1,2-Trichloroethane	ND	0.9		ppb (v/v)
Toluene	ND	0.9		ppb (v/v)
2-Hexanone	ND	1.9		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.9		ppb (v/v)
Dibromochloromethane	ND	0.9		ppb (v/v)
1,2-Dibromoethane	ND	0.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **LM98-05-002**
Lab Sample Number: 98-05-0515-2

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	113	0.9		ppb (v/v)
Tetrachloroethene	2.0	0.9		ppb (v/v)
Chlorobenzene	ND	0.9		ppb (v/v)
Ethylbenzene	ND	0.9		ppb (v/v)
p/m-Xylene	ND	1.9		ppb (v/v)
Bromoform	ND	0.9		ppb (v/v)
Styrene	ND	1.9		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.9		ppb (v/v)
o-Xylene	ND	0.9		ppb (v/v)
4-Ethyltoluene	ND	0.9		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.9		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.9		ppb (v/v)
Benzyl Chloride	ND	0.9		ppb (v/v)
1,3-Dichlorobenzene	ND	0.9		ppb (v/v)
1,4-Dichlorobenzene	ND	0.9		ppb (v/v)
1,2-Dichlorobenzene	ND	0.9		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.9		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **LM98-05-003**
Lab Sample Number: 98-05-0515-3

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.9		ppb (v/v)
Chloromethane	ND	1.9		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	7.5		ppb (v/v)
Vinyl Chloride	ND	1.9		ppb (v/v)
Bromomethane	ND	1.9		ppb (v/v)
Chloroethane	ND	1.9		ppb (v/v)
Acetonitrile	ND	3.8		ppb (v/v)
Trichlorofluoromethane	ND	1.9		ppb (v/v)
Acetone	5.8	3.8		ppb (v/v)
1,1-Dichloroethene	113	1.9		ppb (v/v)
Methylene Chloride	ND	7.5		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	4.4	3.8		ppb (v/v)
Carbon Disulfide	ND	1.9		ppb (v/v)
t-1,2-Dichloroethene	ND	1.9		ppb (v/v)
1,1-Dichloroethane	ND	1.9		ppb (v/v)
Vinyl Acetate	ND	3.8		ppb (v/v)
2-Butanone	ND	3.8		ppb (v/v)
c-1,2-Dichloroethene	ND	1.9		ppb (v/v)
Chloroform	ND	1.9		ppb (v/v)
1,2-Dichloroethane	ND	1.9		ppb (v/v)
1,1,1-Trichloroethane	278	1.9		ppb (v/v)
Benzene	ND	1.9		ppb (v/v)
Carbon Tetrachloride	ND	1.9		ppb (v/v)
1,2-Dichloropropane	ND	1.9		ppb (v/v)
Bromodichloromethane	ND	1.9		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	3.8		ppb (v/v)
c-1,3-Dichloropropene	ND	1.9		ppb (v/v)
t-1,3-Dichloropropene	ND	1.9		ppb (v/v)
1,1,2-Trichloroethane	8.3	1.9		ppb (v/v)
Toluene	ND	1.9		ppb (v/v)
2-Hexanone	ND	3.8		ppb (v/v)
4-Methyl-2-Pentanone	ND	3.8		ppb (v/v)
Dibromochloromethane	ND	1.9		ppb (v/v)
1,2-Dibromoethane	ND	1.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **LM98-05-003**
Lab Sample Number: 98-05-0515-3

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	42.2	1.9		ppb (v/v)
Tetrachloroethene	2.4	1.9		ppb (v/v)
Chlorobenzene	ND	1.9		ppb (v/v)
Ethylbenzene	ND	1.9		ppb (v/v)
p/m-Xylene	ND	3.8		ppb (v/v)
Bromoform	ND	1.9		ppb (v/v)
Styrene	ND	3.8		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.9		ppb (v/v)
o-Xylene	ND	1.9		ppb (v/v)
4-Ethyltoluene	ND	1.9		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.9		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.9		ppb (v/v)
Benzyl Chloride	ND	1.9		ppb (v/v)
1,3-Dichlorobenzene	ND	1.9		ppb (v/v)
1,4-Dichlorobenzene	ND	1.9		ppb (v/v)
1,2-Dichlorobenzene	ND	1.9		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.9		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/20/98

Client Sample Number: **LM98-05-004**
Lab Sample Number: 98-05-0515-4

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.0		ppb (v/v)
Chloromethane	1.6	1.0		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	3.9		ppb (v/v)
Vinyl Chloride	ND	1.0		ppb (v/v)
Bromomethane	ND	1.0		ppb (v/v)
Chloroethane	ND	1.0		ppb (v/v)
Acetonitrile	ND	2.0		ppb (v/v)
Trichlorofluoromethane	ND	1.0		ppb (v/v)
Acetone	7.6	2.0		ppb (v/v)
1,1-Dichloroethene	3.0	1.0		ppb (v/v)
Methylene Chloride	ND	3.9		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	2.0		ppb (v/v)
Carbon Disulfide	ND	1.0		ppb (v/v)
t-1,2-Dichloroethene	ND	1.0		ppb (v/v)
1,1-Dichloroethane	ND	1.0		ppb (v/v)
Vinyl Acetate	ND	2.0		ppb (v/v)
2-Butanone	10.4	2.0		ppb (v/v)
c-1,2-Dichloroethene	ND	1.0		ppb (v/v)
Chloroform	ND	1.0		ppb (v/v)
1,2-Dichloroethane	ND	1.0		ppb (v/v)
1,1,1-Trichloroethane	2.4	1.0		ppb (v/v)
Benzene	ND	1.0		ppb (v/v)
Carbon Tetrachloride	ND	1.0		ppb (v/v)
1,2-Dichloropropane	ND	1.0		ppb (v/v)
Bromodichloromethane	ND	1.0		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	2.0		ppb (v/v)
c-1,3-Dichloropropene	ND	1.0		ppb (v/v)
t-1,3-Dichloropropene	ND	1.0		ppb (v/v)
1,1,2-Trichloroethane	ND	1.0		ppb (v/v)
Toluene	ND	1.0		ppb (v/v)
2-Hexanone	ND	2.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	2.0		ppb (v/v)
Dibromochloromethane	ND	1.0		ppb (v/v)
1,2-Dibromoethane	ND	1.0		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/20/98

Client Sample Number: **LM98-05-004**
Lab Sample Number: 98-05-0515-4

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	2.4	1.0		ppb (v/v)
Tetrachloroethene	ND	1.0		ppb (v/v)
Chlorobenzene	ND	1.0		ppb (v/v)
Ethylbenzene	ND	1.0		ppb (v/v)
p/m-Xylene	ND	2.0		ppb (v/v)
Bromoform	ND	1.0		ppb (v/v)
Styrene	ND	2.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.0		ppb (v/v)
o-Xylene	ND	1.0		ppb (v/v)
4-Ethyltoluene	ND	1.0		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.0		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.0		ppb (v/v)
Benzyl Chloride	ND	1.0		ppb (v/v)
1,3-Dichlorobenzene	ND	1.0		ppb (v/v)
1,4-Dichlorobenzene	ND	1.0		ppb (v/v)
1,2-Dichlorobenzene	ND	1.0		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.0		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.0		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/20/98

Client Sample Number: **LM98-05-005**
Lab Sample Number: 98-05-0515-5

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.0		ppb (v/v)
Chloromethane	1.4	1.0		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	4.0		ppb (v/v)
Vinyl Chloride	ND	1.0		ppb (v/v)
Bromomethane	ND	1.0		ppb (v/v)
Chloroethane	ND	1.0		ppb (v/v)
Acetonitrile	ND	2.0		ppb (v/v)
Trichlorofluoromethane	ND	1.0		ppb (v/v)
Acetone	12.2	2.0		ppb (v/v)
1,1-Dichloroethene	ND	1.0		ppb (v/v)
Methylene Chloride	ND	4.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	2.0		ppb (v/v)
Carbon Disulfide	ND	1.0		ppb (v/v)
t-1,2-Dichloroethene	ND	1.0		ppb (v/v)
1,1-Dichloroethane	ND	1.0		ppb (v/v)
Vinyl Acetate	ND	2.0		ppb (v/v)
2-Butanone	5.4	2.0		ppb (v/v)
c-1,2-Dichloroethene	ND	1.0		ppb (v/v)
Chloroform	ND	1.0		ppb (v/v)
1,2-Dichloroethane	ND	1.0		ppb (v/v)
1,1,1-Trichloroethane	ND	1.0		ppb (v/v)
Benzene	ND	1.0		ppb (v/v)
Carbon Tetrachloride	ND	1.0		ppb (v/v)
1,2-Dichloropropane	ND	1.0		ppb (v/v)
Bromodichloromethane	ND	1.0		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	2.0		ppb (v/v)
c-1,3-Dichloropropene	ND	1.0		ppb (v/v)
t-1,3-Dichloropropene	ND	1.0		ppb (v/v)
1,1,2-Trichloroethane	ND	1.0		ppb (v/v)
Toluene	ND	1.0		ppb (v/v)
2-Hexanone	ND	2.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	2.0		ppb (v/v)
Dibromochloromethane	ND	1.0		ppb (v/v)
1,2-Dibromoethane	ND	1.0		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	05/18/98
Matrix:	Air	Date Received:	05/19/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/20/98

Client Sample Number: **LM98-05-005**
Lab Sample Number: 98-05-0515-5

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	1.0		ppb (v/v)
Tetrachloroethene	ND	1.0		ppb (v/v)
Chlorobenzene	ND	1.0		ppb (v/v)
Ethylbenzene	ND	1.0		ppb (v/v)
p/m-Xylene	ND	2.0		ppb (v/v)
Bromoform	ND	1.0		ppb (v/v)
Styrene	ND	2.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.0		ppb (v/v)
o-Xylene	ND	1.0		ppb (v/v)
4-Ethyltoluene	ND	1.0		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.0		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.0		ppb (v/v)
Benzyl Chloride	ND	1.0		ppb (v/v)
1,3-Dichlorobenzene	ND	1.0		ppb (v/v)
1,4-Dichlorobenzene	ND	1.0		ppb (v/v)
1,2-Dichlorobenzene	ND	1.0		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.0		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.0		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-443

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.5		ppb (v/v)
Chloromethane	ND	0.5		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	2.0		ppb (v/v)
Vinyl Chloride	ND	0.5		ppb (v/v)
Bromomethane	ND	0.5		ppb (v/v)
Chloroethane	ND	0.5		ppb (v/v)
Acetonitrile	ND	1.0		ppb (v/v)
Trichlorofluoromethane	ND	0.5		ppb (v/v)
Acetone	ND	1.0		ppb (v/v)
1,1-Dichloroethene	ND	0.5		ppb (v/v)
Methylene Chloride	ND	2.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0		ppb (v/v)
Carbon Disulfide	ND	0.5		ppb (v/v)
t-1,2-Dichloroethene	ND	0.5		ppb (v/v)
1,1-Dichloroethane	ND	0.5		ppb (v/v)
Vinyl Acetate	ND	1.0		ppb (v/v)
2-Butanone	ND	1.0		ppb (v/v)
c-1,2-Dichloroethene	ND	0.5		ppb (v/v)
Chloroform	ND	0.5		ppb (v/v)
1,2-Dichloroethane	ND	0.5		ppb (v/v)
1,1,1-Trichloroethane	ND	0.5		ppb (v/v)
Benzene	ND	0.5		ppb (v/v)
Carbon Tetrachloride	ND	0.5		ppb (v/v)
1,2-Dichloropropane	ND	0.5		ppb (v/v)
Bromodichloromethane	ND	0.5		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.0		ppb (v/v)
c-1,3-Dichloropropene	ND	0.5		ppb (v/v)
t-1,3-Dichloropropene	ND	0.5		ppb (v/v)
1,1,2-Trichloroethane	ND	0.5		ppb (v/v)
Toluene	ND	0.5		ppb (v/v)
2-Hexanone	ND	1.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.0		ppb (v/v)
Dibromochloromethane	ND	0.5		ppb (v/v)
1,2-Dibromoethane	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0515		
QC Batch ID:	980519	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-443

