Final Report

BF Goodrich Site Investigation Soil Boring and Vapor Probe Installation

Rialto, California

Prepared for

USEPA Region 9
San Francisco, California

November 2010

Prepared by

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ES100410152737SCO/102770001

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1. Introduction

This report presents the methods and findings of environmental investigation activities performed in May and September 2009 at the BF Goodrich Site (Site), within the 160-Acre Area in the northeastern portion of the Rialto-Colton Basin (Figure 1). The portion of the Site where investigation activities were performed is currently occupied by Rialto Concrete Products (RCP), a manufacturer of precast concrete products. The investigation was performed in the vicinity of the former Goodrich burn pits (note that for the purposes of this report it is assumed that there were two adjacent but distinct burn pits; some data sources refer to a single pit), which were historically located where one of RCP's concrete manufacturing and curing buildings now stands.

1.1 Project Objectives

The environmental investigation was conducted for the United States Environmental Protection Agency (EPA) Region 9 by CH2M HILL to further characterize the nature and vertical extent of soil and soil gas contamination associated with the Goodrich burn pits on the 160-Acre Area. Prior investigations in the immediate vicinity of the former burn pits have been limited to relatively shallow depths, in part because of the difficulties associated with working inside the RCP building. The goal of the current EPA investigation was to collect deeper soil and soil vapor information in the vicinity of the Goodrich burn pits.

1.2 Background

Previous investigation work in the vicinity of the Goodrich burn pits has been conducted by two consultants—Geosyntec Consultants (Geosyntec) and ENVIRON International Corporation (ENVIRON). For the prior investigations, the Goodrich disposal/burn pits area was referred to as "Burn Pit Area C" by Geosyntec and as "Study Area 45" by ENVIRON. Former Goodrich employees have testified that ammonium perchlorate along with trichloroethene (TCE) and possibly other chlorinated solvents were disposed of in the burn pits. Historical aerial photos indicate there were one or more adjacent and possibly overlapping and uncovered burn pits. Wastes deposited in the burn pits, possibly impacting the soil, may have included the following:

- Dust and other waste from the grinding of ammonium perchlorate
- Waste generated from cleaning residual propellant (containing ammonium perchlorate and chlorinated solvent) from the mixing equipment
- Propellant waste generated during testing or other stages of production
- Waste propellant from a one-time operation to salvage Sidewinder rocket motor casings

In June 2004, Geosyntec completed four soil borings (RIA-01 to RIA-04) in Area C directly adjacent to three soil gas sampling locations where TCE was detected. The four borings were located within or immediately adjacent to the footprint of the former burn pits

depicted in Figure 2. Soil samples were collected and analyzed from depths of 6 and 12 feet below ground surface (bgs) in each boring (total of eight samples). Perchlorate was detected in all eight samples collected from the four borings. TCE was not detected in the eight samples, although the reporting limit was elevated in three of eight samples (Geosyntec, 2005).

In April 2006, ENVIRON collected and analyzed an additional 35 soil samples from eight borings (SB-C-01 to SB-C-08) in the same area at depths of 5 to 25 feet bgs. Perchlorate was detected at four of eight locations in 12 of 35 samples; all 12 detections were within the footprint of the former burn pits depicted in Figure 2. TCE was not detected in the 20 soil samples where volatile organic compounds (VOCs) were analyzed (ENVIRON, 2010). Soil gas samples were not collected during this phase of investigation.

1.3 Rationale for Sample Locations

Based on earlier investigation activities in the vicinity of the Goodrich burn pits, additional soil sampling was necessary to characterize the vertical extent (deeper) of residual perchlorate contamination in this known source area. Consistent with prior soil investigations at the Site, a reporting limit of approximately 20 micrograms per kilogram (µg/kg) was used for perchlorate.

Figure 2 shows the locations of the three EPA soil borings (EPA-SB1, EPA-SB2, and EPA-SB3), the Geosyntec and ENVIRON investigation locations in the area, and the approximate location of the Goodrich burn pits (based on review of a 1960 aerial photograph). The EPA soil borings were located in the apparent vicinity of the former burn pits, in the west-central portion of the 160-Acre Area. Specifically, EPA-SB1 was drilled adjacent to ENVIRON soil boring SB-C-06, EPA-SB2 was drilled adjacent to ENVIRON soil boring SB-C-04, and EPA-SB3 was drilled approximately 50 feet southwest of ENVIRON boring SB-C-04.

2. Fieldwork Program

This section describes the sampling activities performed by CH2M HILL at the Site, which included soil sampling in three boreholes up to 100 feet bgs, nested vapor probe installation, and soil vapor sampling at four depth intervals in the three borings.

Prior to soil boring activities, individual boring locations were cleared by CH2M HILL using the Underground Service Alert of Southern California (DigAlert) notification processes and a private geophysical utility locating company, Spectrum Geophysics of Burbank, California. In addition, each boring location was cleared to approximately 5 feet using compressed air/vacuum (airknife) before advancing the borehole. In general, all field work was performed or overseen by CH2M HILL in accordance with a Field Sampling Plan and Quality Assurance Project Plan prepared by CH2M HILL (CH2M HILL, 2008 and 2009).

2.1 Subsurface Soil Investigation

2.1.1 Drilling and Sampling Procedures

The three soil borings (EPA-SB1, EPA-SB2, and EPA-SB3) were drilled in the apparent vicinity of the historic burn pits and were located inside a large concrete curing building on RCP's property. Specifically, EPA-SB1 and EPA-SB2 were drilled within or very near the footprint of the former burn pits, and EPA-SB3 was drilled approximately 50 feet to the southeast of the former burn pit area. The three borings were continuously cored and 8-inch casing was advanced using the rotosonic drilling method. Drilling services were provided by Boart Longyear using the Prosonic 300-C/Spider drill rig.

Soil samples were collected at approximately 10-foot intervals from each of the soil borings. Geosyntec (on behalf of Goodrich Corporation) obtained split soil samples from all three EPA boreholes. In an email dated June 3, 2009, a Goodrich representative reported to EPA that the split soil samples were not analyzed. Based on a visual assessment of the continuous core, the location within each 10-foot-depth interval that contained the highest percentage of finer-grained materials (including fine-grained sands) was targeted for sample collection. The rationale for this approach was that finer-grained soils are more likely to retain residual contamination from historic burn pit releases.

Soil was collected from each target interval by hand and transferred to a 4-ounce jar for laboratory analysis using disposable spoons. Nitrile gloves were worn while collecting soil samples. After collecting each sample, spoons and gloves were discarded and replaced with a new set for collecting the next sample to prevent cross-contamination from one sample to the next. Once the core was lithologically logged, photographed, and soil from the designated depth was placed into the appropriate sample jar, the soil was transferred to a roll-off bin for temporary storage.

2.1.2 Laboratory Analytical Methods

All soil samples collected from the borings (primary and duplicate samples) were analyzed for perchlorate (EPA Method 314) by the EPA Region 9 Laboratory in Richmond, California.

2.1.3 Decontamination Procedures

To avoid cross-contamination between sampling locations, all equipment that came into contact with potentially contaminated soil was decontaminated. This included the sampling tools (core barrel) and drill rods. Equipment was decontaminated using a steam cleaner supplied by the onsite municipal water supply (which was tested to ensure that it did not contain perchlorate). Disposable sampling equipment intended for one-time use was not decontaminated, but was packaged for appropriate disposal.

2.2 Soil Vapor Investigation

2.2.1 Soil Vapor Probe Construction

All three soil borings (EPA-SB1, EPA-SB2, and EPA-SB3) were completed with a series of nested soil vapor probes. Soil vapor probes were installed in each borehole at depths of 25, 50, 75, and 100 feet bgs. The soil vapor probes consist of ¼-inch-outside-diameter polyethylene tubing with probe tips (cut slots) at the bottom end. In each borehole, the four soil vapor probes were strapped to a 100-foot-long, 2-inch-diameter polyvinyl chloride (PVC) blank casing to ensure that the probes were situated at the desired depth, and then lowered in to the borehole.

The annulus around each vapor probe was backfilled with #3 sand filter pack, extending approximately 1 foot above and below the probe. Approximately 5 feet of dry granular bentonite was placed above each sand pack. The granular bentonite provides a borehole seal that prevents air communication from the surface during vapor sampling and also prevents potential contaminants (water runoff, etc.) from migrating from the surface downward through the borehole. The remainder of the annulus, between each sealed probe interval and to ground surface, was backfilled with hydrated medium bentonite chips placed in 5-foot lifts. Water from the onsite source (described previously in Section 2.1.3) was used for hydration of all bentonite seals. Each nested soil vapor probe was completed with a 6-inch-diameter round flush-mount well box and lid. Soil vapor probe construction details are summarized in Table 1. A diagram showing typical soil vapor probe construction is provided in Figure 3.

2.2.2 Soil Vapor Probe Sampling

Two rounds of samples were collected from the new nested vapor probes. The first round of sampling was performed in May 2009, approximately 1 month after the soil vapor probes were installed. A second round of sampling was conducted in September 2009 to confirm the results of the first round of sampling. Geosyntec (on behalf of Goodrich Corporation) collected split vapor samples during the May 2009 sampling event. In an email dated June 3, 2009, a Goodrich representative reported to EPA that the split soil vapor samples were not analyzed.

Soil gas samples were collected in 1-liter SUMMA™ canisters, certified clean to EPA Method TO-15 VOC reporting limits. To ensure that stagnant or ambient air was removed from the sampling system and the samples collected were representative of subsurface conditions, three system volumes (tubing + filter pack volume) were purged prior to collecting samples. The target vacuum purge rate was 200 milliliters per minute (mL/min) for both sampling events. During the May sampling event the vacuum pump used for purging could not be regulated down to the desired purge rate, resulting in an elevated flow rate during purging. During the September event, a purge rate of 200 mL/min was maintained throughout purging of the three system volumes. Duplicate and split samples were collected using a T-connector so the SUMMA™ canisters could fill concurrently.

Leak checks were performed where ambient air could enter the sampling system or where cross-contamination may occur while collecting all vapor samples. Isopropyl alcohol (IPA), also known as 2-Propanol, was used to check for the leaks during May 2009 sampling. A clean towel dampened with IPA was placed around the base of the probes at the ground surface and IPA was added to the list of compounds to be analyzed by EPA Method TO-15. During the September 2009 sampling event, helium gas was used as a leak detection compound. A shroud placed over the probe vault and purge fittings was flooded with helium from a compressed tank. During purging, the pump exhaust was periodically checked for the presence of helium using a helium detector. The shroud concentration was also periodically checked to ensure that the helium concentration within the shroud remained above 10 percent helium. The shroud was spiked with additional helium as necessary.

2.2.3 Laboratory Analytical Methods

Soil vapor samples (primary and duplicate samples) for the May and September 2009 vapor sampling events were analyzed by the EPA Region 9 Laboratory in Richmond, California. One additional split sample was collected during the September sampling event. The split sample was analyzed by Air Toxics Ltd. of Folsom, California, a California-certified laboratory. The samples were analyzed for the presence of VOCs by EPA TO-15 modified.

2.3 Investigation Derived Waste

The following investigation-derived waste (IDW) was generated during the soil sampling activities at the Site:

- Used personal protective equipment (PPE) and disposable sampling equipment. The used PPE and disposable sampling equipment were not considered hazardous and were double-bagged and placed in a municipal refuse dumpster for disposal at a municipal landfill.
- Decontamination rinsate. Decontamination rinsate was captured on Visqueen (plastic sheeting) and allowed to evaporate. The Visqueen was then containerized and disposed of with the soil cuttings.
- Excess soil from the soil borings. Excess soil cuttings generated during drilling and soil sampling activities were placed into a roll-off bin for temporary storage. One soil waste sample was analyzed by the following analytical methods:

- Perchlorate (EPA 314)
- Purgeable and extractable petroleum hydrocarbons (EPA 8015B)
- Metals (EPA 6000/7000 series)
- VOCs (EPA 8260B)
- pH (EPA 9040C/9045D)

The IDW soil sample containers were packed on ice and shipped via Fed Ex to the EPA Region 9 laboratory in Richmond, California. CH2M HILL worked with an IDW subcontractor (Haz Mat Trans Inc.) to complete waste profiling and arrange for waste disposal of the IDW as a nonhazardous solid waste. A CH2M HILL representative signed the waste manifests on behalf of EPA.

2.4 Surveying

The locations and elevations of the EPA soil vapor probes were surveyed by a professional land surveyor, Calvada Surveying Inc. of Corona, California. Soil vapor probe coordinates and elevations are included in Table 1.

3. Summary of Results

This section discusses the results of sampling activities conducted by CH2M HILL at the Site.

3.1 Soil Boring Sample Results

Soil samples were collected approximately every 10 feet, to a depth of 100 feet, in the three soil borings (EPA-SB1, EPA-SB2, and EPA-SB3) and analyzed for perchlorate. Soil boring perchlorate results are presented in Table 2. Soil boring logs are provided in Appendix A.

Perchlorate was detected in 19 of 30 soil samples collected from the three EPA soil borings, with perchlorate detected in 19 of 20 samples from EPA-SB1 and EPA-SB2 (the 9-foot sample at EPA-SB1 was non-detect for perchlorate). All 10 soil samples collected at EPA-SB3 were non-detect for perchlorate. Figure 4 shows the vertical distribution of perchlorate in soil along the cross section line displayed on Figure 2. Observations regarding the perchlorate distribution in soil are listed as follows:

- Perchlorate concentrations ranged from non-detect (in 11 samples) to 2,800 µg/kg.
- The highest concentrations of perchlorate were detected in EPA-SB2. Perchlorate was detected at a concentration of greater than 1,000 µg/kg at five depths (14, 27, 42, 62, and 94 feet) in EPA-SB2.
- The highest concentration of perchlorate detected in soil during the EPA investigation (2,800 µg/kg) was at the deepest sample location (94 feet) in EPA-SB2.
- Perchlorate concentrations at EPA-SB1 ranged from non-detect to 290 µg/kg. The maximum perchlorate detection in EPA-SB1 (290 µg/kg) was from the 39-foot sample.
- The maximum perchlorate concentration reported in soil from previous investigations around the historic burn pits was an estimated concentration of 760 J µg/kg from the 15-foot sample in ENVIRON boring SB-C-06.

3.1.1 Quality Assurance Sampling

One field duplicate was collected from each soil boring for quality assurance. The relative percent difference (RPD) between primary and duplicate samples ranged from 3 to 22 percent for samples with perchlorate detected.

3.2 Soil Vapor Sample Results

Two rounds of soil vapor samples were collected from the nested vapor probes. The first round of sampling was performed in May 2009, approximately 1 month after the soil vapor probes were installed. A second round of sampling was conducted in September 2009 to confirm the results of the first round of sampling. Soil vapor results for both sampling

events are available in Table 3, which shows data only for detected analytes, and Appendix B, which summarizes soil vapor results for all analytes.

A total of 17 different VOCs were detected in soil gas (see Table 3), of which five VOCs (chloroform, Freon 11, methylene chloride, tetrachloroethene [PCE], and TCE) were the most prevalent. The discussion of soil vapor results will focus on TCE because it is the VOC that has been detected most frequently and at the highest concentrations in Site groundwater.

TCE was detected in all (26 of 26) soil vapor samples collected as part of the EPA investigation. Figure 5 shows the vertical distribution TCE in soil vapor along the cross-section line displayed on Figure 2. Some observations on the TCE distribution in soil vapor are listed as follows:

- TCE concentrations ranged from 19.9 J micrograms per cubic meter ($\mu g/m^3$) (25-foot probe in EPA-SV3) to 2,610 J $\mu g/m^3$ (100-foot probe in EPA-SV3).
- The highest TCE concentration from each nested soil vapor probe were from samples collected from the deepest (100-foot) vapor probe.
- The maximum TCE concentration reported in soil vapor from previous investigations around the historic burn pits was 1,700 $\mu g/m^3$ from the 6-foot sample in Geosyntec sample location SG-BP-13.

3.2.1 Quality Assurance Sampling

One field duplicate was collected during each of the May and September 2009 sampling events. The RPD between primary and duplicate samples ranged from 0 to 40 percent for detected compounds. Excluding the May 2009 chloroform results, the RPD range for other detected analytes is much smaller (0 to 9 percent).

A performance evaluation (PE) sample was prepared by an outside laboratory and analyzed by the EPA Region 9 Laboratory concurrently with the vapor samples collected during September 2009 vapor sampling. The EPA Region 9 Laboratory sent an empty (under vacuum) SUMMA™ canister to the outside laboratory. The outside laboratory spiked the PE sample with known concentrations of chloroform and TCE and returned the sample to the EPA laboratory for analysis. Results of the PE sample were within advisory acceptance limits provided by the laboratory that prepared the PE sample.

A split sample was collected from the 100-foot probe at EPA-SV3 during the September 2009 sampling event and sent to a separate laboratory, Air Toxics Ltd., for analysis. Results of the split sample for detected analytes were approximately one order of magnitude lower than results from the same depth that were analyzed by the EPA Region 9 Laboratory.

A chemist from EPA's Quality Assurance Office reviewed the data quality for the soil vapor sample results collected in May and September and concluded that the data are useable for project decisions (EPA, 2010). Results for primary, duplicate, and split samples are summarized in Table 3.

3.3 Investigation Derived Waste Sample Results

One IDW soil sample (EPA-SV-SOIL) was collected for waste disposal analyses. Results were below levels of concern for disposal. All IDW analytical data are provided in Appendix C. Soil IDW was transported from the Site by Haz Mat Trans Inc. for disposal at Chemical Waste Management's Kettleman Hills Facility in Kettleman Hills, California.

4. Conclusions

This section summarizes the key findings of the investigation.

4.1 Perchlorate Distribution in Soil

Perchlorate was detected in all but one sample from the two soil borings located within or very near the footprint of the historic Goodrich burn pits (EPA-SB1 and EPA-SB2), suggesting that near surface and deeper perchlorate contamination is related.

The highest perchlorate detection (2,800 µg/kg) was in EPA-SB2 at a depth of 94 feet. This result is higher than any perchlorate results for shallow soil samples collected during the Geosyntec and ENVIRON investigations.

Perchlorate was not detected in soil samples collected (between 6 and 100 feet) from boring EPA-SB3.

4.2 TCE Distribution in Soil Vapor

TCE was detected in soil vapor at all nested soil vapor probes (EPA-SV1, EPA-SV2, and EPA-SV3) at four depths (25, 50, 75, and 100 feet) during both the May and September 2009 sampling events, suggesting that near surface and deeper TCE contamination is related.

The highest TCE detections at each location were from the 100-foot vapor probe samples. This may indicate that the bulk of the TCE contamination from the burn pits has migrated deeper than 100 feet below the source.

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Tables

TABLE 1
Soil Vapor Probe Construction Details
BF Goodrich Site Investigation

Soil Boring	Soil Vapor Probe Designation	Date Completed	Total Borehole Depth (ft bgs)	Coordinates [1]		Ground Surface Elevation [2] (ft msl)	Probe Depth (ft bgs)	Filter Pack Interval [3] (ft bgs)	Seal Interval [4] (ft bgs)
				Northing (feet)	Easting (feet)				
EPA-SB1	EPA-SV1	4/30/2009	100	1,878,815.78	6,738,157.91	1,662.90	25	23 – 27	0 – 23
							50	48 – 52	27 – 48
							75	73 – 76	52 – 73
							100	97 – 100	76 – 97
EPA-SB2	EPA-SV2	5/4/2009	100	1,878,808.85	6,738,191.30	1,662.86	25	23 – 27	0 – 23
							50	48 – 52	27 – 48
							75	73 – 77	52 – 73
							100	97 – 100	77 – 97
EPA-SB3	EPA-SV3	4/28/2009	100	1,878,773.10	6,738,230.96	1,662.91	25	23 – 26	0 – 23
							50	48 – 51	26 – 48
							75	73 – 76	51 – 73
							100	97 – 100	76 – 97

Notes:

ft bgs = feet below ground surface

ft msl = feet (elevation relative to) mean sea level

[1] State Plane Coordinates, CA Zone 5, NAD 83.

[2] Surveyed to NAVD 88

[3] Filter pack material is #3 sand.

[4] Seal material is combination of granular and medium bentonite chips.

TABLE 2
Summary of Perchlorate in Soil
BF Goodrich Site, San Bernardino County, California

Location	Sample Date	Sample Type	Depth	Perchlorate (µg/kg)
EPA-SB1	29-Apr-09	N	9	<21
	29-Apr-09	N	18	**18 J**
	29-Apr-09	N	24	**66**
	29-Apr-09	N	39	**290**
	29-Apr-09	N	42	**40**
	29-Apr-09	FD	42	**41**
	29-Apr-09	N	54	**100**
	29-Apr-09	N	68	**190**
	30-Apr-09	N	76	**140**
	30-Apr-09	N	84	**170**
	30-Apr-09	N	98	**150**
EPA-SB2	01-May-09	N	9	**150**
	01-May-09	N	14	**1,700**
	01-May-09	N	27	**1,800**
	01-May-09	N	38	**790**
	01-May-09	N	42	**1,500**
	01-May-09	FD	42	**1,200**
	01-May-09	N	58	**890**
	01-May-09	N	62	**1,600**
	01-May-09	N	80	**94**
	04-May-09	N	87	**200**
	04-May-09	N	94	**2,800**
EPA-SB3	27-Apr-09	N	6	<22
	27-Apr-09	N	19	<20
	27-Apr-09	N	29	<22
	27-Apr-09	FD	29	<22
	27-Apr-09	N	40	<20
	27-Apr-09	N	46	<20
	27-Apr-09	N	56	<22
	27-Apr-09	N	66	<21
	28-Apr-09	N	75	<21
	28-Apr-09	N	86	<21
	28-Apr-09	N	100	<21

Notes:

Detected results are **bolded**
N = Primary Sample
FD = Field Duplicate
µg/kg = micrograms per kilogram
J = Estimated result
< = Non detect at the reporting limit