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	0.5		ppb (v/v)
Tetrachloroethene	ND	0.5		ppb (v/v)
Chlorobenzene	ND	0.5		ppb (v/v)
Ethylbenzene	ND	0.5		ppb (v/v)
p/m-Xylene	ND	1.0		ppb (v/v)
Bromoform	ND	0.5		ppb (v/v)
Styrene	ND	1.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.5		ppb (v/v)
o-Xylene	ND	0.5		ppb (v/v)
4-Ethyltoluene	ND	0.5		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.5		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.5		ppb (v/v)
Benzyl Chloride	ND	0.5		ppb (v/v)
1,3-Dichlorobenzene	ND	0.5		ppb (v/v)
1,4-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.5		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

EPA TO-14 Full List

LCS/LCSD Batch Number:	980519	Instrument:	GC/MS E
Matrix:	Air	Date Extracted:	N/A
Method:	EPA TO-14	Date Analyzed:	05/19/98

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	94	94	60-140	0	0-30	
1,2-Dichloroethane	111	112	60-140	0	0-30	
Benzene	107	104	60-140	2	0-30	
Carbon Tetrachloride	105	99	60-140	5	0-30	
1,2-Dichloropropane	112	124	60-140	10	0-30	
c-1,3-Dichloropropene	117	130	60-140	10	0-30	
1,1,2-Trichloroethane	108	113	60-140	4	0-30	
1,2-Dibromoethane	109	112	60-140	2	0-30	
Trichloroethene	112	118	60-140	5	0-30	
Tetrachloroethene	105	104	60-140	0	0-30	
Bromoform	106	107	60-140	0	0-30	
1,4-Dichlorobenzene	95	94	60-140	1	0-30	
1,2-Dichlorobenzene	90	92	60-140	2	0-30	

Calscience Environmental Laboratories, Inc.

GLOSSARY OF TERMS AND QUALIFIERS

Work Order Number: 98-05-0515

Qualifier	Definition
ND	Not detected at indicated reporting limit.

7440 Lincoln Way, Garden Grove, CA 92841-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience
Environmental
Laboratories, Inc.

June 03, 1998

George McKelvey
RADIAN International, LLC
16845 Von Karman Avenue, Suite 100
Irvine, CA 92606

Subject: **Calscience Work Order Number: 98-05-0768**
Client Reference: Low Vacuum Pulse Testing

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 05/28/98 and analyzed in accordance with the attached chain-of-custody.

The results in this analytical report are limited to the samples tested, and any reproduction of this report must be made in its entirety.

If you have any questions regarding this report, require sampling supplies or field services, or information on our analytical services, please feel free to call me at (714) 895-5494.

Sincerely,

Calscience Environmental
Laboratories, Inc.
William H. Christensen
Deliverables Manager

Steven L. Lane
Laboratory Director

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0768		
QC Batch ID:	980529	Date Collected:	05/27/98
Matrix:	Air	Date Received:	05/28/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/29/98

Client Sample Number: **LM98-05-006**
Lab Sample Number: 98-05-0768-1

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.9		ppb (v/v)
Chloromethane	1.8	0.9		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	3.7		ppb (v/v)
Vinyl Chloride	ND	0.9		ppb (v/v)
Bromomethane	ND	0.9		ppb (v/v)
Chloroethane	ND	0.9		ppb (v/v)
Acetonitrile	ND	1.9		ppb (v/v)
Trichlorofluoromethane	ND	0.9		ppb (v/v)
Acetone	6.6	1.9		ppb (v/v)
1,1-Dichloroethene	ND	0.9		ppb (v/v)
Methylene Chloride	ND	3.7		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.9		ppb (v/v)
Carbon Disulfide	ND	0.9		ppb (v/v)
t-1,2-Dichloroethene	ND	0.9		ppb (v/v)
1,1-Dichloroethane	ND	0.9		ppb (v/v)
Vinyl Acetate	ND	1.9		ppb (v/v)
2-Butanone	ND	1.9		ppb (v/v)
c-1,2-Dichloroethene	ND	0.9		ppb (v/v)
Chloroform	ND	0.9		ppb (v/v)
1,2-Dichloroethane	ND	0.9		ppb (v/v)
1,1,1-Trichloroethane	ND	0.9		ppb (v/v)
Benzene	ND	0.9		ppb (v/v)
Carbon Tetrachloride	ND	0.9		ppb (v/v)
1,2-Dichloropropane	ND	0.9		ppb (v/v)
Bromodichloromethane	ND	0.9		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.9		ppb (v/v)
c-1,3-Dichloropropene	ND	0.9		ppb (v/v)
t-1,3-Dichloropropene	ND	0.9		ppb (v/v)
1,1,2-Trichloroethane	ND	0.9		ppb (v/v)
Toluene	ND	0.9		ppb (v/v)
2-Hexanone	ND	1.9		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.9		ppb (v/v)
Dibromochloromethane	ND	0.9		ppb (v/v)
1,2-Dibromoethane	ND	0.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0768		
QC Batch ID:	980529	Date Collected:	05/27/98
Matrix:	Air	Date Received:	05/28/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/29/98

Client Sample Number: **LM98-05-006**
Lab Sample Number: 98-05-0768-1

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	0.9		ppb (v/v)
Tetrachloroethene	ND	0.9		ppb (v/v)
Chlorobenzene	ND	0.9		ppb (v/v)
Ethylbenzene	ND	0.9		ppb (v/v)
p/m-Xylene	ND	1.9		ppb (v/v)
Bromoform	ND	0.9		ppb (v/v)
Styrene	ND	1.9		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.9		ppb (v/v)
o-Xylene	ND	0.9		ppb (v/v)
4-Ethyltoluene	ND	0.9		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.9		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.9		ppb (v/v)
Benzyl Chloride	ND	0.9		ppb (v/v)
1,3-Dichlorobenzene	ND	0.9		ppb (v/v)
1,4-Dichlorobenzene	ND	0.9		ppb (v/v)
1,2-Dichlorobenzene	ND	0.9		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.9		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0768		
QC Batch ID:	980529	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/29/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-447

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.5		ppb (v/v)
Chloromethane	ND	0.5		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	2.0		ppb (v/v)
Vinyl Chloride	ND	0.5		ppb (v/v)
Bromomethane	ND	0.5		ppb (v/v)
Chloroethane	ND	0.5		ppb (v/v)
Acetonitrile	ND	1.0		ppb (v/v)
Trichlorofluoromethane	ND	0.5		ppb (v/v)
Acetone	ND	1.0		ppb (v/v)
1,1-Dichloroethene	ND	0.5		ppb (v/v)
Methylene Chloride	ND	2.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0		ppb (v/v)
Carbon Disulfide	ND	0.5		ppb (v/v)
t-1,2-Dichloroethene	ND	0.5		ppb (v/v)
1,1-Dichloroethane	ND	0.5		ppb (v/v)
Vinyl Acetate	ND	1.0		ppb (v/v)
2-Butanone	ND	1.0		ppb (v/v)
c-1,2-Dichloroethene	ND	0.5		ppb (v/v)
Chloroform	ND	0.5		ppb (v/v)
1,2-Dichloroethane	ND	0.5		ppb (v/v)
1,1,1-Trichloroethane	ND	0.5		ppb (v/v)
Benzene	ND	0.5		ppb (v/v)
Carbon Tetrachloride	ND	0.5		ppb (v/v)
1,2-Dichloropropane	ND	0.5		ppb (v/v)
Bromodichloromethane	ND	0.5		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.0		ppb (v/v)
c-1,3-Dichloropropene	ND	0.5		ppb (v/v)
t-1,3-Dichloropropene	ND	0.5		ppb (v/v)
1,1,2-Trichloroethane	ND	0.5		ppb (v/v)
Toluene	ND	0.5		ppb (v/v)
2-Hexanone	ND	1.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.0		ppb (v/v)
Dibromochloromethane	ND	0.5		ppb (v/v)
1,2-Dibromoethane	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-05-0768		
QC Batch ID:	980529	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	05/29/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-447

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	0.5		ppb (v/v)
Tetrachloroethene	ND	0.5		ppb (v/v)
Chlorobenzene	ND	0.5		ppb (v/v)
Ethylbenzene	ND	0.5		ppb (v/v)
p/m-Xylene	ND	1.0		ppb (v/v)
Bromoform	ND	0.5		ppb (v/v)
Styrene	ND	1.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.5		ppb (v/v)
o-Xylene	ND	0.5		ppb (v/v)
4-Ethyltoluene	ND	0.5		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.5		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.5		ppb (v/v)
Benzyl Chloride	ND	0.5		ppb (v/v)
1,3-Dichlorobenzene	ND	0.5		ppb (v/v)
1,4-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.5		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

EPA TO-14 Full List

LCS/LCSD Batch Number:	980529	Instrument:	GC/MS E
Matrix:	Air	Date Extracted:	N/A
Method:	EPA TO-14	Date Analyzed:	05/29/98

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	99	96	60-140	3	0-30	
1,2-Dichloroethane	100	101	60-140	0	0-30	
Benzene	101	100	60-140	0	0-30	
Carbon Tetrachloride	108	107	60-140	0	0-30	
1,2-Dichloropropane	83	85	60-140	2	0-30	
c-1,3-Dichloropropene	81	83	60-140	2	0-30	
1,1,2-Trichloroethane	92	92	60-140	0	0-30	
1,2-Dibromoethane	94	94	60-140	0	0-30	
Trichloroethene	96	96	60-140	0	0-30	
Tetrachloroethene	100	99	60-140	1	0-30	
Bromoform	96	94	60-140	2	0-30	
1,4-Dichlorobenzene	102	90	60-140	12	0-30	
1,2-Dichlorobenzene	97	86	60-140	12	0-30	

Calscience Environmental Laboratories, Inc.

GLOSSARY OF TERMS AND QUALIFIERS

Work Order Number: 98-05-0768

Qualifier	Definition
ND	Not detected at indicated reporting limit.

7440 Lincoln Way, Garden Grove, CA 92841-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience
Environmental
Laboratories, Inc.

June 12, 1998

George McKelvey
RADIAN International, LLC
16845 Von Karman Avenue, Suite 100
Irvine, CA 92606

Subject: **Calscience Work Order Number: 98-06-0159**
Client Reference: Low Vacuum Pulse Testing

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 06/05/98 and analyzed in accordance with the attached chain-of-custody.

The results in this analytical report are limited to the samples tested, and any reproduction of this report must be made in its entirety.

If you have any questions regarding this report, require sampling supplies or field services, or information on our analytical services, please feel free to call me at (714) 895-5494.