TABLE 3

Summary of Detected Volatile Organic Compounds in Soil Vapor

BF Goodrich Site, San Bernardino County, California

Location	Depth	Sample Date	Analyte / Sample Type	Benzene µg/m³	Chloromethane µg/m³	Chloroform µg/m³	1,2-Dichlorobenzene µg/m³	Ethylbenzene µg/m³	Freon 11 µg/m³	Freon 12 µg/m³	Freon 113 µg/m³	Methylene Chloride µg/m³	2-Propanol µg/m³	Styrene µg/m³	Tetrachloro ethene µg/m³	Toluene µg/m³	Trichloroethene µg/m³	1,2,4-Trimethyl benzene µg/m³	m,p-Xylene µg/m³	o-Xylene µg/m³
EPA-SB1	25 [1]	26-May-09	N	<6	<4	**40**	<10	<8	**9 J**	<9	<10	**4 J**	**7**	**4 J**	**20**	<7	**100**	<9	<20	<8
	50	26-May-09	N	<6	<4	**200**	<10	<8	**30**	<10	<10	**5 J**	**3 J**	<8	**30**	<7	**100**	<9	<20	<8
		26-May-09	FD	<6	<4	**300**	<10	<8	**30**	<10	<10	**5 J**	<5	<8	**30**	<7	**100**	<9	<20	<8
		08-Sep-09	N	<2	<2	**254**	<2	<2	**21.3**	<2	<2	**4.86 J**	**39.3**	<2	**27.1**	<2	**134**	<2	<4	<2
	75	26-May-09	N	<6	<4	**700**	<10	<8	**40**	**5 J**	<10	**5 J**	**3 J**	<8	**40**	<7	**300**	**5 J**	<20	<8
		08-Sep-09	N	<2.2	<2.2	**879**	<2.2	<2.2	**49.4**	<2.2	<2.2	**5.21 J**	<2.2	<2.2	**45.4**	<2.2	**317**	<2.2	<4.4	<2.2
	100	26-May-09	N	<6	<4	**900**	<10	<8	**50**	**8 J**	**8 J**	**10**	<5	**6 J**	**50**	**10**	**500**	**6 J**	**9 J**	**4 J**
		09-Sep-09	N	<2.2	<2.2	**1,420**	<2.2	<2.2	**61.8**	**7.42 J**	<2.2	**9.38**	<2.2	<2.2	**65.8**	<2.2	**1,070**	<2.2	<4.3	<2.2
EPA-SB2	25	26-May-09	N	<6	<4	**46**	**8 J**	<8	**20**	<9	<15	<7	**6**	<8	**46**	**5 J**	**141**	**6 J**	<20	<8
		09-Sep-09	N	<2	<2	**32.7**	<2	<2	**12.4**	<2	<2	**3.82 J**	<2	<2	**46.8**	<2	**306**	<2	<4	<2
	50	26-May-09	N	<6	<4	**100**	<10	<8	**20**	<9	<10	**4 J**	**1,200**	<8	**20**	<7	**60**	<9	<20	<8
		09-Sep-09	N	<1.9	<1.9	**269**	<1.9	<1.9	**30.9**	<1.9	<1.9	**6.60 J**	<1.9	<1.9	**28.5**	<1.9	**118**	<1.9	<3.8	<1.9
	75	26-May-09	N	<6	<4	**500**	<10	<8	**60**	<10	<10	**5 J**	<5	<8	**50**	**6 J**	**300**	<9	**9 J**	<8
		09-Sep-09	N	<2.2	<2.2	**635**	<2.2	<2.2	**73**	<2.2	<2.2	**6.25 J**	<2.2	<2.2	**40**	<2.2	**360**	<2.2	<4.3	<2.2
		09-Sep-09	FD	<2.2	<2.2	**684**	<2.2	<2.2	**73**	<2.2	<2.2	**5.91 J**	<2.2	<2.2	**40**	<2.2	**392**	<2.2	<4.3	<2.2
	100	26-May-09	N	<6	<4	**1,100**	<10	<8	**60**	**6 J**	<10	**20**	<5	**5 J**	**50**	**10**	**1,100**	**6 J**	**10 J**	**4 J**
		10-Sep-09	N	<1.9	<1.9	**1,170**	<1.9	<1.9	**73**	**7.42 J**	<1.9	**25.4**	<1.9	<1.9	**81.4**	<1.9	**1,240**	<1.9	<3.8	<1.9
EPA-SB3	25	26-May-09	N	<6	<4	**30**	<10	<8	**50**	<9	<10	<6	<5	**6 J**	**30**	**4 J**	**10**	**7 J**	**10 J**	**5 J**
		10-Sep-09	N	<1.9	<1.9	**41**	<1.9	<1.9	**47.2**	<1.9	<1.9	<1.9	<1.9	<1.9	**17**	<1.9	**19.9 J**	<1.9	<3.8	<1.9
	50	26-May-09	N	<6	<4	**100**	<10	**4 J**	**60**	<9	<10	<7	<5	<8	**30**	**10**	**50**	**7 J**	**10 J**	**6 J**
		10-Sep-09	N	<2	<2	**146**	<2	<2	**61.8**	<2	<2	**4.17 J**	<2	<2	**16.3**	<2	**64.5**	<2	<3.9	<2
	75	26-May-09	N	**4 J**	<4	**200**	<10	**5 J**	**70**	<9	<10	**8**	**10**	**6 J**	**30**	**10**	**300**	**7 J**	**10 J**	**6 J**
		11-Sep-09	N	<1.9	<1.9	**239**	<1.9	<1.9	**89.9**	<1.9	<1.9	**7.99**	<1.9	<1.9	**33.9**	<1.9	**446**	<1.9	<3.8	<1.9
	100	26-May-09	N	**20**	**3 J**	**515**	**9 J**	**7 J**	**70 J**	**6 J**	<140	**46 J**	<5	**4 J**	**60**	**43 J**	**1,700**	**8 J**	**20 J**	**8 J**
		11-Sep-09	SS	**1.0 J**	<18	**78**	<13	<9.5	**11 J**	<11	<17	**7.7**	---	<9.3	**7.5 J**	<8.2	**290**	<11	<9.5	<9.5
		11-Sep-09	N	<19	**2.89 J**	**645**	<19	<19	**98.9 J**	**6.43 J**	<19	**56.6 J**	<19	<19	**66.9 J**	<19	**2,610 J**	<19	<39	<19

Notes:

Detected results are in **bold**

[1] No sample was collected from the 25-foot vapor probe at EPA-SV1 in September 2009. The well vault was flooded due to curing activities in the building and the probe could not be purged.

N = Primary Sample

FD = Field Duplicate

SS = Split Sample

µg/m³ = micrograms per cubic meter

J = Estimated result

< = Non detect at the reporting limit

Figures

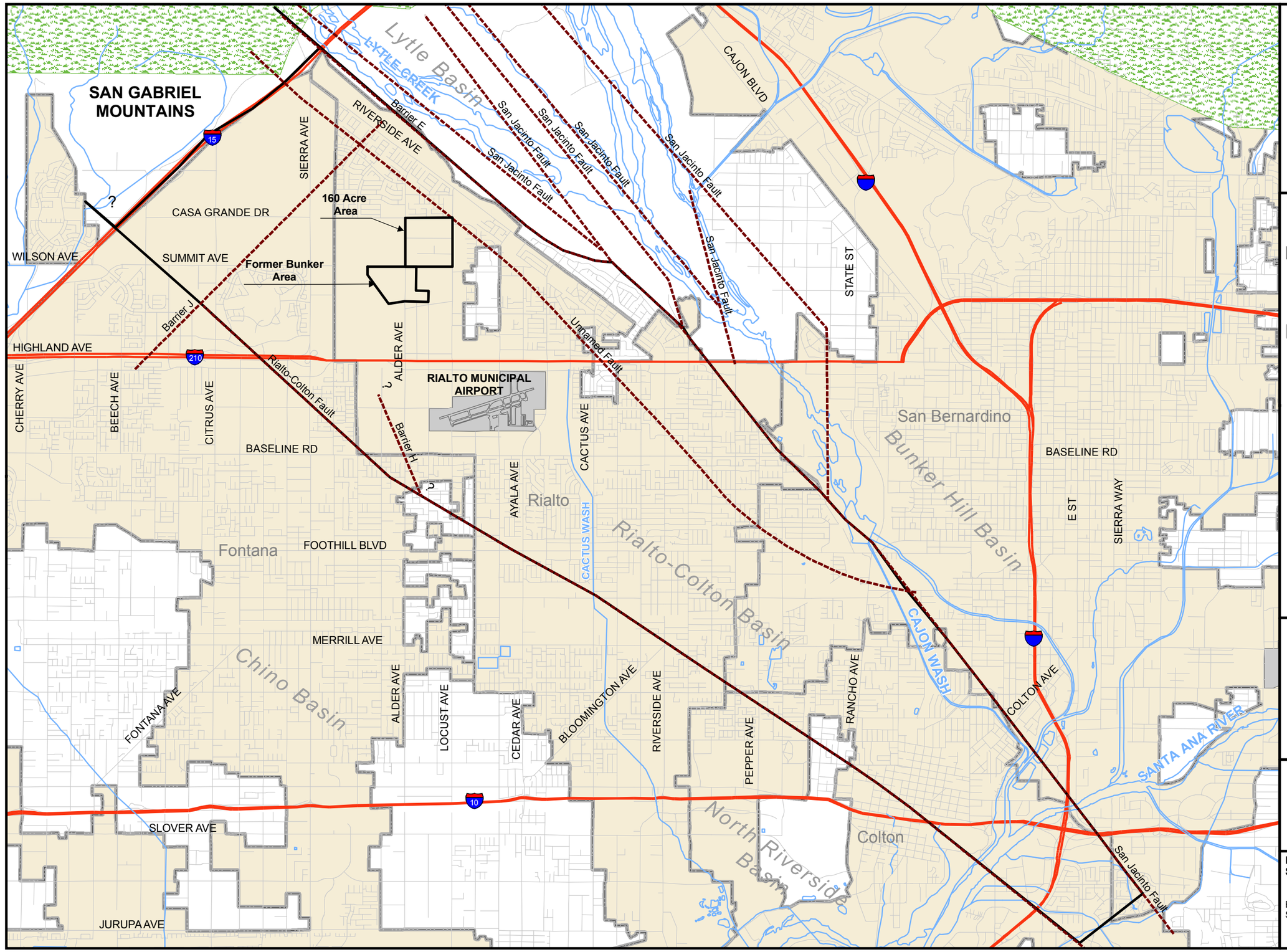
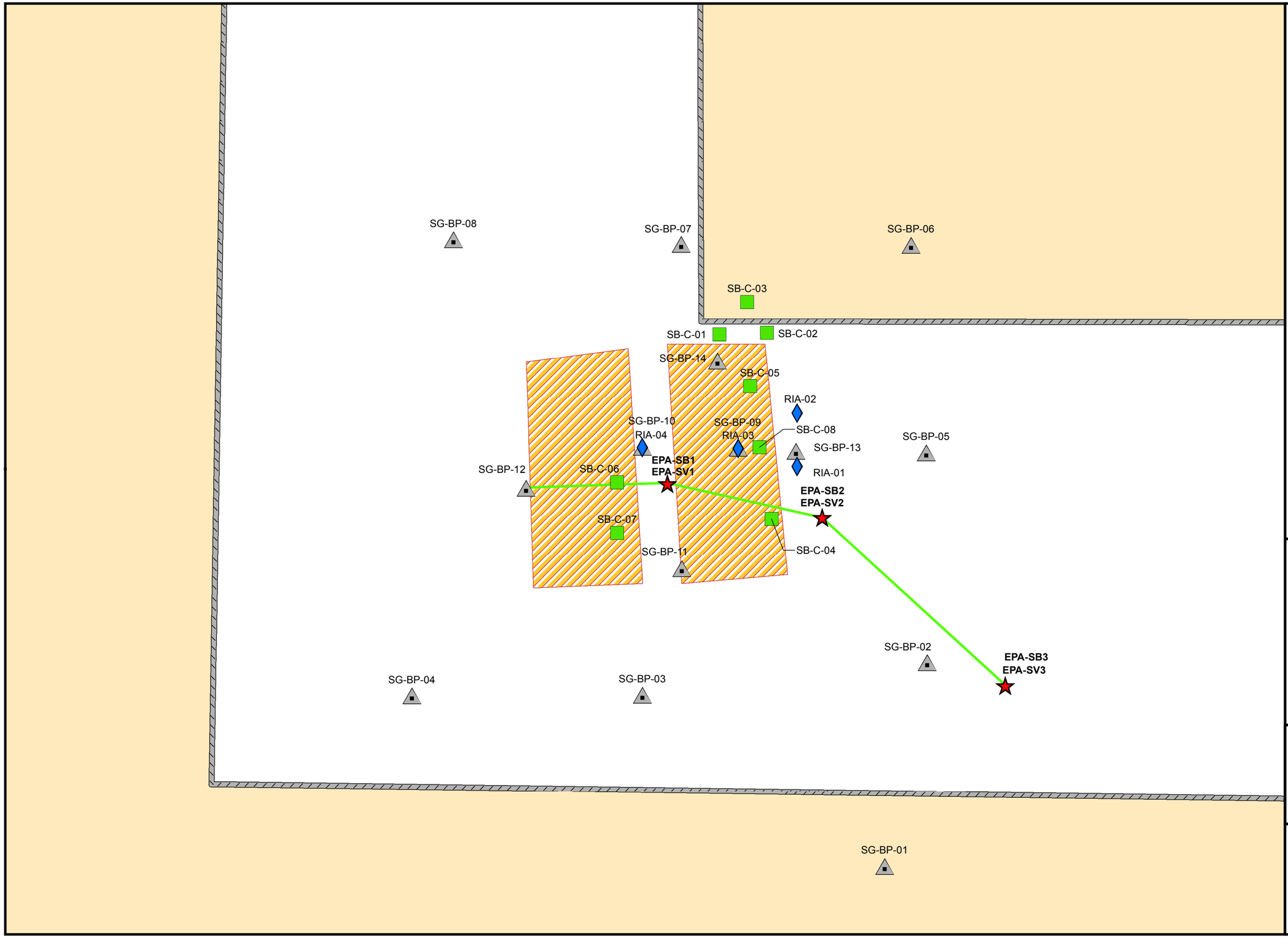


FIGURE 1
SITE LOCATION MAP

B.F. Goodrich Site
San Bernardino County, CA

CH2MHILL

\\MADISON\GROUPS\EMS\GIS_LIBRARY\RIALTO-COLTON\MAPFILES\REPORT_MAPFILES\20100824\FIGURE1_SITELOCATIONMAP.MXD CVONFREE 8/24/2010 14:32:49



LEGEND

- EPA Soil Boring And Soil Vapor Probe Location
- Environ Soil Boring Location
- Geosyntec Soil Boring Location (Approximate)
- Geosyntec Soil Vapor Sampling Location (Approximate)
- Cross Section
- Approximate Extent of Historic Goodrich Burn Pits (1)
- Approximate Footprint of Rialto Concrete Products Curing Building

Note:
(1) Approximate pit locations based on review of 1960 aerial photograph.