Sincerely,

Calscience Environmental
Laboratories, Inc.
William H. Christensen
Deliverables Manager

Steven L. Lane
Laboratory Director

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-06-0159		
QC Batch ID:	980604	Date Collected:	06/03/98
Matrix:	Air	Date Received:	06/05/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/05/98

Client Sample Number: **LM98-06-001**
Lab Sample Number: 98-06-0159-1

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.2		ppb (v/v)
Chloromethane	ND	1.2		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	4.7		ppb (v/v)
Vinyl Chloride	ND	1.2		ppb (v/v)
Bromomethane	ND	1.2		ppb (v/v)
Chloroethane	ND	1.2		ppb (v/v)
Acetonitrile	ND	2.4		ppb (v/v)
Trichlorofluoromethane	ND	1.2		ppb (v/v)
Acetone	27.2	2.4		ppb (v/v)
1,1-Dichloroethene	ND	1.2		ppb (v/v)
Methylene Chloride	ND	4.7		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	2.4		ppb (v/v)
Carbon Disulfide	ND	1.2		ppb (v/v)
t-1,2-Dichloroethene	ND	1.2		ppb (v/v)
1,1-Dichloroethane	ND	1.2		ppb (v/v)
Vinyl Acetate	ND	2.4		ppb (v/v)
2-Butanone	ND	2.4		ppb (v/v)
c-1,2-Dichloroethene	ND	1.2		ppb (v/v)
Chloroform	ND	1.2		ppb (v/v)
1,2-Dichloroethane	ND	1.2		ppb (v/v)
1,1,1-Trichloroethane	ND	1.2		ppb (v/v)
Benzene	ND	1.2		ppb (v/v)
Carbon Tetrachloride	ND	1.2		ppb (v/v)
1,2-Dichloropropane	ND	1.2		ppb (v/v)
Bromodichloromethane	ND	1.2		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	2.4		ppb (v/v)
c-1,3-Dichloropropene	ND	1.2		ppb (v/v)
t-1,3-Dichloropropene	ND	1.2		ppb (v/v)
1,1,2-Trichloroethane	ND	1.2		ppb (v/v)
Toluene	ND	1.2		ppb (v/v)
2-Hexanone	ND	2.4		ppb (v/v)
4-Methyl-2-Pentanone	ND	2.4		ppb (v/v)
Dibromochloromethane	ND	1.2		ppb (v/v)
1,2-Dibromoethane	ND	1.2		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-06-0159		
QC Batch ID:	980604	Date Collected:	06/03/98
Matrix:	Air	Date Received:	06/05/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/05/98

Client Sample Number: **LM98-06-001**
Lab Sample Number: 98-06-0159-1

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	1.2		ppb (v/v)
Tetrachloroethene	ND	1.2		ppb (v/v)
Chlorobenzene	ND	1.2		ppb (v/v)
Ethylbenzene	ND	1.2		ppb (v/v)
Bromoform	ND	1.2		ppb (v/v)
Styrene	ND	2.4		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.2		ppb (v/v)
Xylenes (total)	ND	3.6		ppb (v/v)
4-Ethyltoluene	ND	1.2		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.2		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.2		ppb (v/v)
Benzyl Chloride	ND	1.2		ppb (v/v)
1,3-Dichlorobenzene	ND	1.2		ppb (v/v)
1,4-Dichlorobenzene	ND	1.2		ppb (v/v)
1,2-Dichlorobenzene	ND	1.2		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.2		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.2		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-06-0159		
QC Batch ID:	980604	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/04/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-452

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	0.5		ppb (v/v)
Tetrachloroethene	ND	0.5		ppb (v/v)
Chlorobenzene	ND	0.5		ppb (v/v)
Ethylbenzene	ND	0.5		ppb (v/v)
Bromoform	ND	0.5		ppb (v/v)
Styrene	ND	1.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.5		ppb (v/v)
Xylenes (total)	ND	1.5		ppb (v/v)
4-Ethyltoluene	ND	0.5		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.5		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.5		ppb (v/v)
Benzyl Chloride	ND	0.5		ppb (v/v)
1,3-Dichlorobenzene	ND	0.5		ppb (v/v)
1,4-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.5		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing		
Work Order Number:	98-06-0159		
QC Batch ID:	980604	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/04/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-452

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.5		ppb (v/v)
Chloromethane	ND	0.5		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	2.0		ppb (v/v)
Vinyl Chloride	ND	0.5		ppb (v/v)
Bromomethane	ND	0.5		ppb (v/v)
Chloroethane	ND	0.5		ppb (v/v)
Acetonitrile	ND	1.0		ppb (v/v)
Trichlorofluoromethane	ND	0.5		ppb (v/v)
Acetone	ND	1.0		ppb (v/v)
1,1-Dichloroethene	ND	0.5		ppb (v/v)
Methylene Chloride	ND	2.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0		ppb (v/v)
Carbon Disulfide	ND	0.5		ppb (v/v)
t-1,2-Dichloroethene	ND	0.5		ppb (v/v)
1,1-Dichloroethane	ND	0.5		ppb (v/v)
Vinyl Acetate	ND	1.0		ppb (v/v)
2-Butanone	ND	1.0		ppb (v/v)
c-1,2-Dichloroethene	ND	0.5		ppb (v/v)
Chloroform	ND	0.5		ppb (v/v)
1,2-Dichloroethane	ND	0.5		ppb (v/v)
1,1,1-Trichloroethane	ND	0.5		ppb (v/v)
Benzene	ND	0.5		ppb (v/v)
Carbon Tetrachloride	ND	0.5		ppb (v/v)
1,2-Dichloropropane	ND	0.5		ppb (v/v)
Bromodichloromethane	ND	0.5		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.0		ppb (v/v)
c-1,3-Dichloropropene	ND	0.5		ppb (v/v)
t-1,3-Dichloropropene	ND	0.5		ppb (v/v)
1,1,2-Trichloroethane	ND	0.5		ppb (v/v)
Toluene	ND	0.5		ppb (v/v)
2-Hexanone	ND	1.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.0		ppb (v/v)
Dibromochloromethane	ND	0.5		ppb (v/v)
1,2-Dibromoethane	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

EPA TO-14 Full List

LCS/LCSD Batch Number:	980604	Instrument:	GC/MS E
Matrix:	Air	Date Extracted:	N/A
Method:	EPA TO-14	Date Analyzed:	06/04/98

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	ualifier
Vinyl Chloride	95	90	60-140	5	0-30	
1,2-Dichloroethane	126	120	60-140	4	0-30	
Benzene	89	86	60-140	3	0-30	
Carbon Tetrachloride	116	112	60-140	3	0-30	
1,2-Dichloropropane	95	91	60-140	4	0-30	
c-1,3-Dichloropropene	112	107	60-140	4	0-30	
1,1,2-Trichloroethane	101	97	60-140	4	0-30	
1,2-Dibromoethane	104	100	60-140	3	0-30	
Trichloroethene	115	112	60-140	2	0-30	
Tetrachloroethene	108	102	60-140	5	0-30	
Bromoform	112	107	60-140	4	0-30	
1,4-Dichlorobenzene	100	97	60-140	3	0-30	
1,2-Dichlorobenzene	108	104	60-140	3	0-30	

Calscience Environmental Laboratories, Inc.

GLOSSARY OF TERMS AND QUALIFIERS

Work Order Number: 98-06-0159

Qualifier	Definition
ND	Not detected at indicated reporting limit.

Calscience
Environmental
Laboratories, Inc.

June 15, 1998

George McKelvey
RADIAN International, LLC
16845 Von Karman Avenue, Suite 100
Irvine, CA 92606

Subject: **Calscience Work Order Number: 98-06-0317**
Client Reference: Lockheed

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 06/11/98 and analyzed in accordance with the attached chain-of-custody.

The results in this analytical report are limited to the samples tested, and any reproduction of this report must be made in its entirety.

If you have any questions regarding this report, require sampling supplies or field services, or information on our analytical services, please feel free to call me at (714) 895-5494.

Sincerely,

Calscience Environmental
Laboratories, Inc.
William H. Christensen
Deliverables Manager

Steven L. Lane
Laboratory Director

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed		
Work Order Number:	98-06-0317		
QC Batch ID:	980611	Date Collected:	06/10/98
Matrix:	Air	Date Received:	06/11/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/11/98

Client Sample Number: **LM98-06-002**
Lab Sample Number: 98-06-0317-1

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.1		ppb (v/v)
Chloromethane	ND	1.1		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	4.4		ppb (v/v)
Vinyl Chloride	ND	1.1		ppb (v/v)
Bromomethane	ND	1.1		ppb (v/v)
Chloroethane	ND	1.1		ppb (v/v)
Acetonitrile	ND	2.2		ppb (v/v)
Trichlorofluoromethane	ND	1.1		ppb (v/v)
Acetone	10.8	2.2		ppb (v/v)
1,1-Dichloroethene	25.9	1.1		ppb (v/v)
Methylene Chloride	ND	4.4		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	2.2		ppb (v/v)
Carbon Disulfide	ND	1.1		ppb (v/v)
t-1,2-Dichloroethene	ND	1.1		ppb (v/v)
1,1-Dichloroethane	ND	1.1		ppb (v/v)
Vinyl Acetate	ND	2.2		ppb (v/v)
2-Butanone	3.4	2.2		ppb (v/v)
c-1,2-Dichloroethene	ND	1.1		ppb (v/v)
Chloroform	ND	1.1		ppb (v/v)
1,2-Dichloroethane	ND	1.1		ppb (v/v)
1,1,1-Trichloroethane	1.8	1.1		ppb (v/v)
Benzene	ND	1.1		ppb (v/v)
Carbon Tetrachloride	ND	1.1		ppb (v/v)
1,2-Dichloropropane	ND	1.1		ppb (v/v)
Bromodichloromethane	ND	1.1		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	2.2		ppb (v/v)
c-1,3-Dichloropropene	ND	1.1		ppb (v/v)
t-1,3-Dichloropropene	ND	1.1		ppb (v/v)
1,1,2-Trichloroethane	ND	1.1		ppb (v/v)
Toluene	ND	1.1		ppb (v/v)
2-Hexanone	ND	2.2		ppb (v/v)
4-Methyl-2-Pentanone	ND	2.2		ppb (v/v)
Dibromochloromethane	ND	1.1		ppb (v/v)
1,2-Dibromoethane	ND	1.1		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed		
Work Order Number:	98-06-0317		
QC Batch ID:	980611	Date Collected:	06/10/98
Matrix:	Air	Date Received:	06/11/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/11/98

Client Sample Number: **LM98-06-002**
Lab Sample Number: 98-06-0317-1

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	13.2	1.1		ppb (v/v)
Tetrachloroethene	ND	1.1		ppb (v/v)
Chlorobenzene	ND	1.1		ppb (v/v)
Ethylbenzene	ND	1.1		ppb (v/v)
Bromoform	ND	1.1		ppb (v/v)
Styrene	ND	2.2		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.1		ppb (v/v)
Xylenes (total)	ND	3.3		ppb (v/v)
4-Ethyltoluene	ND	1.1		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.1		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.1		ppb (v/v)
Benzyl Chloride	ND	1.1		ppb (v/v)
1,3-Dichlorobenzene	ND	1.1		ppb (v/v)
1,4-Dichlorobenzene	ND	1.1		ppb (v/v)
1,2-Dichlorobenzene	ND	1.1		ppb (v/v)
1,2,4-Trichlorobenzene	1.7	1.1		ppb (v/v)
Hexachloro-1,3-Butadiene	1.2	1.1		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed		
Work Order Number:	98-06-0317		
QC Batch ID:	980611	Date Collected:	06/10/98
Matrix:	Air	Date Received:	06/11/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/11/98

Client Sample Number: **LM98-06-003**
Lab Sample Number: 98-06-0317-2

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.3		ppb (v/v)
Chloromethane	ND	1.3		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	5.2		ppb (v/v)
Vinyl Chloride	ND	1.3		ppb (v/v)
Bromomethane	ND	1.3		ppb (v/v)
Chloroethane	ND	1.3		ppb (v/v)
Acetonitrile	ND	2.6		ppb (v/v)
Trichlorofluoromethane	ND	1.3		ppb (v/v)
Acetone	5.9	2.6		ppb (v/v)
1,1-Dichloroethene	1.6	1.3		ppb (v/v)
Methylene Chloride	ND	5.2		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	2.6		ppb (v/v)
Carbon Disulfide	ND	1.3		ppb (v/v)
t-1,2-Dichloroethene	ND	1.3		ppb (v/v)
1,1-Dichloroethane	ND	1.3		ppb (v/v)
Vinyl Acetate	ND	2.6		ppb (v/v)
2-Butanone	ND	2.6		ppb (v/v)
c-1,2-Dichloroethene	ND	1.3		ppb (v/v)
Chloroform	ND	1.3		ppb (v/v)
1,2-Dichloroethane	ND	1.3		ppb (v/v)
1,1,1-Trichloroethane	ND	1.3		ppb (v/v)
Benzene	ND	1.3		ppb (v/v)
Carbon Tetrachloride	ND	1.3		ppb (v/v)
1,2-Dichloropropane	ND	1.3		ppb (v/v)
Bromodichloromethane	ND	1.3		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	2.6		ppb (v/v)
c-1,3-Dichloropropene	ND	1.3		ppb (v/v)
t-1,3-Dichloropropene	ND	1.3		ppb (v/v)
1,1,2-Trichloroethane	ND	1.3		ppb (v/v)
Toluene	ND	1.3		ppb (v/v)
2-Hexanone	ND	2.6		ppb (v/v)
4-Methyl-2-Pentanone	ND	2.6		ppb (v/v)
Dibromochloromethane	ND	1.3		ppb (v/v)
1,2-Dibromoethane	ND	1.3		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed		
Work Order Number:	98-06-0317		
QC Batch ID:	980611	Date Collected:	06/10/98
Matrix:	Air	Date Received:	06/11/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/11/98

Client Sample Number: **LM98-06-003**
Lab Sample Number: 98-06-0317-2

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	1.3		ppb (v/v)
Tetrachloroethene	ND	1.3		ppb (v/v)
Chlorobenzene	ND	1.3		ppb (v/v)
Ethylbenzene	ND	1.3		ppb (v/v)
Bromoform	ND	1.3		ppb (v/v)
Styrene	ND	2.6		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.3		ppb (v/v)
Xylenes (total)	ND	3.9		ppb (v/v)
4-Ethyltoluene	ND	1.3		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.3		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.3		ppb (v/v)
Benzyl Chloride	ND	1.3		ppb (v/v)
1,3-Dichlorobenzene	ND	1.3		ppb (v/v)
1,4-Dichlorobenzene	ND	1.3		ppb (v/v)
1,2-Dichlorobenzene	ND	1.3		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.3		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.3		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed		
Work Order Number:	98-06-0317		
QC Batch ID:	980611	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/11/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-455

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.5		ppb (v/v)
Chloromethane	ND	0.5		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	2.0		ppb (v/v)
Vinyl Chloride	ND	0.5		ppb (v/v)
Bromomethane	ND	0.5		ppb (v/v)
Chloroethane	ND	0.5		ppb (v/v)
Acetonitrile	ND	1.0		ppb (v/v)
Trichlorofluoromethane	ND	0.5		ppb (v/v)
Acetone	ND	1.0		ppb (v/v)
1,1-Dichloroethene	ND	0.5		ppb (v/v)
Methylene Chloride	ND	2.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0		ppb (v/v)
Carbon Disulfide	ND	0.5		ppb (v/v)
t-1,2-Dichloroethene	ND	0.5		ppb (v/v)
1,1-Dichloroethane	ND	0.5		ppb (v/v)
Vinyl Acetate	ND	1.0		ppb (v/v)
2-Butanone	ND	1.0		ppb (v/v)
c-1,2-Dichloroethene	ND	0.5		ppb (v/v)
Chloroform	ND	0.5		ppb (v/v)
1,2-Dichloroethane	ND	0.5		ppb (v/v)
1,1,1-Trichloroethane	ND	0.5		ppb (v/v)
Benzene	ND	0.5		ppb (v/v)
Carbon Tetrachloride	ND	0.5		ppb (v/v)
1,2-Dichloropropane	ND	0.5		ppb (v/v)
Bromodichloromethane	ND	0.5		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.0		ppb (v/v)
c-1,3-Dichloropropene	ND	0.5		ppb (v/v)
t-1,3-Dichloropropene	ND	0.5		ppb (v/v)
1,1,2-Trichloroethane	ND	0.5		ppb (v/v)
Toluene	ND	0.5		ppb (v/v)
2-Hexanone	ND	1.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.0		ppb (v/v)
Dibromochloromethane	ND	0.5		ppb (v/v)
1,2-Dibromoethane	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Lockheed		
Work Order Number:	98-06-0317		
QC Batch ID:	980611	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	06/11/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-455

Parameter	Result	RL	Qualifiers	Units
Trichloroethene	ND	0.5		ppb (v/v)
Tetrachloroethene	ND	0.5		ppb (v/v)
Chlorobenzene	ND	0.5		ppb (v/v)
Ethylbenzene	ND	0.5		ppb (v/v)
Bromoform	ND	0.5		ppb (v/v)
Styrene	ND	1.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.5		ppb (v/v)
Xylenes (total)	ND	1.5		ppb (v/v)
4-Ethyltoluene	ND	0.5		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.5		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.5		ppb (v/v)
Benzyl Chloride	ND	0.5		ppb (v/v)
1,3-Dichlorobenzene	ND	0.5		ppb (v/v)
1,4-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.5		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

EPA TO-14 Full List

LCS/LCSD Batch Number:	980611	Instrument:	GC/MS E
Matrix:	Air	Date Extracted:	N/A
Method:	EPA TO-14	Date Analyzed:	06/11/98

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	74	79	60-140	6	0-30	
1,2-Dichloroethane	96	102	60-140	6	0-30	
Benzene	86	88	60-140	2	0-30	
Carbon Tetrachloride	100	105	60-140	4	0-30	
1,2-Dichloropropane	91	92	60-140	1	0-30	
c-1,3-Dichloropropene	99	100	60-140	1	0-30	
1,1,2-Trichloroethane	104	103	60-140	0	0-30	
1,2-Dibromoethane	112	113	60-140	0	0-30	
Trichloroethene	105	106	60-140	0	0-30	
Tetrachloroethene	94	97	60-140	3	0-30	
Bromoform	100	103	60-140	2	0-30	
1,4-Dichlorobenzene	98	103	60-140	4	0-30	
1,2-Dichlorobenzene	103	106	60-140	2	0-30	

Calscience Environmental Laboratories, Inc.

GLOSSARY OF TERMS AND QUALIFIERS

Work Order Number: 98-06-0317

Qualifier	Definition
ND	Not detected at indicated reporting limit.

7440 Lincoln Way, Garden Grove, CA 92841-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience
Environmental
Laboratories, Inc.

July 23, 1998

George McKelvey
RADIAN International, LLC
16845 Von Karman Avenue, Suite 100
Irvine, CA 92606

Subject: **Calscience Work Order Number: 98-07-0344**
Client Reference: Low Vacuum Pulse Testing Unit 8

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 07/16/98 and analyzed in accordance with the attached chain-of-custody.

The results in this analytical report are limited to the samples tested, and any reproduction of this report must be made in its entirety.

If you have any questions regarding this report, require sampling supplies or field services, or information on our analytical services, please feel free to call me at (714) 895-5494.

Sincerely,

Calscience Environmental
Laboratories, Inc.
William H. Christensen
Deliverables Manager

Steven L. Lane
Laboratory Director

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing Unit 8		
Work Order Number:	98-07-0344		
QC Batch ID:	980720	Date Collected:	07/15/98
Matrix:	Air	Date Received:	07/16/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	07/20/98

Client Sample Number: **LM98-07-001**
Lab Sample Number: 98-07-0344-1

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.9		ppb (v/v)
Chloromethane	ND	0.9		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	3.5		ppb (v/v)
Vinyl Chloride	ND	0.9		ppb (v/v)
1,3-Butadiene	ND	1.7		ppb (v/v)
Bromomethane	ND	0.9		ppb (v/v)
Chloroethane	ND	0.9		ppb (v/v)
Acetonitrile	135	17		ppb (v/v)
Trichlorofluoromethane	ND	0.9		ppb (v/v)
Acetone	191	17		ppb (v/v)
1,1-Dichloroethene	303	9		ppb (v/v)
Methylene Chloride	ND	3.5		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.7		ppb (v/v)
Carbon Disulfide	ND	0.9		ppb (v/v)
t-1,2-Dichloroethene	ND	0.9		ppb (v/v)
1,1-Dichloroethane	2.3	0.9		ppb (v/v)
Vinyl Acetate	ND	1.7		ppb (v/v)
2-Butanone	11.1	1.7		ppb (v/v)
c-1,2-Dichloroethene	ND	0.9		ppb (v/v)
Chloroform	ND	0.9		ppb (v/v)
1,2-Dichloroethane	1.4	0.9		ppb (v/v)
1,1,1-Trichloroethane	21.0	0.9		ppb (v/v)
Benzene	ND	0.9		ppb (v/v)
Carbon Tetrachloride	1.3	0.9		ppb (v/v)
1,2-Dichloropropane	ND	0.9		ppb (v/v)
Bromodichloromethane	1.4	0.9		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.7		ppb (v/v)
c-1,3-Dichloropropene	ND	0.9		ppb (v/v)
t-1,3-Dichloropropene	ND	0.9		ppb (v/v)
1,1,2-Trichloroethane	ND	0.9		ppb (v/v)
Toluene	ND	0.9		ppb (v/v)
2-Hexanone	ND	1.7		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.7		ppb (v/v)
Dibromochloromethane	ND	0.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing Unit 8		
Work Order Number:	98-07-0344		
QC Batch ID:	980720	Date Collected:	07/15/98
Matrix:	Air	Date Received:	07/16/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	07/20/98

Client Sample Number: **LM98-07-001**
Lab Sample Number: 98-07-0344-1

Parameter	Result	RL	Qualifiers	Units
1,2-Dibromoethane	ND	0.9		ppb (v/v)
Trichloroethene	161	0.9		ppb (v/v)
Tetrachloroethene	3.4	0.9		ppb (v/v)
Chlorobenzene	ND	0.9		ppb (v/v)
Ethylbenzene	ND	0.9		ppb (v/v)
Bromoform	ND	0.9		ppb (v/v)
Styrene	ND	1.7		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.9		ppb (v/v)
Xylenes (total)	ND	2.6		ppb (v/v)
4-Ethyltoluene	ND	0.9		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.9		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.9		ppb (v/v)
Benzyl Chloride	ND	0.9		ppb (v/v)
1,3-Dichlorobenzene	ND	0.9		ppb (v/v)
1,4-Dichlorobenzene	ND	0.9		ppb (v/v)
1,2-Dichlorobenzene	ND	0.9		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.9		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing Unit 8		
Work Order Number:	98-07-0344		
QC Batch ID:	980720	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	07/20/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-477