N

0 10 20

Feet

FIGURE 2
SOIL BORING AND SOIL VAPOR PROBE LOCATIONS

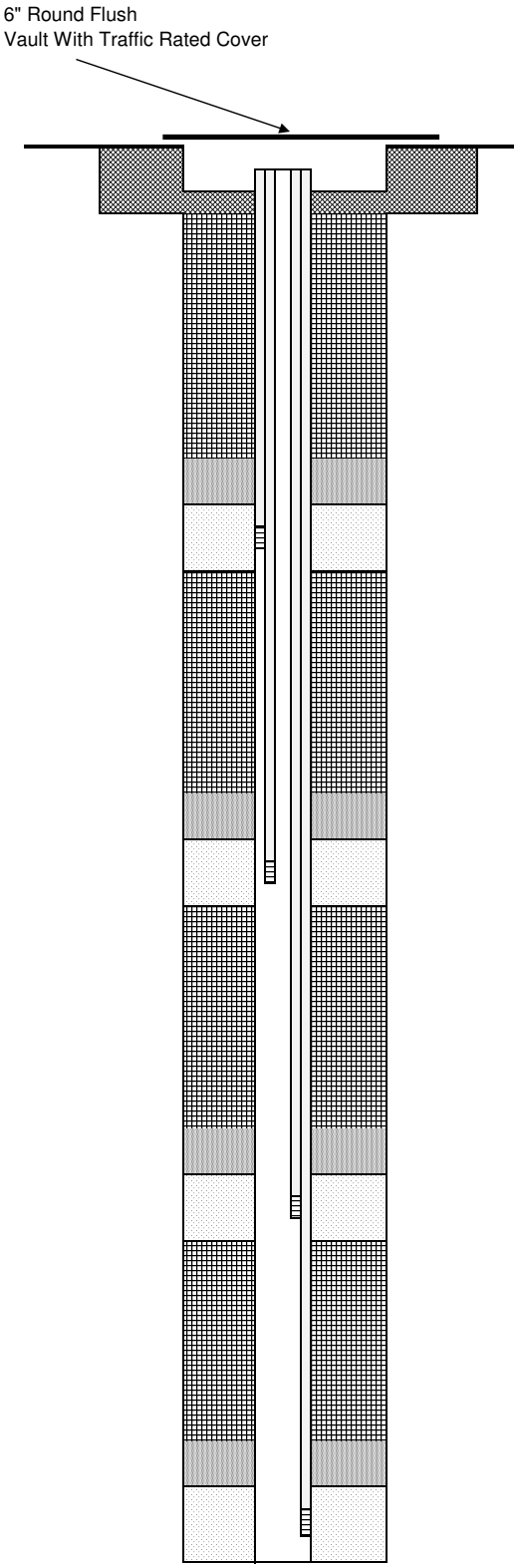
B.F. Goodrich Site
San Bernardino County, CA

CH2MHILL

\\MADISON\GROUPS\EMS\GIS_LIBRARY\RIALTO-COLTON\MAPFILES\REPORT_MAPFILES\SOILBORINGS\FIGURE2_SOILBORINGS.MXD CVONFREE 9/29/2010 09:56:35

CH2MHILL

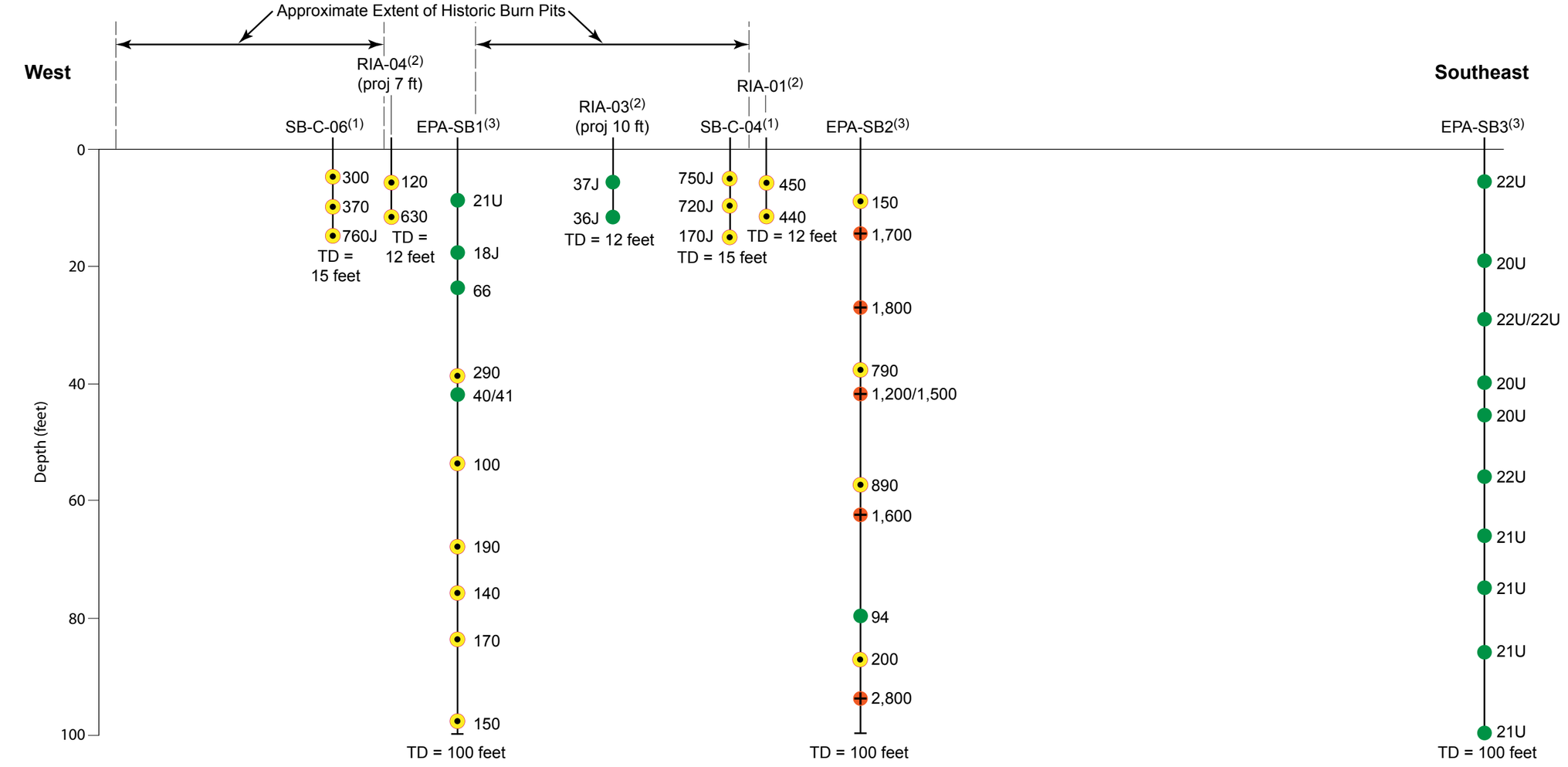
TYPICAL NESTED SOIL GAS PROBE



EXPLANATION

- Concrete
- Bentonite Seal Medium Chips (Hydrated)
- Bentonite Seal Granular (Dry)
- Filter Pack RMC #3 sand
- PVC Blank Casing Support
- 0.25-inch Polyethylene Tubing Strapped to PVC
- Perforated Section of Tubing

FIGURE 3
Typical Nested Soil Vapor Probe
BF Goodrich Site Investigation



Legend

150 Perchlorate concentration in soil micrograms per kilogram (µg/kg)

Perchlorate concentration non-detect to less than 100 µg/kg

Perchlorate concentration greater than or equal to 100 µg/kg and less than 1000 µg/kg

Perchlorate concentration greater than or equal to 1000 µg/kg

Notes:

1) Data collected by ENVIRON, April 2006. Source: ENVIRON, 2008.
2) Data collected by Geosyntec, June 2004. Source: Geosyntec, 2005.
3) Data collected by CH2M HILL, April/May 2009.

J The reported result of this analyte should be considered an estimated value.