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.5		ppb (v/v)
Chloromethane	ND	0.5		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	2.0		ppb (v/v)
Vinyl Chloride	ND	0.5		ppb (v/v)
1,3-Butadiene	ND	1.0		ppb (v/v)
Bromomethane	ND	0.5		ppb (v/v)
Chloroethane	ND	0.5		ppb (v/v)
Acetonitrile	ND	1.0		ppb (v/v)
Trichlorofluoromethane	ND	0.5		ppb (v/v)
Acetone	ND	1.0		ppb (v/v)
1,1-Dichloroethene	ND	0.5		ppb (v/v)
Methylene Chloride	ND	2.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0		ppb (v/v)
Carbon Disulfide	ND	0.5		ppb (v/v)
t-1,2-Dichloroethene	ND	0.5		ppb (v/v)
1,1-Dichloroethane	ND	0.5		ppb (v/v)
Vinyl Acetate	ND	1.0		ppb (v/v)
2-Butanone	ND	1.0		ppb (v/v)
c-1,2-Dichloroethene	ND	0.5		ppb (v/v)
Chloroform	ND	0.5		ppb (v/v)
1,2-Dichloroethane	ND	0.5		ppb (v/v)
1,1,1-Trichloroethane	ND	0.5		ppb (v/v)
Benzene	ND	0.5		ppb (v/v)
Carbon Tetrachloride	ND	0.5		ppb (v/v)
1,2-Dichloropropane	ND	0.5		ppb (v/v)
Bromodichloromethane	ND	0.5		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.0		ppb (v/v)
c-1,3-Dichloropropene	ND	0.5		ppb (v/v)
t-1,3-Dichloropropene	ND	0.5		ppb (v/v)
1,1,2-Trichloroethane	ND	0.5		ppb (v/v)
Toluene	ND	0.5		ppb (v/v)
2-Hexanone	ND	1.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.0		ppb (v/v)
Dibromochloromethane	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Low Vacuum Pulse Testing Unit 8		
Work Order Number:	98-07-0344		
QC Batch ID:	980720	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	07/20/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-477

Parameter	Result	RL	Qualifiers	Units
1,2-Dibromoethane	ND	0.5		ppb (v/v)
Trichloroethene	ND	0.5		ppb (v/v)
Tetrachloroethene	ND	0.5		ppb (v/v)
Chlorobenzene	ND	0.5		ppb (v/v)
Ethylbenzene	ND	0.5		ppb (v/v)
Bromoform	ND	0.5		ppb (v/v)
Styrene	ND	1.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.5		ppb (v/v)
Xylenes (total)	ND	1.5		ppb (v/v)
4-Ethyltoluene	ND	0.5		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.5		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.5		ppb (v/v)
Benzyl Chloride	ND	0.5		ppb (v/v)
1,3-Dichlorobenzene	ND	0.5		ppb (v/v)
1,4-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.5		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.5		ppb (v/v)

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

EPA TO-14 Full List

LCS/LCSD Batch Number:	980720	Instrument:	GC/MS E
Matrix:	Air	Date Extracted:	N/A
Method:	EPA TO-14	Date Analyzed:	07/20/98

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	130	98	60-140	28	0-30	
1,2-Dichloroethane	81	61	60-140	28	0-30	
Benzene	110	88	60-140	22	0-30	
Carbon Tetrachloride	71	62	60-140	13	0-30	
1,2-Dichloropropane	79	94	60-140	17	0-30	
c-1,3-Dichloropropene	72	78	60-140	8	0-30	
1,1,2-Trichloroethane	86	82	60-140	4	0-30	
1,2-Dibromoethane	96	79	60-140	19	0-30	
Trichloroethene	82	77	60-140	6	0-30	
Tetrachloroethene	99	79	60-140	22	0-30	
Bromoform	92	74	60-140	21	0-30	
1,4-Dichlorobenzene	95	84	60-140	12	0-30	
1,2-Dichlorobenzene	89	83	60-140	6	0-30	

Calscience Environmental Laboratories, Inc.

GLOSSARY OF TERMS AND QUALIFIERS

Work Order Number: 98-07-0344

Qualifier	Definition
ND	Not detected at indicated reporting limit.

7440 Lincoln Way, Garden Grove, CA 92841-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

August 07, 1998

George McKelvey
RADIAN International, LLC
16845 Von Karman Avenue, Suite 100
Irvine, CA 92606

Subject: **Calscience Work Order Number:** **98-07-0761**
Client Reference: **Vapor Pulse Test/67515815.1000**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 07/30/98 and analyzed in accordance with the attached chain-of-custody.

The results in this analytical report are limited to the samples tested, and any reproduction of this report must be made in its entirety.

If you have any questions regarding this report, require sampling supplies or field services, or information on our analytical services, please feel free to call me at (714) 895-5494.

Sincerely,

Calscience Environmental
Laboratories, Inc.
William H. Christensen
Deliverables Manager

Steven L. Lane
Laboratory Director

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	07/29/98
Matrix:	Air	Date Received:	07/30/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **LM98-07-002**
Lab Sample Number: 98-07-0761-1

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.9		ppb (v/v)
Chloromethane	ND	1.9		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	7.6		ppb (v/v)
Vinyl Chloride	ND	1.9		ppb (v/v)
Bromomethane	ND	1.9		ppb (v/v)
Chloroethane	ND	1.9		ppb (v/v)
Acetonitrile	ND	3.8		ppb (v/v)
Trichlorofluoromethane	ND	1.9		ppb (v/v)
Acetone	48.1	3.8		ppb (v/v)
1,1-Dichloroethene	425	1.9	E	ppb (v/v)
Methylene Chloride	ND	7.6		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	3.8		ppb (v/v)
Carbon Disulfide	ND	1.9		ppb (v/v)
t-1,2-Dichloroethene	ND	1.9		ppb (v/v)
1,1-Dichloroethane	7.3	1.9		ppb (v/v)
Vinyl Acetate	6.5	3.8		ppb (v/v)
2-Butanone	13.9	3.8		ppb (v/v)
c-1,2-Dichloroethene	ND	1.9		ppb (v/v)
Chloroform	ND	1.9		ppb (v/v)
1,2-Dichloroethane	ND	1.9		ppb (v/v)
1,1,1-Trichloroethane	52.2	1.9		ppb (v/v)
Benzene	ND	1.9		ppb (v/v)
Carbon Tetrachloride	ND	1.9		ppb (v/v)
1,2-Dichloropropane	ND	1.9		ppb (v/v)
Bromodichloromethane	ND	1.9		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	3.8		ppb (v/v)
c-1,3-Dichloropropene	ND	1.9		ppb (v/v)
t-1,3-Dichloropropene	ND	1.9		ppb (v/v)
1,1,2-Trichloroethane	ND	1.9		ppb (v/v)
Toluene	ND	1.9		ppb (v/v)
2-Hexanone	ND	3.8		ppb (v/v)
4-Methyl-2-Pentanone	ND	3.8		ppb (v/v)
Dibromochloromethane	ND	1.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	07/29/98
Matrix:	Air	Date Received:	07/30/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **LM98-07-002**
Lab Sample Number: 98-07-0761-1

Parameter	Result	RL	Qualifiers	Units
1,2-Dibromoethane	ND	1.9		ppb (v/v)
Trichloroethene	270	1.9		ppb (v/v)
Tetrachloroethene	3.3	1.9		ppb (v/v)
Chlorobenzene	ND	1.9		ppb (v/v)
Ethylbenzene	ND	1.9		ppb (v/v)
Bromoform	ND	1.9		ppb (v/v)
Styrene	ND	3.8		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.9		ppb (v/v)
Xylenes (total)	ND	5.7		ppb (v/v)
4-Ethyltoluene	ND	1.9		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.9		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.9		ppb (v/v)
Benzyl Chloride	ND	1.9		ppb (v/v)
1,3-Dichlorobenzene	ND	1.9		ppb (v/v)
1,4-Dichlorobenzene	ND	1.9		ppb (v/v)
1,2-Dichlorobenzene	ND	1.9		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.9		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	07/29/98
Matrix:	Air	Date Received:	07/30/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **LM98-07-003**
Lab Sample Number: 98-07-0761-2

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.8		ppb (v/v)
Chloromethane	ND	1.8		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	7.4		ppb (v/v)
Vinyl Chloride	ND	1.8		ppb (v/v)
Bromomethane	ND	1.8		ppb (v/v)
Chloroethane	ND	1.8		ppb (v/v)
Acetonitrile	ND	3.7		ppb (v/v)
Trichlorofluoromethane	ND	1.8		ppb (v/v)
Acetone	7.2	3.7		ppb (v/v)
1,1-Dichloroethene	247	1.8		ppb (v/v)
Methylene Chloride	ND	7.4		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	7.0	3.7		ppb (v/v)
Carbon Disulfide	ND	1.8		ppb (v/v)
t-1,2-Dichloroethene	ND	1.8		ppb (v/v)
1,1-Dichloroethane	ND	1.8		ppb (v/v)
Vinyl Acetate	ND	3.7		ppb (v/v)
2-Butanone	4.3	3.7		ppb (v/v)
c-1,2-Dichloroethene	ND	1.8		ppb (v/v)
Chloroform	ND	1.8		ppb (v/v)
1,2-Dichloroethane	ND	1.8		ppb (v/v)
1,1,1-Trichloroethane	30.8	1.8		ppb (v/v)
Benzene	ND	1.8		ppb (v/v)
Carbon Tetrachloride	ND	1.8		ppb (v/v)
1,2-Dichloropropane	ND	1.8		ppb (v/v)
Bromodichloromethane	ND	1.8		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	3.7		ppb (v/v)
c-1,3-Dichloropropene	ND	1.8		ppb (v/v)
t-1,3-Dichloropropene	ND	1.8		ppb (v/v)
1,1,2-Trichloroethane	ND	1.8		ppb (v/v)
Toluene	ND	1.8		ppb (v/v)
2-Hexanone	ND	3.7		ppb (v/v)
4-Methyl-2-Pentanone	ND	3.7		ppb (v/v)
Dibromochloromethane	ND	1.8		ppb (v/v)

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ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	07/29/98
Matrix:	Air	Date Received:	07/30/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **LM98-07-004**
Lab Sample Number: 98-07-0761-3

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	1.9		ppb (v/v)
Chloromethane	ND	1.9		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	7.6		ppb (v/v)
Vinyl Chloride	ND	1.9		ppb (v/v)
Bromomethane	ND	1.9		ppb (v/v)
Chloroethane	ND	1.9		ppb (v/v)
Acetonitrile	ND	3.8		ppb (v/v)
Trichlorofluoromethane	ND	1.9		ppb (v/v)
Acetone	13.0	3.8		ppb (v/v)
1,1-Dichloroethene	479	1.9	E	ppb (v/v)
Methylene Chloride	ND	7.6		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	9.4	3.8		ppb (v/v)
Carbon Disulfide	ND	1.9		ppb (v/v)
t-1,2-Dichloroethene	ND	1.9		ppb (v/v)
1,1-Dichloroethane	5.8	1.9		ppb (v/v)
Vinyl Acetate	ND	3.8		ppb (v/v)
2-Butanone	12.9	3.8		ppb (v/v)
c-1,2-Dichloroethene	2.0	1.9		ppb (v/v)
Chloroform	ND	1.9		ppb (v/v)
1,2-Dichloroethane	14.0	1.9		ppb (v/v)
1,1,1-Trichloroethane	570	1.9	E	ppb (v/v)
Benzene	ND	1.9		ppb (v/v)
Carbon Tetrachloride	ND	1.9		ppb (v/v)
1,2-Dichloropropane	ND	1.9		ppb (v/v)
Bromodichloromethane	ND	1.9		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	3.8		ppb (v/v)
c-1,3-Dichloropropene	ND	1.9		ppb (v/v)
t-1,3-Dichloropropene	ND	1.9		ppb (v/v)
1,1,2-Trichloroethane	38.8	1.9		ppb (v/v)
Toluene	ND	1.9		ppb (v/v)
2-Hexanone	ND	3.8		ppb (v/v)
4-Methyl-2-Pentanone	ND	3.8		ppb (v/v)
Dibromochloromethane	ND	1.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	07/29/98
Matrix:	Air	Date Received:	07/30/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **LM98-07-004**
Lab Sample Number: 98-07-0761-3