U Not detected

TD Total depth

See Figure 2 for cross-section location

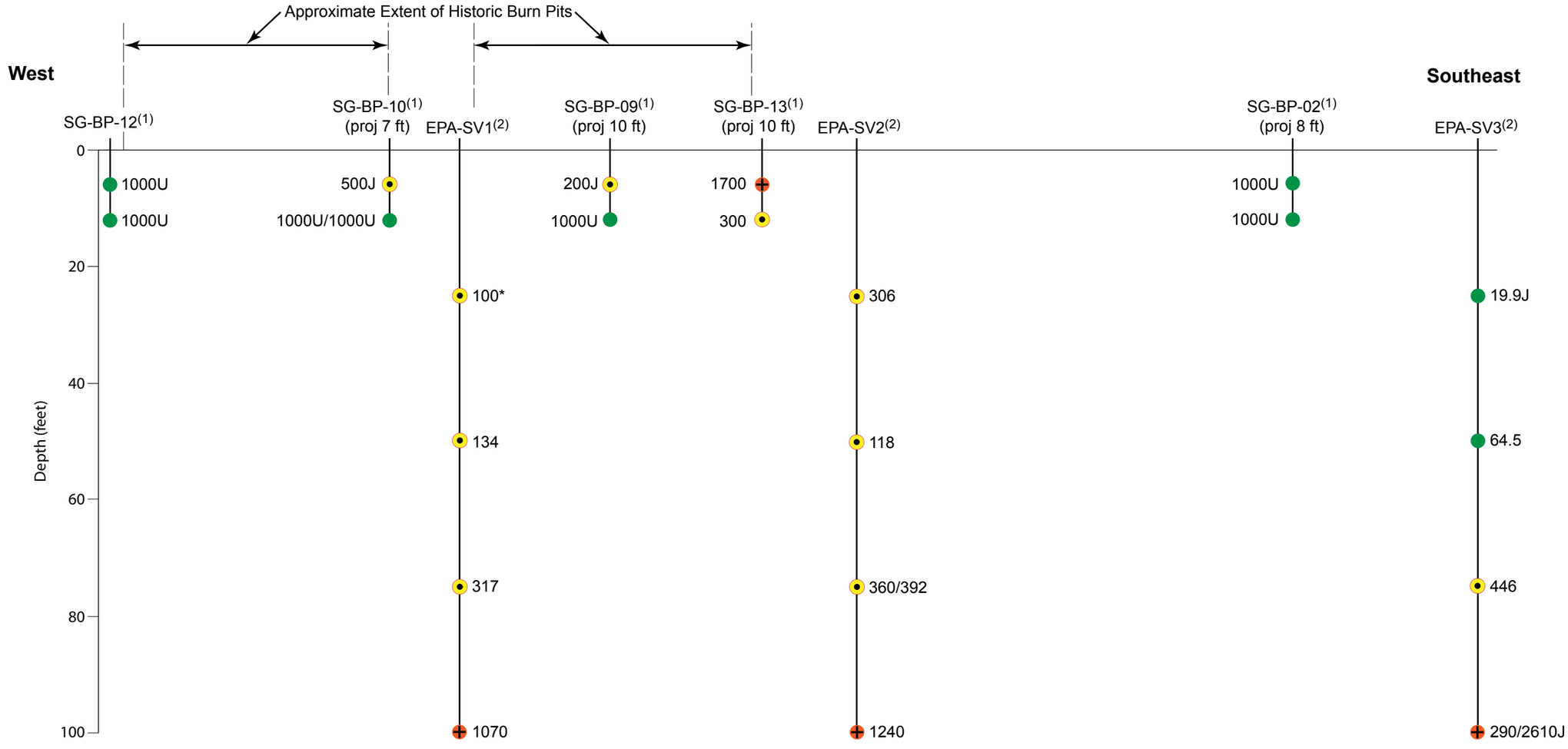
0 10 feet

Vertical Exaggeration = 2X

20

FIGURE 4
Perchlorate Distribution in Soil
BF Goodrich Site Investigation

CH2MHILL



Legend

306 Trichloroethene (TCE) concentration in soil vapor micrograms per cubic meter (µg/m3)

TCE concentration non-detect to less than 100 µg/m3

TCE concentration greater than or equal to 100 µg/m3 and less than 1000 µg/m3

TCE concentration greater than or equal to 1000 µg/m3

Notes:

1) Data collected by Geosyntec, May/June 2004. Source: Geosyntec, 2006.
2) Data collected by CH2M HILL, September 2009. *Data collected by CH2M HILL, May 2009.

J The reported result of this analyte should be considered an estimated value

U Not detected

See Figure 2 for cross-section location

0 10 feet

Vertical Exaggeration = 2X

20

FIGURE 5
TCE Distribution in Soil Vapor
BF Goodrich Site Investigation

CH2MHILL

Appendix A
Boring Logs

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-SB1	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.1536646, W 117.4166414
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 4/29/2009
END : 4/30/2009
LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
0	0.0	5.3			8" thick concrete flooring.	
					POORLY GRADED GRAVEL WITH SAND (GP) light olive brown (2.5Y 5/4), moist, 60% gravel, 30% fine to medium sand, 10% coarse sand, subrounded.	
5	6.0	4.0			**POORLY GRADED GRAVEL WITH SAND (GP)** light olive brown (2.5Y 5/4), moist, 60% gravel, 30% fine to medium sand, 10% coarse sand, subrounded.	4/29/09, 10:20
					SILTY GRAVEL WITH SAND (GM) olive brown (2.5Y 4/4), moist, 50% gravel, 25% fines, 10% cobble, 10% medium sand, 5% coarse sand, gravel with sandy silt matrix.	
					POORLY GRADED GRAVEL WITH SAND (GP) light olive brown (2.5Y 5/4), moist, 50% gravel, 20% cobbles, 20% fine to medium sand, 10% coarse sand, subrounded, cobbles at 7' to 8', elongate.	
				PID = 0		collect soil sample: 09-EPASB-01-9-01-12
10	10.0	5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/6), moist, 60% medium to coarse sand, some fine sand, 40% gravel.	10:35
					POORLY GRADED SAND WITH GRAVEL (SP) light olive brown (2.5Y 5/6), moist, 60% medium to coarse sand, some fine sand, 40% gravel, some coarse gravel at 11', some coarse sand at 12.5'.	
					SILTY GRAVEL (GM) pale yellow (5Y 7/3), dry, 50% cobbles, 30% gravel, 20% fines.	
15	15.0	5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/4), moist, 30% gravel, 30% medium sand, 20% cobbles, 20% coarse sand, cobbles at 15', 17', and 19'.	10:45
				PID = 0		collect soil sample: 09-EPASB01-18-01-013
20	20.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** dark olive brown (2.5Y 3/3), moist, 50% gravel, 20% coarse sand, 15% medium sand, 10% cobble, 5% fine sand, subrounded cobbles.	11:10
				PID = 0		collect soil sample: 09-EPASB-01-24-01-014
25	25.0					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-SB1	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.1536646, W 117.4166414
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 4/29/2009
END : 4/30/2009
LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	25.0	5.0			**POORLY GRADED SAND WITH GRAVEL (SM)** olive (5Y 5/4), moist, 40% gravel, subrounded, 30% medium sand, 20% coarse sand, 10% fine sand.	11:20, install soil vapor probe at 25' bgs
					POORLY GRADED GRAVEL WITH SAND (GP) olive (5Y 4/4), moist, 50% gravel, 20% cobble, 20% medium sand, 10% coarse sand.	
					POORLY GRADED SAND WITH GRAVEL (SP) olive (5Y 5/4), moist, 40% gravel, subrounded, 30% medium sand, 20% coarse sand, 10% fine sand.	
					POORLY GRADED GRAVEL WITH SILT (GP-GM) light gray (5Y 7/2), dry, angular, gravel fragments.	
30	30.0				**POORLY GRADED GRAVEL WITH SAND (GP)** olive (5Y 4/4), moist, 60% gravel, 30% medium sand, 10% coarse sand, subrounded.	
		5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive (5Y 4/4), moist, 60% gravel, 30% medium sand, 10% coarse sand, subrounded, cobbles at 31', 32', 33', and 35'.	11:45
35	35.0					
		5.0			**POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM)** pale olive (5Y 6/3), moist, 20% fine sand, 30% gravel, 20% medium to coarse sand, 20% cobbles, 10% fines.	12:20
					POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM) yellow (5Y 7/6), dry, 40% gravel, 20% cobbles, 20% fine to medium sand, 10% coarse sand, 10% fines, subangular.	
				PID = 0		collect soil sample: 09-EPASB-01-39-015
40	40.0					
		5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** pale olive (5Y 6/3), moist, 50% gravel, 30% fine sand, 10% cobbles, 10% coarse sand.	14:00
	42.0					
				PID = 0	**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), moist, 50% medium sand, 30% fine sand, 10% fine gravel, 10% coarse sand.	collect soil sample: 09-EPASB-01-42-01-016
					POORLY GRADED SAND WITH GRAVEL (SP) olive brown (2.5Y 4/4), moist, 30% coarse sand, 30% gravel, 20% medium sand, 20% fine sand, coarsens downward.	collect soil sample: 09-EPASB-01-42-02-017
45	45.0				**POORLY GRADED GRAVEL WITH SILT (GP-GM)** light olive gray (5Y 6/2), moist, fragments of weakly cemented gravels within fine matrix, caliche-like texture.	
		5.0				14:35
					POORLY GRADED SAND WITH GRAVEL (SP) olive brown (2.5Y 4/4), moist, 30% coarse sand, 30% gravel, 20% medium sand, 20% fine sand, coarsens downward.	
					POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM) olive (5Y 4/4), moist, 40% gravel, 20% medium sand, 10% cobble, 10% coarse sand, 10% fine sand, 10% fines, locally weakly cemented gravel within fines as matrix.	
50	50.0					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-SB1	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.1536646, W 117.4166414
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 4/29/2009
END : 4/30/2009
LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	50.0	5.0		PID = 0	**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/3), moist, 30% coarse sand, 30% gravel, 25% cobbles, subrounded, 15% medium sand. **SILTY GRAVEL (GM)** light gray (5Y 7/2), dry, 40% gravel, 30% cobbles, 30% fines. **POORLY GRADED SAND WITH GRAVEL (GP)** olive brown (2.5Y 4/4), 50% medium to coarse sand, 30% gravel, 20% cobbles, a few cobbles at 52' and 53'.	14:50, install soil vapor probe at 50' bgs
55	55.0	5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/4), moist, 50% medium to coarse sand, 40% gravel, 10% fine sand, subrounded. **SILTY GRAVEL (GM)** light gray (5Y 7/2), dry, 50% gravel, 30% fines, 20% cobbles.	collect soil sample: 09-EPASB-01-54-01-018 15:25
60	60.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4), moist, 50% gravel, 30% medium to coarse sand, 20% cobbles, cobbles at top and bottom, subrounded.	15:50
65	65.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4), moist, 50% gravel, 30% medium to coarse sand, 20% cobbles.	16:40
70	70.0	5.0		PID = 0	**SILTY SAND WITH GRAVEL (SM)** olive brown (2.5Y 4/3), moist, 40% sand, 20% cobbles, 20% gravel, 20% silt, weakly cemented, gravels within silty sand matrix at 68', cobbles at 69'.	collect soil sample: 09-EPASB-01-68-01-019
75	75.0	5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/4), moist, 30% coarse sand, 30% med. sand, 30% gravel, subrounded, 10% cobbles, subangular cobbles at 71' and 72.5'.	17:00, stopped at 70' on 4/29/09

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-SB1	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.1536646, W 117.4166414
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 4/29/2009
END : 4/30/2009
LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	75.0	5.0		PID = 0	**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4), moist, 60% gravel, 20% coarse sand, 15% medium sand, 5% cobbles.	4/30/09, 8:15, install soil vapor probe at 75' bgs collect soil sample: 09-EPASB-01-76-01-020
					POORLY GRADED SAND WITH GRAVEL (SP) olive brown (2.5Y 4/4), 35% medium sand, 30% gravel, 20% coarse sand, 15% fine sand, gravel, subrounded.	
					POORLY GRADED GRAVEL WITH SAND (GP) pale olive (5Y 6/3), moist, 50% gravel, 20% cobbles, 20% fine to medium sand, 10% coarse sand, cobbles at 77' and 79'.	
80	80.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** pale olive (5Y 6/3), moist, 50% gravel, 20% cobbles, 20% fine to medium sand, 10% coarse sand, cobbles at 77' and 79'.	8:40
					POORLY GRADED SAND WITH GRAVEL (SP) olive (5Y 4/4), moist, 35% gravel, 30% coarse sand, 20% medium sand, 15% cobbles, subrounded cobbles at 82'-83', 1" thick layer of greenish gray silt at 84'.	
				PID = 0	**POORLY GRADED SAND WITH GRAVEL (SP)** olive (5Y 4/4), moist, 35% gravel, 30% coarse sand, 20% medium sand, 15% cobbles, cobbles at top.	collect soil sample: 09-EPASB-01-84-01-021
85	85.0	4.0			**SILTY GRAVEL (GM)** dry, 50% gravel, 30% fines, 20% cobbles, subrounded.	9:15
90	90.0	5.0			**SILTY GRAVEL (GM)** dry, 50% gravel, 30% fines, 20% cobbles, subrounded.	10:10
					POORLY GRADED GRAVEL WITH SAND (GP) olive (5Y 4/4), moist, 40% gravel, 30% medium sand, 20% cobbles, 10% coarse sand, subrounded.	
95	95.0	3.5			**SILTY GRAVEL (GM)** dry, 50% gravel, 30% fines, 20% cobbles, subrounded.	10:40
					SILTY GRAVEL WITH SAND (GM) light gray (5Y 7/2), moist, 30% gravel, 20% cobbles, 20% fine sand, 20% fines, 10% coarse sand.	
				PID = 0	**POORLY GRADED GRAVEL WITH SAND (GP)** olive (5Y 4/4), moist, 55% gravel, 30% medium sand, 10% fine sand, 5% coarse sand, subrounded gravel.	collect soil sample: 09-EPASB-01-98-01-022
100					No recovery.	11:05, install soil vapor probe at 100' bgs, total depth: 100' bgs

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-SB2 SHEET 1 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.153645, W 117.4165311
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 5/1/2009 END : 5/4/2009 LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
0	0.0	4.5			Concrete.	
					SILTY SAND WITH GRAVEL (SM) very dark grayish brown (10YR 3/2), moist, 50% fine to medium sand, 30% fines, 20% gravel, subrounded.	
5	6.0	4.0			**POORLY GRADED SAND WITH GRAVEL (SP)** brown (10YR 4/3), moist, 30% medium sand, 20% gravel, 20% cobbles, 20% coarse sand, 10% fine sand, subrounded cobbles.	5/1/09, 9:05
				PID = 0		collect soil sample: 09-EPASB-02-9-01-023
10	10.0	5.0			**POORLY GRADED GRAVEL WITH SILT (GP-GM)** pale olive (5Y 6/3), moist, 60% cobbles, subangular, 20% gravel, 10% fine sand, 10% fines.	9:15
					POORLY GRADED SAND WITH GRAVEL (SP) light olive brown (2.5Y 5/4), moist, 40% coarse sand, 30% gravel, 30% medium sand, subrounded gravel.	
					POORLY GRADED GRAVEL (GP) 60% gravel, 30% cobbles, 10% sand.	
					POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) light olive brown (2.5Y 5/4), moist, 35% medium sand, 20% gravel, 20% coarse sand, 15% cobbles, 10% fines, cobbles and fines at 13.5'-14', fine sand at bottom 6".	
15	15.0	5.0		PID = 0		collect soil sample: 09-EPASB-02-14.5-01-024 9:20
					POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM) light yellowish brown (2.5Y 6/3), moist, 50% gravel, 20% cobbles, 20% fine sand, 10% fines.	
20	20.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/3), moist, 40% gravel, 25% cobbles, 25% fine to medium sand, 10% coarse sand, cobbles at 23.5'.	9:35
25	25.0					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-SB2	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.153645, W 117.4165311
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 5/1/2009
END : 5/4/2009
LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	25.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/3), moist, 50% gravel, 20% cobbles, 20% fine to medium sand, 10% coarse sand, subrounded cobbles.	10:45, install soil vapor probe at 25' bgs
				PID = 0	**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/3), moist, 30% medium sand, 30% gravel, 20% coarse sand, 10% cobbles, 10% fine sand.	collect soil sample: 09-EPASB-02-27-01-025
30	30.0				**SILTY GRAVEL (GM)** pale olive (5Y 6/3), moist, 40% gravel, 30% cobbles, 30% fines, subangular cobbles.	
		5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** olive (5Y 4/3), moist, 35% gravel, 30% medium sand, 20% coarse sand, 10% fine sand, 5% cobbles, subrounded.	11:15
					SILTY GRAVEL (GM) pale olive (5Y 6/3), moist, 40% gravel, 30% cobbles, 30% fines, subangular cobbles.	
35	35.0					
		5.0			**POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM)** olive (5Y 4/4), moist, 40% gravel, 30% fine sand, 10% cobbles, 10% coarse sand, 10% fines.	11:30
				PID = 0	**POORLY GRADED SAND WITH GRAVEL (GP)** olive brown (2.5Y 4/3), moist, 30% gravel, 30% fine sand, 20% cobbles, 10% coarse sand, 10% medium sand.	collect soil sample: 09-EPASB-02-38-01-026
40	40.0					
		5.0			**POORLY GRADED SAND WITH GRAVEL (GP)** olive (5Y 5/3), moist, 40% gravel, 30% fine to medium sand, 20% fines, 10% coarse sand.	13:30
	42.0				**POORLY GRADED SAND (SP)** olive (5Y 5/4), moist, 85% fine sand, 10% gravel, subrounded, 5% clayey silt at top.	collect soil sample: 09-EPASB-02-42-01-027
				PID = 0	**POORLY GRADED GRAVEL WITH SAND (GP)** olive (5Y 5/4), 40% gravel, 20% cobbles, subrounded, 20% coarse sand, 10% medium sand, 10% fine sand.	collect soil sample: 09-EPASB-02-42-02-028
45	45.0					
		5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive (5Y 5/4), 40% gravel, 20% cobbles, subrounded, 20% coarse sand, 10% medium sand, 10% fine sand.	13:45
50	50.0					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-SB2 SHEET 3 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.153645, W 117.4165311
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 5/1/2009 END : 5/4/2009 LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	50.0	5.0			**SILTY GRAVEL (GM)** light gray (5Y 7/2), dry, 40% gravel, 40% cobbles, 20% fines, cobbles at 49' and 50', 5'' long.	14:15, install soil vapor probe at 50' bgs
					SILTY GRAVEL (GM) light gray (5Y 7/2), dry, 40% gravel, 40% cobbles, 20% fines, cobbles at 54'.	
55	55.0					
		5.0			**SILTY GRAVEL (GM)** light gray (5Y 7/2), dry, 40% gravel, 40% cobbles, 20% fines, sandier at 57'.	14:30
				PID = 0		collect soil sample: 09-EPASB-02-57.5-01-029
					POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM) light gray (5Y 7/2), dry, 40% gravel, 30% cobbles, 20% fine sand, 10% fines, subangular cobbles.	
60	60.0					
		5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/4), moist, 40% medium sand, 20% gravel, 20% coarse sand, 10% cobbles, 10% fine sand, subrounded cobbles.	15:00
				PID = 0		collect soil sample: 09-EPASB-02-62.5-01-030
					POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM) light gray (5Y 7/2), dry, 40% gravel, 30% cobbles, 20% fine sand, 10% fines.	
65	65.0					
		5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4), 50% gravel, 20% coarse sand, 20% medium sand, 10% cobbles, subrounded gravel.	5/1/09, 15:15
					POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM) light gray (5Y 7/2), dry, 40% gravel, 30% cobbles, 20% fine sand, 10% fines.	
70	70.0					
		5.0			**POORLY GRADED SAND WITH GRAVEL (GP)** olive brown (2.5Y 4/4), moist, 40% gravel, 30% coarse sand, 20% medium sand, 10% cobbles, subrounded cobbles, cobbles at 71' and 73'.	16:00
75	75.0					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-SB2	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.153645, W 117.4165311
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 5/1/2009
END : 5/4/2009
LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	75.0	5.0			**POORLY GRADED SAND WITH GRAVEL (GP)** olive brown (2.5Y 4/4), moist, 40% gravel, 30% coarse sand, 20% medium sand, 10% cobbles, some weakly cemented gravels within silty sand matrix at 79' to 80'.	16:15, install soil vapor probe at 75' bgs
80	80.0			PID = 0		
		5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/4), moist, 40% medium sand, 30% gravel, 20% coarse sand, 10% cobbles, cobbles at 82', 83', and 85', more gravel at 82', and 83'.	5:00, stopped at 80' bgs on 5/1/09, collect soil sample: 09-EPASB-02-80-01-031
85	85.0					
		5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4), moist, 50% gravel, 20% medium sand, 10% cobbles, 10% coarse sand, 10% fine sand, subrounded gravel, cobble at 86'.	5/4/09, 8:05
				PID = 0		collect soil sample: 09-EPASB-02-87-01-032
					SILTY GRAVEL (GM) 40% gravel, 40% cobbles, 20% fines.	
90	90.0					
		5.0			**SILTY GRAVEL (GM)** 40% gravel, 40% cobbles, 20% fines.	8:45
					POORLY GRADED GRAVEL WITH SAND (GP) olive brown (2.5Y 4/4), moist, 50% gravel, 30% medium sand, 10% cobbles, 10% coarse sand, more sand at 93', 2-3" zone of clayey silt as matrix to gravels at 94'.	
				PID = 0		collect soil sample: 09-EPASB-02-94-01-033
95	95.0					
		5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4), moist, 50% gravel, 30% medium sand, 10% cobbles, 10% coarse sand.	9:05
					POORLY GRADED SAND WITH GRAVEL (SP) olive brown (2.5Y 4/4), 40% medium sand, 35% gravel, 20% coarse sand, 5% cobbles, subrounded cobbles.	9:30, install soil vapor probe at 100' bgs, total depth: 100' bgs
100						

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-SB3 SHEET 1 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products
ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear
COORDINATES : N 34.1535462, W 117.4164007
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method
WATER LEVELS : ---
START : 4/27/2009
END : 4/28/2009
LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
0	0.0	5.5			**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/3), moist, 40% medium sand, 30% gravel, 20% fine sand, 10% coarse sand, subrounded.	
					POORLY GRADED GRAVEL WITH SAND (GP) light olive brown (2.5Y 5/3), moist, 40% gravel , 40% cobbles, 20% fine sand, trace coarse sand, color becomes olive brown (2.5Y 4/4).	
5					**POORLY GRADED SAND WITH GRAVEL (SP)** dark brown (10YR 3/3), moist, 50% fine sand, 30% gravel, 20% medium sand, trace mica, subrounded.	
	5.5			PID = 0		collect soil sample: 09-EPASB-03-5.5-01-001
	6.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** light olive brown (2.5Y 5/3), moist, 40% gravel, 30% cobbles, 20% fine to medium sand, 10% coarse sand.	4/27/09, 9:50
10						
	11.0	4.0			**POORLY GRADED GRAVEL WITH SAND (GP)** light olive brown (2.5Y 5/3), moist, 70% gravel, 30% medium to coarse sand, elongate, subrounded.	10:00
					POORLY GRADED GRAVEL WITH SAND (GP) grayish brown (2.5Y 5/2), moist, 40% gravel, 30% cobbles, 20% fine sand, 10% coarse sand, subrounded.	
15	15.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** grayish brown (2.5Y 5/2), moist, 40% gravel, 30% cobbles, 20% fine sand, 10% coarse sand, subrounded.	10:10
					POORLY GRADED SAND WITH GRAVEL (GP) light olive brown (2.5Y 5/3), moist, 40% fine to medium sand, 30% gravel, 20% cobbles, 10% coarse sand.	
	19.0			PID = 0		collect soil sample: 001-EPASB-03-19-01-002
20	20.0	4.5			**POORLY GRADED GRAVEL WITH SAND (GP)** grayish brown (2.5Y 5/2), moist, 40% gravel, 30% cobbles, 20% fine sand, 10% coarse sand, subrounded.	10:40
					POORLY GRADED GRAVEL WITH SAND (GP) olive (5Y 5/3), moist, 40% gravel, 30% cobbles, 20% fine to medium sand, 10% coarse sand, subrounded.	
					POORLY GRADED SAND WITH GRAVEL (SP) light olive brown (2.5Y 5/3), moist, 40% med to coarse sand, 30% gravel, 20% cobbles, 10% fine sand, subrounded.	
						11:05
25	25.0					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-SB3 SHEET 2 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.1535462, W 117.4164007
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 4/27/2009 END : 4/28/2009 LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	25.0	5.0			**SILTY SAND WITH GRAVEL (SM)** light olive gray (5Y 6/2), dry, 20% coarse sand, 30% fine sand, 30% fines, 20% gravel, subrounded.	install soil vapor probe at 25' bgs
					POORLY GRADED GRAVEL WITH SAND (GP) olive brown (2.5Y 4/3), moist, 50% gravel, 20% cobbles, 20% coarse sand, 10% fine to medium sand, subrounded.	
	29.0			PID = 0	**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/3), moist, 50% medium sand, 30% fine sand, 20% coarse sand, 1-2" of mostly fine sand at top.	collect soil sample: 09-EPASB-03-29-01-003 collect soil sample: 09-EPASB-03-29-02-004 11:20
30	30.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive gray (5Y 5/2), moist, 50% gravel, subrounded, 20% cobbles, 20% fine sand, 10% coarse sand.	
35	35.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive gray (5Y 5/2), moist, 30% gravel, 30% cobbles, 30% fine sand, 10% coarse sand, cobbles from 35' to 37' bgs.	11:30
40	40.0	5.0		PID = 0	**POORLY GRADED SAND WITH GRAVEL (SP)** olive (5Y 4/3), moist, 40% gravel, subangular-subrounded, 30% medium sand, 20% fine sand, 10% coarse sand.	12:05, collect soil sample: 09-EPASB-03-40-01-005
					POORLY GRADED GRAVEL (GP) olive gray (5Y 5/2), moist, 4" cobble.	
					POORLY GRADED SAND WITH GRAVEL (SP) grayish brown (2.5Y 5/2), moist, 40% gravel, subrounded, 30% medium sand, 20% coarse sand, 10% fine sand.	
45	45.0					
	45.5	5.0		PID = 0	**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/3), moist, 40% gravel, subrounded, 30% medium sand, 20% fine sand, 10% coarse sand.	13:38 collect soil sample: 09-EPASB-03-45.5-01-006
					POORLY GRADED GRAVEL WITH SAND (GP) olive (5Y 4/3), moist, 40% gravel, 30% fine to medium sand, 25% cobbles, 5% coarse sand, more sandy at 48'-50'.	
50	50.0					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-SB3 SHEET 3 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.1535462, W 117.4164007
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 4/27/2009 END : 4/28/2009 LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	50.0	4.5			**SILTY GRAVEL WITH SAND (GM)** olive gray (5Y 5/2), dry, 40% gravel, 20% cobbles, 10% coarse sand, 10% fine sand, 20% fines, subrounded.	13:45, install soil vapor probe at 50' bgs
55	55.0	5.0		PID = 0	**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/3), moist, 50% gravel, 20% cobbles, 20% fine to medium sand, 10% coarse sand, 5" cobble at 58'.	15:25 collect soil sample: 09-EPASB-03-56-01-007
	56.0					
60	60.0	5.0			**POORLY GRADED SAND WITH GRAVEL (SP)** light gray (5Y 7/2), moist, 60% fine to medium sand, 40% gravel. **POORLY GRADED GRAVEL WITH SAND (GP)** light olive brown (2.5Y 5/3), moist, 50% gravel, 30% medium to coarse sand, 20% cobbles, subrounded.	15:45
65	65.0	5.0		PID = 0	**SILTY GRAVEL WITH SAND (GM)** light olive brown (2.5Y 5/3), low plasticity; moist, 50% gravel, 30% fine sand, 20% clay, low plasticity, round cobble at 68'.	16:00 collect soil sample: 09-EPASB-03-66-01-008
	66.0					
70	70.0	5.0			**POORLY GRADED GRAVEL WITH SAND (GP)** light olive brown (2.5Y 5/4), moist, 60% gravel, subrounded, 40% fine to medium sand. **SILTY GRAVEL WITH SAND (GM)** light olive brown (2.5Y 5/4), moist, 60% gravel, 20% fine sand, 20% fines.	16:25
75	75.0					