Parameter	Result	RL	Qualifiers	Units
1,2-Dibromoethane	ND	1.9		ppb (v/v)
Trichloroethene	224	1.9		ppb (v/v)
Tetrachloroethene	6.9	1.9		ppb (v/v)
Chlorobenzene	ND	1.9		ppb (v/v)
Ethylbenzene	ND	1.9		ppb (v/v)
Bromoform	ND	1.9		ppb (v/v)
Styrene	ND	3.8		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	1.9		ppb (v/v)
Xylenes (total)	ND	5.7		ppb (v/v)
4-Ethyltoluene	ND	1.9		ppb (v/v)
1,3,5-Trimethylbenzene	ND	1.9		ppb (v/v)
1,2,4-Trimethylbenzene	ND	1.9		ppb (v/v)
Benzyl Chloride	ND	1.9		ppb (v/v)
1,3-Dichlorobenzene	ND	1.9		ppb (v/v)
1,4-Dichlorobenzene	ND	1.9		ppb (v/v)
1,2-Dichlorobenzene	ND	1.9		ppb (v/v)
1,2,4-Trichlorobenzene	ND	1.9		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	1.9		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	07/29/98
Matrix:	Air	Date Received:	07/30/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **LM98-07-005**
Lab Sample Number: 98-07-0761-4

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	2.2		ppb (v/v)
Chloromethane	4.0	2.2		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	8.6		ppb (v/v)
Vinyl Chloride	ND	2.2		ppb (v/v)
Bromomethane	ND	2.2		ppb (v/v)
Chloroethane	ND	2.2		ppb (v/v)
Acetonitrile	ND	4.3		ppb (v/v)
Trichlorofluoromethane	ND	2.2		ppb (v/v)
Acetone	13.9	4.3		ppb (v/v)
1,1-Dichloroethene	ND	2.2		ppb (v/v)
Methylene Chloride	ND	8.6		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	4.3		ppb (v/v)
Carbon Disulfide	ND	2.2		ppb (v/v)
t-1,2-Dichloroethene	ND	2.2		ppb (v/v)
1,1-Dichloroethane	ND	2.2		ppb (v/v)
Vinyl Acetate	ND	4.3		ppb (v/v)
2-Butanone	15.4	4.3		ppb (v/v)
c-1,2-Dichloroethene	ND	2.2		ppb (v/v)
Chloroform	ND	2.2		ppb (v/v)
1,2-Dichloroethane	ND	2.2		ppb (v/v)
1,1,1-Trichloroethane	ND	2.2		ppb (v/v)
Benzene	ND	2.2		ppb (v/v)
Carbon Tetrachloride	ND	2.2		ppb (v/v)
1,2-Dichloropropane	ND	2.2		ppb (v/v)
Bromodichloromethane	ND	2.2		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	4.3		ppb (v/v)
c-1,3-Dichloropropene	ND	2.2		ppb (v/v)
t-1,3-Dichloropropene	ND	2.2		ppb (v/v)
1,1,2-Trichloroethane	ND	2.2		ppb (v/v)
Toluene	ND	2.2		ppb (v/v)
2-Hexanone	ND	4.3		ppb (v/v)
4-Methyl-2-Pentanone	ND	4.3		ppb (v/v)
Dibromochloromethane	ND	2.2		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	07/29/98
Matrix:	Air	Date Received:	07/30/98
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **LM98-07-005**
Lab Sample Number: 98-07-0761-4

Parameter	Result	RL	Qualifiers	Units
1,2-Dibromoethane	ND	2.2		ppb (v/v)
Trichloroethene	ND	2.2		ppb (v/v)
Tetrachloroethene	ND	2.2		ppb (v/v)
Chlorobenzene	ND	2.2		ppb (v/v)
Ethylbenzene	ND	2.2		ppb (v/v)
Bromoform	ND	2.2		ppb (v/v)
Styrene	ND	4.3		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	2.2		ppb (v/v)
Xylenes (total)	ND	6.4		ppb (v/v)
4-Ethyltoluene	ND	2.2		ppb (v/v)
1,3,5-Trimethylbenzene	ND	2.2		ppb (v/v)
1,2,4-Trimethylbenzene	ND	2.2		ppb (v/v)
Benzyl Chloride	ND	2.2		ppb (v/v)
1,3-Dichlorobenzene	ND	2.2		ppb (v/v)
1,4-Dichlorobenzene	ND	2.2		ppb (v/v)
1,2-Dichlorobenzene	ND	2.2		ppb (v/v)
1,2,4-Trichlorobenzene	ND	2.2		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	2.2		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT

EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-496

Parameter	Result	RL	Qualifiers	Units
Dichlorodifluoromethane	ND	0.5		ppb (v/v)
Chloromethane	ND	0.5		ppb (v/v)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane	ND	2.0		ppb (v/v)
Vinyl Chloride	ND	0.5		ppb (v/v)
1,3-Butadiene	ND	1.0		ppb (v/v)
Bromomethane	ND	0.5		ppb (v/v)
Chloroethane	ND	0.5		ppb (v/v)
Acetonitrile	ND	1.0		ppb (v/v)
Trichlorofluoromethane	ND	0.5		ppb (v/v)
Acetone	ND	1.0		ppb (v/v)
1,1-Dichloroethene	ND	0.5		ppb (v/v)
Methylene Chloride	ND	2.0		ppb (v/v)
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0		ppb (v/v)
Carbon Disulfide	ND	0.5		ppb (v/v)
t-1,2-Dichloroethene	ND	0.5		ppb (v/v)
1,1-Dichloroethane	ND	0.5		ppb (v/v)
Vinyl Acetate	ND	1.0		ppb (v/v)
2-Butanone	ND	1.0		ppb (v/v)
c-1,2-Dichloroethene	ND	0.5		ppb (v/v)
Chloroform	ND	0.5		ppb (v/v)
1,2-Dichloroethane	ND	0.5		ppb (v/v)
1,1,1-Trichloroethane	ND	0.5		ppb (v/v)
Benzene	ND	0.5		ppb (v/v)
Carbon Tetrachloride	ND	0.5		ppb (v/v)
1,2-Dichloropropane	ND	0.5		ppb (v/v)
Bromodichloromethane	ND	0.5		ppb (v/v)
2-Chloroethyl Vinyl Ether	ND	1.0		ppb (v/v)
c-1,3-Dichloropropene	ND	0.5		ppb (v/v)
t-1,3-Dichloropropene	ND	0.5		ppb (v/v)
1,1,2-Trichloroethane	ND	0.5		ppb (v/v)
Toluene	ND	0.5		ppb (v/v)
2-Hexanone	ND	1.0		ppb (v/v)
4-Methyl-2-Pentanone	ND	1.0		ppb (v/v)

Calscience Environmental Laboratories, Inc.

ANALYTICAL REPORT
EPA TO-14 Full List

Client Name:	RADIAN International, LLC		
Project ID:	Vapor Pulse Test/67515815.1000		
Work Order Number:	98-07-0761		
QC Batch ID:	980805A	Date Collected:	N/A
Matrix:	Air	Date Received:	N/A
Preparation:	N/A	Date Prepared:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Client Sample Number: **Method Blank**
Lab Sample Number: 095-01-021-496

Parameter	Result	RL	Qualifiers	Units
Dibromochloromethane	ND	0.5		ppb (v/v)
1,2-Dibromoethane	ND	0.5		ppb (v/v)
Trichloroethene	ND	0.5		ppb (v/v)
Tetrachloroethene	ND	0.5		ppb (v/v)
Chlorobenzene	ND	0.5		ppb (v/v)
Ethylbenzene	ND	0.5		ppb (v/v)
Bromoform	ND	0.5		ppb (v/v)
Styrene	ND	1.0		ppb (v/v)
1,1,2,2-Tetrachloroethane	ND	0.5		ppb (v/v)
Xylenes (total)	ND	1.5		ppb (v/v)
4-Ethyltoluene	ND	0.5		ppb (v/v)
1,3,5-Trimethylbenzene	ND	0.5		ppb (v/v)
1,2,4-Trimethylbenzene	ND	0.5		ppb (v/v)
Benzyl Chloride	ND	0.5		ppb (v/v)
1,3-Dichlorobenzene	ND	0.5		ppb (v/v)
1,4-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2-Dichlorobenzene	ND	0.5		ppb (v/v)
1,2,4-Trichlorobenzene	ND	0.5		ppb (v/v)
Hexachloro-1,3-Butadiene	ND	0.5		ppb (v/v)

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Quality Control - LCS/LCS Duplicate

EPA TO-14 Full List

LCS/LCSD Batch Number:	980805A	Instrument:	GC/MS E
Matrix:	Air	Date Extracted:	N/A
Method:	EPA TO-14	Date Analyzed:	08/05/98

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Vinyl Chloride	60	65	60-140	8	0-30	
1,2-Dichloroethane	60	69	60-140	13	0-30	
Benzene	62	67	60-140	7	0-30	
Carbon Tetrachloride	63	70	60-140	10	0-30	
1,2-Dichloropropane	63	62	60-140	1	0-30	
c-1,3-Dichloropropene	64	63	60-140	1	0-30	
1,1,2-Trichloroethane	62	61	60-140	1	0-30	
1,2-Dibromoethane	63	62	60-140	1	0-30	
Trichloroethene	66	66	60-140	0	0-30	
Tetrachloroethene	62	61	60-140	1	0-30	
Bromoform	64	64	60-140	0	0-30	
1,4-Dichlorobenzene	64	63	60-140	1	0-30	
1,2-Dichlorobenzene	65	63	60-140	3	0-30	

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GLOSSARY OF TERMS AND QUALIFIERS

Work Order Number: 98-07-0761

Qualifier	Definition
E	Concentration exceeds the calibration range.
ND	Not detected at indicated reporting limit.

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RADIAN INTERNATIONAL LLC

Appendix B

Field Data Sheets for Mid-1998 Pulse Testing

Author: Tom Willer at IRV_PO01
Date: 6/12/98 12:39 PM
Priority: Normal
TO: George McKelvey
CC: Tom Willer
Subject: Lockheed Beaumont Vapor Sampling Notes

George-

Here are a few notes and some groundwater measurements recorded on 6/10/98.

WELL #	TOC MEASUREMENT	TIME
MW-25	N/A	1255
EW-14	53.52	1300
EW-13	N/A	1305
MW-24	38.50	1335
MW-31	59.46	1338
VRW-3	N/A	1340
MW-61A	53.34	1346
VRW-1	38.52	1348
MW-26	35.65	1355

N/A denotes well hooked up to vapor extraction system;
I was unable to open VRW-3.

I purged the pump and assembly prior to use on VEW-11 (first well).
The readings on the OVM were 0/0
The readings on the OVA were 1.5/1.5

Thanks.