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-SB3 SHEET 4 OF 4

SOIL BORING LOG

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 160-Acre Area/Rialto Concrete Products

ELEVATION : 1662.9 ft msl
DRILLING CONTRACTOR : Boart Longyear

COORDINATES : N 34.1535462, W 117.4164007
DRILLING METHOD AND EQUIPMENT : Prosonic 300C, Rotosonic Method

WATER LEVELS : ---
START : 4/27/2009 END : 4/28/2009 LOGGER : C Kamali

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	ENVIRONMENTAL DATA	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	75.0	5.0		PID = 0	**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/4), moist, 55% gravel, 30% fine to medium sand, 5% cobble, 5% coarse sand, 5% silt, 5" long cobble at 79', some silt at 75'.	16:50, stopped at 75' bgs on 4/27/09, collect soil sample: 09-EPASB-03-75-01-009, install soil vapor probe at 75' bgs
80	80.0					
		5.0			**SILTY GRAVEL WITH SAND (GM)** light olive brown (2.5Y 5/3), moist, 50% gravel, 30% fines, 20% fine sand.	4/28/09, 8:30
					SILTY GRAVEL (GM) light brownish gray (2.5Y 6/2), moist, 50% gravel, 30% fines, 20% cobbles, some fine sand.	
					SILTY GRAVEL WITH SAND (GM) light olive brown (2.5Y 5/3), moist, 50% gravel, 30% fines, 20% fine sand, gravel with sandy silt matrix, subrounded.	
					SILTY GRAVEL (GM) light brownish gray (2.5Y 6/2), moist, 50% gravel, 30% fines, 20% cobbles, some fine sand.	
85	85.0					
		3.5				8:55
	86.0			PID = 0	**SILTY GRAVEL WITH SAND (GM)** light olive brown (2.5Y 5/4), moist, 50% gravel, 30% fines, 20% fine to medium, moderately cemented locally, subrounded gravels with sandy silt matrix.	collect soil sample: 09-EPASB-03-86-01-010
					POORLY GRADED GRAVEL WITH SAND (GP) olive brown (2.5Y 4/3), moist, 40% gravel, 30% cobble, 20% fine to medium sand, 10% coarse sand.	
90	90.0					
		4.0			**POORLY GRADED GRAVEL WITH SAND (GP)** olive brown (2.5Y 4/3), moist, 40% gravel, 30% cobble, 20% fine to medium sand, 10% coarse sand.	9:30
95						
	96.0					10:20
		4.0				
				PID = 0		11:15, collect soil sample: 09-EPASB-03-100-01-011, install soil vapor probe at 100' bgs, total depth: 100' bgs
100						

Appendix B
Summary of Volatile Organic Compounds in Soil Vapor

TABLE B1
Summary of Volatile Organic Compounds in Soil Vapor
BF Goodrich Site, San Bernardino County, California

Analyte	Location	EPA-SV1	EPA-SV1	EPA-SV1	EPA-SV1	EPA-SV1	EPA-SV1	EPA-SV1	EPA-SV1	EPA-SV2	EPA-SV2	EPA-SV2	EPA-SV2	EPA-SV2	EPA-SV2	EPA-SV2
	Sample	09-EPASG-01-025-01-013	09-EPASG-01-050-01-011	09-EPASG-01-050-02-012	09-EPASG-01-050-01-014	09-EPASG-01-075-01-010	09-EPASG-01-075-01-015	09-EPASG-01-100-01-009	09-EPASG-01-100-01-016	09-EPASG-02-025-01-008	09-EPASG-02-025-01-017	09-EPASG-02-050-01-007	09-EPASG-02-050-01-018	09-EPASG-02-075-01-006	09-EPASG-02-075-01-019	09-EPASG-02-075-02-020
	Date	5/26/2009	5/26/2009	5/26/2009	9/8/2009	5/26/2009	9/8/2009	5/26/2009	9/9/2009	5/26/2009	9/9/2009	5/26/2009	9/9/2009	5/26/2009	9/9/2009	9/9/2009
	Depth	25	50	50 (FD)	50	75	75	100	100	25	25	50	50	75	75	75 (FD)
	Units															
1,1,1-Trichloroethane	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<11	<2	<10	<1.9	<10	<2.2	<2.2
1,1,2,2-Tetrachloroethane	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<13	<2	<10	<1.9	<10	<2.2	<2.2
1,1,2-Trichloroethane	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<11	<2	<10	<1.9	<10	<2.2	<2.2
1,1-Dichloroethane	ug/m3	<8	<8	<8	<2	<8	<2.2	<8	<2.2	<8	<2	<8	<1.9	<8	<2.2	<2.2
1,1-Dichloroethene	ug/m3	<7	<8	<8	<2	<8	<2.2	<8	<2.2	<8	<2	<8	<1.9	<8	<2.2	<2.2
1,2,4-Trichloro benzene	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<14	<2	<10	<1.9	<10	<2.2	<2.2
1,2,4-Trimethyl benzene	ug/m3	<9	<9	<9	<2	**5 J**	<2.2	**6 J**	<2.2	**6 J**	<2	<9	<1.9	<9	<2.2	<2.2
1,2-Dibromoethane	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<15	<2	<10	<1.9	<10	<2.2	<2.2
1,2-Dichloro benzene	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	**8 J**	<2	<10	<1.9	<10	<2.2	<2.2
1,2-Dichloroethane	ug/m3	<8	<8	<8	<2	<8	<2.2	<8	<2.2	<8	<2	<8	<1.9	<8	<2.2	<2.2
1,2-Dichloropropane	ug/m3	<9	<9	<9	<2	<9	<2.2	<9	<2.2	<9	<2	<9	<1.9	<9	<2.2	<2.2
1,3,5-Trimethylbenzene	ug/m3	<9	<9	<9	<2	<9	<2.2	<9	<2.2	<9	<2	<9	<1.9	<9	<2.2	<2.2
1,3-Dichloro benzene	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<12	<2	<10	<1.9	<10	<2.2	<2.2
1,4-Dichloro benzene	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<12	<2	<10	<1.9	<10	<2.2	<2.2
2-Propanol	ug/m3	**7**	**3 J**	<5	**39.3**	**3 J**	<2.2	<5	<2.2	**6**	<2	**1,200**	<1.9	<5	<2.2	<2.2
Benzene	ug/m3	<6	<6	<6	<2	<6	<2.2	<6	<2.2	<6	<2	<6	<1.9	<6	<2.2	<2.2
Bromo methane	ug/m3	<7	<7	<7	<2	<7	<2.2	<7	<2.2	<7	<2	<7	<1.9	<7	<2.2	<2.2
Carbon tetrachloride	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<12	<2	<10	<1.9	<10	<2.2	<2.2
Chloro benzene	ug/m3	<9	<9	<9	<2	<9	<2.2	<9	<2.2	<9	<2	<9	<1.9	<9	<2.2	<2.2
Chloro methane	ug/m3	<4	<4	<4	<2	<4	<2.2	<4	<2.2	<4	<2	<4	<1.9	<4	<2.2	<2.2
Chloroethane	ug/m3	<5	<5	<5	<2	<5	<2.2	<5	<2.2	<5	<2	<5	<1.9	<5	<2.2	<2.2
Chloroform	ug/m3	**40**	**200**	**300**	**254**	**700**	**879**	**900**	**1,420**	**46**	**32.7**	**100**	**269**	**500**	**635**	**684**
cis-1,2-Dichloro ethene	ug/m3	<7	<8	<8	<2	<8	<2.2	<8	<2.2	<8	<2	<8	<1.9	<8	<2.2	<2.2
cis-1,3-Dichloro propene	ug/m3	<8	<9	<9	<2	<9	<2.2	<9	<2.2	<9	<2	<9	<1.9	<9	<2.2	<2.2
Ethyl benzene	ug/m3	<8	<8	<8	<2	<8	<2.2	<8	<2.2	<8	<2	<8	<1.9	<8	<2.2	<2.2
Freon 11	ug/m3	**9 J**	**30**	**30**	**21.3**	**40**	**49.4**	**50**	**61.8**	**20**	**12.4**	**20**	**30.9**	**60**	**73**	**73**
Freon 113	ug/m3	<10	<10	<10	<2	<10	<2.2	**8 J**	<2.2	<15	<2	<10	<1.9	<10	<2.2	<2.2
Freon 114	ug/m3	<10	<10	<10	<2	<10	<2.2	<10	<2.2	<13	<2	<10	<1.9	<10	<2.2	<2.2
Freon 12	ug/m3	<9	<10	<10	<2	**5 J**	<2.2	**8 J**	**7.42 J**	<9	<2	<9	<1.9	<10	<2.2	<2.2
Hexachlorobutadiene	ug/m3	<20	<20	<20	<2	<20	<2.2	<20	<2.2	<21	<2	<20	<1.9	<20	<2.2	<2.2
m,p-Xylene	ug/m3	<20	<20	<20	<4	<20	<4.4	**9 J**	<4.3	<20	<4	<20	<3.8	**9 J**	<4.3	<4.3
Methylene Chloride	ug/m3	**4 J**	**5 J**	**5 J**	**4.86 J**	**5 J**	**5.21 J**	**10**	**9.38**	<7	**3.82 J**	**4 J**	**6.60 J**	**5 J**	**6.25 J**	**5.91 J**
o-Xylene	ug/m3	<8	<8	<8	<2	<8	<2.2	**4 J**	<2.2	<8	<2	<8	<1.9	<8	<2.2	<2.2
Styrene	ug/m3	**4 J**	<8	<8	<2	<8	<2.2	**6 J**	<2.2	<8	<2	<8	<1.9	<8	<2.2	<2.2
Tetrachloro ethene	ug/m3	**20**	**30**	**30**	**27.1**	**40**	**45.4**	**50**	**65.8**	**46**	**46.8**	**20**	**28.5**	**50**	**40**	**40**
Toluene	ug/m3	<7	<7	<7	<2	<7	<2.2	**10**	<2.2	**5 J**	<2	<7	<1.9	**6 J**	<2.2	<2.2
trans-1,3-Dichloropropene	ug/m3	<8	<9	<9	<2	<9	<2.2	<9	<2.2	<9	<2	<9	<1.9	<9	<2.2	<2.2
Trichloro ethene	ug/m3	**100**	**100**	**100**	**134**	**300**	**317**	**500**	**1,070**	**141**	**306**	**60**	**118**	**300**	**360**	**392**
Vinyl chloride	ug/m3	<5	<5	<5	<2	<5	<2.2	<5	<2.2	<5	<2	<5	<1.9	<5	<2.2	<2.2