Tom

Vapor Well Field Sampling Results[1]
Former Burn Pit Area Low-Vacuum Extraction System Pulse Test
Lockheed Beaumont Facility No. 1

Date	VEW-6 Time	VEW-6 OVM (Bg/R)[2]	VEW-6 OVA (Bg/R)	VEW-10 Time	VEW-10 OVM (Bg/R)	VEW-10 OVA (Bg/R)	VEW-11 Time	VEW-11 OVM (Bg/R)	VEW-11 OVA (Bg/R)	VRW-2 Time	VRW-2 OVM (Bg/R)	VRW-2 OVA (Bg/R)
5-18-98	1020	0 / <1	/	1035	0 / <1	/	1000	0 / <1	/	1152	0 / <1	/
	1025	0 / <1	1.8 / 2.2	1045	0 / <1	1 / 1	1005	0 / 1	1.8 / 2.6	1100	0 / <1	0 / 0
	1605	0 / <1	0 / 0	1650	0 / <1	0 / 0	1520	0 / <1	1.0 / 1.0	1720	0 / <1	1.8 / 1.8
5-19-98	1210	.6 / <1	2.0 / 2.0	1400	.6 / <1	1.8 / 1.8	1240	.6 / 1.6	2.0 / 2.0	1500	.6 / <1	1.0 / 1.0
5-27-98	1225	0 / 0	4.1 / 4.1	1320	0 / 1.3	3.2 / 5.2	1130	0 / 0	2.0 / 2.0	1410	0 / 0	3.2 / 3.8
	1245	0 / 0	4.0 / 4.0	1345	0 / 0	3.1 / 4.8	1145	0 / 0	2.0 / 2.1	1430	0 / 0	3.4 / 3.8
	1310	0 / 0	4.0 / 4.0	1400	0 / 0	3.0 / 4.7	1210	0 / 0	2.0 / 2.2	1430	0 / 0	3.4 / 4.0
		/	/		/	/	1240	0 / 0	4.1 / 4.3		/	/
6-3-98	1145	0 / 0.6	1.2 / 1.4	1230	0 / 1.4	1.4 / 3.6	1045	0 / 2.6	2.0 / 4.0	1320	0 / 0.2	1.6 / 2.2
	1200	0 / 0.7	1.3 / 1.4	1245	0 / 1.	1.4 / 3.4	1100	0 / 1.5	1.0 / 2.0	1330	0 / 0.0	1.6 / 2.2
	1210	0 / 0.6	1.4 / 1.6	1300	0 / 1.1	1.6 / 3.4	1120	0 / 0.4	1.0 / 0.15	1350	0 / 0	1.6 / 2.2
6/10/98	12:26	0 / 0.4	1.7 / 1.7	1316	0 / 1.1	1.6 / 2.8	11:20	0 / 1.3	1.5 / 1.5	1407	0 / 0	1.8 / 2.9
	12:36	0 / 0.2	1.8 / 1.8	1326	0 / 1.1	1.6 / 3.0	11:32	0 / 1.9	1.5 / 1.5	1417	0 / 0	1.9 / 2.9
	12:50	0 / 0	1.7 / 1.7	1341	0 / 0.7	1.6 / 2.2	11:45	0 / 0.8	1.5 / 1.5	1433	0 / 0	1.9 / 2.9
	13:06	0 / 0	1.7 / 1.7	1356	0 / 0.6	1.7 / 3.9	12:00	0 / 0.8	1.5 / 1.5	1447	0 / 0	1.9 / 2.9
		/	/		/	/		/	/		/	/

[1] – All readings in parts-per-million (ppm)
[2] – Background reading/Sample reading

IF OVM =0 use <1 since OVM Rounds Down!
(i.e., .6 = <1)

Bunker

(909) 945-7532

Vapor Well Field Sampling Results[1]
Former Burn Pit Area Low-Vacuum Extraction System Pulse Test
Lockheed Beaumont Facility No. 1

Date	VEW-6			VEW-10			VEW-11			VRW-2		
	Time	OVM (Bg/R)[2]	OVA (Bg/R)	Time	OVM (Bg/R)	OVA (Bg/R)	Time	OVM (Bg/R)	OVA (Bg/R)	Time	OVM (Bg/R)	OVA (Bg/R)
6/17/98	~~0917~~ 0915	0 / 0.6	0 / 0.8	1103	0 / 1.2	0 / 2.2	0917	0 / 0.6	0 / 0.3	1153	0 / 0	0 / 0.2
	1028	0 / 0.2	0 / 0	1115	0 / 1.2	0 / 2.2	0929	0 / 0.8	0 / 0.4	1205	0 / 0	0 / 0.0
	1041	0 / 0.2	0 / 0	1127	0 / 0.8	0 / 1.8	0943	0 / 0.5	0 / 0.3	1218	0 / 0	0 / 0.2
	1055	0 / 0.2	0 / 0	1143	0 / 0.8	0 / 1.8	0957	0 / 1.0	0 / 0.3	1233	0 / 0	0 / 0.2
7-1-98	1453	0 / 0.3	2.0 / 2.1	1539	0 / 0.3	2.0 / 4.3	1407	0 / 0.3	2.8 / 2.8	1630	0.2 / 0.6	2.1 / 2.9
	1505	0 / 0.8	2.0 / 2.0	1551	0 / 1.1	2.3 / 3.9	1419	0 / 1.6	2.8 / 4.3	1642	0 / 0	2.1 / 2.4
	1516	0 / 0	2 / 2	1604	0.2 / 0.6	2.1 / 3.8	1432	0 / 1.0	2.4 / 2.8	1655	0 / 0	NA / NA*
	1533	0 / 0	2 / 2	1619	0.2 / 0.6	2.2 / 3.6	1447	0 / 1.0	2.0 / 2.3	1710	0 / 0	NA / NA*
7-5-98	1130	0 / 1.1	1.7 / 1.7	~~1230~~ 1220	0 / 1.1	1.6 / 2.3	1030**	0 / 1.1	0.2 / 0.6	1310	0 / 0	1.7 / 1.7
	1140	0 / 1.1	1.7 / 1.8	~~1230~~ 1230	0 / 1.1	1.6 / 2.3	1040	0 / 1.1	0.8 / 1.0	1320	0 / 0	1.6 / 1.6
	1150	0 / 1.1	1.7 / 1.7	~~1240~~ 1240	0 / 1.1	1.6 / 2.3	1050	0 / 1.1	1.2 / 1.2	1330	0 / 0	1.7 / 1.7
	1200	0 / 1.1	1.6 / 1.6	~~1250~~ 1250	0 / 1.1	1.6 / 2.4	1100	0 / 1.1	1.8 / 1.8			
7/29/98	1247	0 / 2.2	1.0 / 1.2	1338	0. / 4.7	0.9 / 3.6	1155	0 / 1.5	1.0 / 2.9	1429	0 / 0	1.0 / 2.6
+ *	1259	0 / 9.4	1.1 / 5.9	1350	0 / 2.3	1.0 / 2.3	1208	0 / 1.5	1.0 / 1.5	1441	0 / 0	1.1 / 1.3
	1313	0 / 2.3	1.0 / 1.3	1403	0 / 2.3	1.1 / 2.3	1220	0 / 2.2	0.8 / 0.9	1454	0 / 0	1.2 / 1.2
	1329	0 / 0	1.1 / 1.1	1418	0 / 2.1	1.1 / 2.1	1235	0 / 2.2	0.9 / 1.6	1509	0 / 0	1.0 / 1.0

[1] – All readings in parts-per-million (ppm)
[2] – Background reading/Sample reading

+ 2nd reading 0/2.2 1.0/1.2 using correct bag

* OVA went down midway through sampling @ VRW

** OVM LAMP MAY BE DIRTY AGAIN - NOT positive that readings are accurate. Reset 0 as of 7-1 now all readings on 7-15.

OVM CALIBRATION LOG

					Calibration			Post-Use Calibration			
					Calibration Gas						
Date	Time	OVM Serial No.	Model No.	Lamp (10.2, 11.8)	Concentration (ppm)	Cylinder/ Batch No.	Calibration Check (ppm)	Post-Use Calibration Check (ppm)	Time	Project	Initials
5-18-98	1000	51544-269	580-15	~~10.6~~ 10.6	100	5695	99.7			LM Decommissioning	GSH
5-19-98	1415				100		98.0	88.0	1720	LM Decommissioning	GSH
5-19-98	1250				100		99.0	86.0	1500		
5-~~18~~-98	1105				100		101.0	88	1500		
6-3-98	1010				100	5695	100.9	78	1400		
6/10/98	0950				100		99.0	77	1515	LM Decommissioning	TMW
6/12/98	0844				100		97.9	75.2	1245		
7-1-98	1300				100		90	67	1730		
7-15-98	0945				100		99.0	27	1335		GSH
7-29-98	1040				100		98.7	99.1	1039		TMW
7-29-98	1240				100		99.9	99.0	1515		TMW

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY TMN DATE 7/29/98 PROJECT NUMBER 67515815.1000
CLIENT LOCKHEED MARTIN LOCATION BEAUMONT FACILITY #1
WORK PERFORMED VAPOR PULSE TESTING - FIELD READINGS + SAMPLES

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
Tom Miller	0800	1000		1540	1700	9

Time	Work Performed (Indicate if out-of-scope)
0800 - 0830	PREP FIELD EQUIPMENT ETC
0830 - 1000	TRAVEL TO SITE
1015	CHECK IN W/ GEORGE COLLINS & ADAM (EARTHTECH)
1015 - 1115	*CALIBRATE FID / CALIBRATE OVM
1115 - 1145	SET UP IN BURN PIT (002)
1150 - 1235	PURGE VEW-11 & SAMPLE CALIB. OVM 100/99.9
1247 - 1327	PURGE VEW-6 & SAMPLE (003)
1338 - 1420	PURGE VEW-10 & SAMPLE (004)
1429 - 1510	PURGE VMW-2 & SAMPLE (005)
1510 - 1525	POST CAL EQUIPMENT
	OVM 100/99.1 FID 0/1.0 51.6/47.0
1535	CHECK OUT W/ SECURITY LEAVE SITE
1540 - 1700	TRAVEL FROM SITE

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours			1.0

Tomorrow's Expected Work	DELIVER CANNISTER SAMPLES TO LAB

* Detail Out-of-Scope work on back of this page

Health and Safety Levels/Actions:

CHECK IN W/ SECURITY, CALL IRV OFFICE PERIODICALLY
CHECK IN W/ CMM 1140

Quality Control Actions Taken:

Problems/Corrective Action: FID NOT WORKING / WOULD NOT CALIBRATE; ADDRESSED PROBLEM → GAS SELECT ADJ ETC

Out-of-Scope Explanation: PREVIOUS FID USER WAS NOT FAMILIAR W/ INSTRUMENT CALIBRATION AND MADE INCORRECT ADJUSTMENTS TO UNIT.
FIXED UNIT - BEGAN CALIBRATION PROCEDURE
FLOW IN INSTRUMENT IS LOW < 1.5 LPM
CALLED DON (HAZCO); HE REPAIRED INSTRUMENT 7/14/98
CHECK GAS SELECT SETTING AND CAL GAS TYPE 3.0/HEXANE
VACUUM LEAKS AND PUMP WERE ALSO REPAIRED AT HAZCO.
GAS SELECT CAN BE ± 2 ∴ AS LOW AS 1.0 AS HIGH AS 5.0
CALIBRATED INST 0/1.0 51.6/51.0 GAS SELECT 3.78

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY GS McKelvey DATE 5-19-98 (TUES.) PROJECT NUMBER 675/5815
CLIENT Lockheed Martin LOCATION Beaumont Facility No. 1
WORK PERFORMED Collected OVA and OVM samples from ~~the~~ wells.

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
GS McKelvey	0930	1150	—	1520	1700	7.5

Time	Work Performed (Indicate if out-of-scope)
0930 - 1015	Deliver VAPOR CANISTERS TO CAL Science Labs.
1015 - 1130	TRAVEL TO BEAUMONT
1130 - 1145	SETUP E-CORDS FROM TREATMENT UNIT.
1145 - 1230	Purge VEW-11 @ 5 L/min. Collect vapor samples for OVA/OVM analysis only
1255 - 1335	Purge VEW-6. Collect OVA & OVM SAMPLES ONLY
1345 - 1425	Purge VEW-10. Collect OVA & OVM samples only.
1435 - 1455	Purge VEW-2 @ 5 L/MIN. Collect OVA & OVM SAMPLES Only.
1500 - 1520	PACK UP, POH. Calibrate INSTRUMENTS
1520 - PRESENT	TRAVEL BACK TO BEAUMONT

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours	8	7.5 (Field) + 0.5 (Office)	

Tomorrow's Expected Work (Next Wednesday (5-27))
CANISTER SAMPLE - VEW-11. OVA & OVM SAMPLES AT ALL FOUR WELLS.

* Detail Out-of-Scope work on back of this page

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY GS Mckelvey DATE 7-15-98 Wed PROJECT NUMBER 67515B15.
CLIENT Lockheed Martin LOCATION Beaumont Facility Burn Pit.
WORK PERFORMED Purged and Sampled VEW-6, VEW-10, VEW-1, and VEW-2 w/ OVA/OVM. Collected Canister Sample at VEW-11

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
GS Mckelvey	0600	0930	—	1500	1630	8.5

Time	Work Performed (Indicate if out-of-scope)
0600-0930	GSM Travel to Beaumont
0930-1000	Calibrate OVA, Talk with Parsons Tech Rep, on site. Scott Decker
1020-1100	Purge VEW-11, Collect Canister Sample at 1110
1170-1700	Purge VEW-6, Collect OVA & OVM samples only (1) →
1210-1250	Purge VEW-10, Collect OVA & OVM Samples Only
1305-1330	Purge VEW-2, Collect OVA & OVM Samples Only
1345-1415	Down time - Dead car battery
1415-1445	Post. Cal. Insts. De Mob.
1500-1630	Return to Irvine

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours	8	8	

Tomorrow's Expected Work
None

* Detail Out-of-Scope work on back of this page

Health and Safety Levels/Actions:

Quality Control Actions Taken:

Problems/Corrective Action:

1) OVA seems to be mis-registering for low values i.e. 0-1.1 fluctuations. Will not read below 1.0.

Out-of-Scope Explanation:

1-July 1998 VEW Sampling Visit

1300 Arrive on Site

Check in w/ Lockheed Security - George

CALIBRATE INSTRUMENTS OVA / OVM

SET UP EQUIPMENT IN Burn pit Area

* TERRA Next on Site COLLECTING GW MEASUREMENTS

1400 SET UP AT VEW-11

1407 COLLECT 1ST ~~SAMPLE~~ VAPOR READING

1443 COLLECT LAST ~~SAMPLE~~ VAPOR READING

MOB TO VEW-6

1453 BEGIN PURGING VEW-6 / COLLECT ~~FIRST SAMPLE~~ VAPOR READING

1533 COLLECT LAST VAPOR READING

MOB TO VEW-10

1539 COLLECT FIRST VAPOR READING

1619 COLLECT LAST VAPOR READING

MOB TO VEW-2

1630 COLLECT FIRST VAPOR READING

1710 COLLECT FINAL VAPOR READING

DEMOB EQUIPMENT

POST CAL INSTRUMENTS

CHECK OUT W/ SECURITY / LEAVE SITE

TRAVEL BACK TO INL

ARRIVE IN INL

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY TMW DATE 6/17/98 PROJECT NUMBER 675158 15.1000
CLIENT LOCKHEED MARTIN LOCATION BEAUMONT FACILITY #1
WORK PERFORMED COLLECTED VAPOR SAMPLES ETC FROM VEW WELLS

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
Tom Willer	0630	0800				

Time	Work Performed (Indicate if out-of-scope)
0630 - 0800	TRAVEL TO SITE
0800 - 0900	CHECK IN W/ LOCKHEED SECURITY. SET UP
	EQUIPMENT. CALIBRATE OVM / OVA
0910 - 1000	PURGE VEW-11. COLLECT CANISTER SAMPLE
	LB98-06-004 (CANISTER I.D. CEL D#29)
1000 - 1100	PURGE VEW-6. COLLECT OVM/OVA READINGS
1100 - ~~1200~~ 11:50	PURGE VEW-10 COLLECT OVM/OVA READINGS
1150 - 1240	PURGE VRW-2. COLLECT OVM/OVA
	READINGS
1300 - 1320	POST CAL INSTRUMENTS - REFILL HYDROGEN
	SUPPLY ON OVA
1330 - 1500	OFF-SITE - TRAVEL TO IRV
1630	RELINQUISH SAMPLES TO GSM

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours	8	8	Ø

Tomorrow's Expected Work	ROUND #8 - LAST STATIC SAMPLES
ALL WELLS WILL BE SAMPLED W/ CANISTERS. (6/24)	

* Detail Out-of-Scope work on back of this page

Health and Safety Levels/Actions:

NO PROBLEMS ENCOUNTERED
NO SNAKES ETC
CALLED INTO OFFICE FROM SITE AT REGULAR INTERVALS

Quality Control Actions Taken:

NONE NEEDED

Problems/Corrective Action:

NONE

Out-of-Scope Explanation:

NONE

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY TMW DATE 6/10/98 PROJECT NUMBER 67515815.1000
CLIENT LOCKHEED MARTIN LOCATION BEAUMONT FACILITY #1
WORK PERFORMED COLLECT VAPOR SAMPLES ETC. FROM VEW WELLS
COLLECT GW MEASUREMENTS

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
TM WILLER	0730	0900	—			8.0

Time	Work Performed (Indicate if out-of-scope)
0730-0900	TRAVEL TO SITE
0900 - 1000	CALIBRATE INSTRUMENTS
1000 - 1115	SET UP AT VEW-11. SCOUT OTHER LOCATIONS
	PURGE PUMP
11:20-1200	COLLECT CANISTER SAMPLES LB98-06-002
	(PUMP); LB98-06-003 (NO PUMP)
1200-1220	MOB TO VEW-6
12:26-1306	COLLECT OVM/OVA SAMPLES (40 MIN ELAPSED)
1306 - 1316	MOB TO VEW-10
1316 - 1356	COLLECT OVM/OVA SAMPLES (40 MIN ELAPSED)
1356-1407	MOB TO VEW-2
1407 - 1447	COLLECT OVM/OVA SAMPLES (40 MIN ELAPSED)
1500 - 1540	COLLECT FIELD GEAR / POST CAL INSTRUMENTS
1540 -	TRAVEL HOME

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours	8	8	

Tomorrow's Expected Work
SEVENTH EVENT SCHEDULED FOR JUNE 17

* Detail Out-of-Scope work on back of this page

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY GS McKelvey DATE 6-3-98 (Wed.) PROJECT NUMBER 67515815.1000
CLIENT Lockheed Martin LOCATION Beaumont Facility No. 1
WORK PERFORMED Collected vapor samples etc. from VEW wells.

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
GS McKelvey	0830	1000	—	1450	1700	8

Time	Work Performed (Indicate if out-of-scope)
0830-1000	Travel to Beaumont
1000-1030	Calibrate instruments. Set up vapor pump, etc.
1035-1120	Purge VEW-11. Collect OVA & OVM readings. Collect canister sample # LM98-06-001
1130-1210	Purge VEW-6. Collect OVA & OVM readings only
1220-1300	Purge VEW-10. Collect OVA & OVM readings only
1310-1340	Purge VEW-7. Collect OVA & OVM readings only.
1400-1420	Post Cal. instruments
1430-1700	Travel to Irvine. Deliver samples to Lab.

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours	8	8	

Tomorrow's Expected Work
(Weds. June 10) Round #6.

* Detail Out-of-Scope work on back of this page

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY GS McKelvey DATE 5-27-98 PROJECT NUMBER ~~6757~~ 675758.14
CLIENT Lockheed Martin LOCATION Beaumont No. 1
WORK PERFORMED CANISTER SAMPLE COLLECTED AT VEW-11. OVA & OVM READINGS COLLECTED AT ALL 4 WELLS.

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
GS McKelvey	0900	1100	—	1515	1700	8

Time	Work Performed (Indicate if out-of-scope)
0930-1100	TRAVEL TO BEAUMONT.
1100-1120	CALIBRATE OVM & OVA
1175-1710	PURGE VEW-11 Collect OVM & OVA READINGS
1718	COLLECT CANISTER SAMPLE # LM98-05-006 FROM VEW-11. (2)
~~1255~~ 1225-130	PURGE VEW-6. Collect OVM & OVA Readings ONLY.
1315-1400	PURGE VEW-10. Collect OVM & OVA Readings ONLY.
1410-1430	PURGE VEW-2. Collect OVM & OVA READINGS ONLY.
1430-1450	PURGE SOME MORE AT VEW-11 TO CONFIRM low OVA READINGS
1500-1515	POST CAL. INSTRUMENTS.
1515-1700	RETURN TO IRVINE. Buy GAS.

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours	8	8	

Tomorrow's Expected Work
NEXT VISIT SCHEDULED FOR WEDS. 6-3-98.

* Detail Out-of-Scope work on back of this page

Health and Safety Levels/Actions:

Quality Control Actions Taken:

Problems/Corrective Action:

(1) ONA ~~Flow~~ FLAME GOES OUT EASILY. IS VERY OFF IN CALIBRATION TO 51.1 HEXANE (only registers ≈ 40 ppm).
-WILL CALL STEVE SPAULDING TO INFORM.

(2) NOT SURE IF 1ST CANISTER FILLED CORRECTLY. FILLED ~~second~~ BACKUP CANISTER AND EMPTIED FIRST. NO FURTHER ACTION.

Out-of-Scope Explanation:

DAILY FIELD TICKET

INSTRUCTIONS: Field Leader: Please complete one form per shift per field day or part of field day. Log other field task members' field time in first box. Return to PD with copy to PM. Determine from PD if there is any ADDITIONAL CLIENT FORM for logging/invoicing field time; if so, have task members complete that form individually and return to PD.

PREPARED BY GS McKelvey DATE 5-18-98 (Mon) PROJECT NUMBER 671562.14
CLIENT Lockheed-Martin LOCATION Beaumont DPA Vapor Wells
WORK PERFORMED Sampled All 4 wells; shut down system; collected second sampling event also.

Name	Start Time	Arrived Job	Time Out	Left Job	Stop Time	Total Hours
GS McKelvey	0600	0730	1200-1300	1745	1900	12

Time	Work Performed (Indicate if out-of-scope)
0601-0615	Mob @ office
0615-0730	GSM travel to Beaumont
0735-0940	GSM calls for OVM. GPG to bring out ASAP
	GSM & Steve Spalding tour site. Inspect wells
	GSM setting up canister systems, etc.
	Prepare to sample VEW-6, VEW-10, VEW-11, & VEW-2
0940-0950	Calibrate OVM
0950-1115	Sample Vapor wells while In-Vac system is running.
	Collected canister samples for each and OVA & OVM
	readings. See attached sheet for field screening results.
1115	Shut down In-Vac System
1130-1230	Lunch
1230-1430	Standby
1440-1515	Purge VEW-11 @ 5 l/min. 1515-Sample VEW-11 (canister)
1530-1605	Purge VEW-6 @ 5 l/min; collect OVM & OVA samples only
1610-1650	Purge VEW-10 @ 5 l/min. Collect OVM & OVA samples only
1655-1720	Purge VEW-2 @ 5 l/min. Collect OVM & OVA samples only

1730-1745 Put Cal. instruments away & travel to Lumberton 1745-

Summary of Hours	Budget	Actual	Out-of-Scope*
Today's hours	10	10 billed +2 comp	

Tomorrow's Expected Work (5-19-98, Tue.)
Expect to be on site @ 1015. Will canister sample VEW-11 and OVM & OVA sample all four wells. Will deliver canisters to Lab Tues. p.m. (Third sample event).

* Detail Out-of-Scope work on back of this page