Notes:

Detected results are **bolded**
FD: Field Duplicate
SS: Split Sample
ug/m3: micrograms per cubic meter
J = Estimated result
< = Non detect at the reporting limit

TABLE B1
Summary of Volatile Organic Compounds in Soil Vapor
BF Goodrich Site, San Bernardino County, California

Analyte	Location	EPA-SV2	EPA-SV2	EPA-SV3	EPA-SV3	EPA-SV3	EPA-SV3	EPA-SV3	EPA-SV3	EPA-SV3	EPA-SV3	EPA-SV3
	Sample	09-EPASG-02-100-01-005	09-EPASG-02-100-01-021	09-EPASG-03-025-01-004	09-EPASG-03-025-01-022	09-EPASG-03-050-01-003	09-EPASG-03-050-01-023	09-EPASG-03-075-01-002	09-EPASG-03-075-01-024	09-EPASG-03-100-01-001	09-EPASG-03-100-01-025	09-EPASG-03-100-03-026
	Date	5/26/2009	9/10/2009	5/26/2009	9/10/2009	5/26/2009	9/10/2009	5/26/2009	9/11/2009	5/26/2009	9/11/2009	9/11/2009
	Depth	100	100	25	25	50	50	75	75	100	100	100 (SS)
	Units											
1,1,1-Trichloroethane	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<100	<19	<12
1,1,2,2-Tetrachloroethane	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<130	<19	<15
1,1,2-Trichloroethane	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<100	<19	<12
1,1-Dichloroethane	ug/m^3	<7	<1.9	<7	<1.9	<8	<2	<8	<1.9	<8	<19	<8.8
1,1-Dichloroethene	ug/m^3	<7	<1.9	<7	<1.9	<7	<2	<7	<1.9	<75	<19	<8.6
1,2,4-Trichloro benzene	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<140	<19	<65
1,2,4-Trimethyl benzene	ug/m^3	**6 J**	<1.9	**7 J**	<1.9	**7 J**	<2	**7 J**	<1.9	**8 J**	<19	<11
1,2-Dibromoethane	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<150	<19	<17
1,2-Dichloro benzene	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	**9 J**	<19	<13
1,2-Dichloroethane	ug/m^3	<7	<1.9	<7	<1.9	<8	<2	<8	<1.9	<8	<19	<8.8
1,2-Dichloropropane	ug/m^3	<9	<1.9	<9	<1.9	<9	<2	<9	<1.9	<9	<19	<10
1,3,5-Trimethylbenzene	ug/m^3	<9	<1.9	<9	<1.9	<9	<2	<9	<1.9	<93	<19	<11
1,3-Dichloro benzene	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<110	<19	<13
1,4-Dichloro benzene	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<110	<19	<13
2-Propanol	ug/m^3	<5	<1.9	<5	<1.9	<5	<2	**10**	<1.9	<5	<19	---
Benzene	ug/m^3	<6	<1.9	<6	<1.9	<6	<2	**4 J**	<1.9	**20**	<19	**1.0 J**
Bromo methane	ug/m^3	<7	<1.9	<7	<1.9	<7	<2	<7	<1.9	<73	<19	<8.5
Carbon tetrachloride	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<120	<19	<14
Chloro benzene	ug/m^3	<9	<1.9	<9	<1.9	<9	<2	<9	<1.9	<9	<19	<10
Chloro methane	ug/m^3	<4	<1.9	<4	<1.9	<4	<2	<4	<1.9	**3 J**	**2.89 J**	<18
Chloroethane	ug/m^3	<5	<1.9	<5	<1.9	<5	<2	<5	<1.9	<50	<19	<5.8
Chloroform	ug/m^3	**1,100**	**1,170**	**30**	**41**	**100**	**146**	**200**	**239**	**515**	**645**	**78**
cis-1,2-Dichloro ethene	ug/m^3	<7	<1.9	<7	<1.9	<7	<2	<7	<1.9	<75	<19	<8.6
cis-1,3-Dichloro propene	ug/m^3	<8	<1.9	<8	<1.9	<9	<2	<9	<1.9	<9	<19	<9.9
Ethyl benzene	ug/m^3	<8	<1.9	<8	<1.9	**4 J**	<2	**5 J**	<1.9	**7 J**	<19	<9.5
Freon 11	ug/m^3	**60**	**73**	**50**	**47.2**	**60**	**61.8**	**70**	**89.9**	**70 J**	**98.9 J**	**11 J**
Freon 113	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<140	<19	<17
Freon 114	ug/m^3	<10	<1.9	<10	<1.9	<10	<2	<10	<1.9	<130	<19	<15
Freon 12	ug/m^3	**6 J**	**7.42 J**	<9	<1.9	<9	<2	<9	<1.9	**6 J**	**6.43 J**	<11
Hexachlorobutadiene	ug/m^3	<20	<1.9	<20	<1.9	<20	<2	<20	<1.9	<200	<19	<93
m,p-Xylene	ug/m^3	**10 J**	<3.8	**10 J**	<3.8	**10 J**	<3.9	**10 J**	<3.8	**20 J**	<39	<9.5
Methylene Chloride	ug/m^3	**20**	**25.4**	<6	<1.9	<7	**4.17 J**	**8**	**7.99**	**46 J**	**56.6 J**	**7.7**
o-Xylene	ug/m^3	**4 J**	<1.9	**5 J**	<1.9	**6 J**	<2	**6 J**	<1.9	**8 J**	<19	<9.5
Styrene	ug/m^3	**5 J**	<1.9	**6 J**	<1.9	<8	<2	**6 J**	<1.9	**4 J**	<19	<9.3
Tetrachloro ethene	ug/m^3	**50**	**81.4**	**30**	**17**	**30**	**16.3**	**30**	**33.9**	**60**	**66.9 J**	**7.5 J**
Toluene	ug/m^3	**10**	<1.9	**4 J**	<1.9	**10**	<2	**10**	<1.9	**43 J**	<19	<8.2
trans-1,3-Dichloropropene	ug/m^3	<8	<1.9	<8	<1.9	<9	<2	<9	<1.9	<9	<19	<9.9
Trichloro ethene	ug/m^3	**1,100**	**1,240**	**10**	**19.9 J**	**50**	**64.5**	**300**	**446**	**1,700**	**2610 J**	**290**
Vinyl chloride	ug/m^3	<5	<1.9	<5	<1.9	<5	<2	<5	<1.9	<5	<19	<5.6

Notes:

Detected results are **bolded**
FD: Field Duplicate
SS: Split Sample
ug/m^3: micrograms per cubic meter
J = Estimated result
< = Non detect at the reporting limit

Appendix C
Summary of Soil Investigation Derived Waste Results

TABLE C1
Summary of Soil Investigation Derived Waste Results
BF Goodrich Site, San Bernardino County, California

Analyte	Location / Sample / Date	Units	EPA-SV / EPA-SV-SOIL / 5/11/2009
Perchlorate		ug/kg	**150**
pH		pH units	**9.7**
Metals			
Antimony		mg/kg	<2
Arsenic		mg/kg	**6.9**
Barium		mg/kg	**55**
Beryllium		mg/kg	**0.31**
Cadmium		mg/kg	<0.51
Chromium		mg/kg	**19**
Cobalt		mg/kg	**5.4**
Copper		mg/kg	**18**
Lead		mg/kg	**10**
Mercury		mg/kg	<0.025
Molybdenum		mg/kg	<5.1
Nickel		mg/kg	**11**
Selenium		mg/kg	<2
Silver		mg/kg	<1
Thallium		mg/kg	<5.1
Vanadium		mg/kg	**32**
Zinc		mg/kg	**38**
Total Petroleum Hydrocarbons (TPH)			
TPH as Diesel		mg/kg	**2.9 J**
TPH as Gasoline		mg/kg	<2.4
TPH as Motor Oil		mg/kg	**78**
Volatile Organic Compounds (VOCs)			
1,1,1-Trichloroethane		ug/kg	<240
1,1,2,2-Tetrachloroethane		ug/kg	<240
1,1,2-Trichloroethane		ug/kg	<240
1,1-Dichloroethane		ug/kg	<240
1,1-Dichloroethene		ug/kg	<240
1,1-Dichloropropene		ug/kg	<240
1,2,3-Trichloropropane		ug/kg	<240
1,2-Dibromo-3-chloropropane		ug/kg	<950
1,2-Dibromoethane		ug/kg	<240
1,2-Dichloro benzene		ug/kg	<240
1,2-Dichloroethane		ug/kg	<240
1,2-Dichloropropane		ug/kg	<240
1,3-Dichloro benzene		ug/kg	<240
1,3-Dichloropropane		ug/kg	<240
1,4-Dichloro benzene		ug/kg	<240
2-Butanone		ug/kg	<1900
2-Hexanone		ug/kg	<1900
4-Methyl-2-pentanone		ug/kg	<1900
Acetone		ug/kg	<1900
Benzene		ug/kg	<240

TABLE C1
Summary of Soil Investigation Derived Waste Results
BF Goodrich Site, San Bernardino County, California

Analyte	Location / Sample / Date	Units	EPA-SV / EPA-SV-SOIL / 5/11/2009
Bromo methane		ug/kg	<240
Bromodichloro methane		ug/kg	<240
Bromoform		ug/kg	<240
Carbon disulfide		ug/kg	<240
Carbon tetrachloride		ug/kg	<240
Chloro benzene		ug/kg	<240
Chloro methane		ug/kg	<240
Chlorodibromo methane		ug/kg	<240
Chloroethane		ug/kg	<240
Chloroform		ug/kg	<240
cis-1,2-Dichloro ethene		ug/kg	<240
cis-1,3-Dichloro propene		ug/kg	<240
Ethyl benzene		ug/kg	<240
Ethyl tert-Butyl Ether		ug/kg	<950
Freon 11		ug/kg	<240
Freon 113		ug/kg	<240
Freon 12		ug/kg	<240
m,p-Xylene		ug/kg	<470
Methyl tert-butyl ether		ug/kg	<950
Methylene Chloride		ug/kg	<240
o-Xylene		ug/kg	<240
Styrene		ug/kg	<240
Tert-amyl methyl ether		ug/kg	<950
Tetrachloro ethene		ug/kg	<240
Toluene		ug/kg	<240
trans-1,2-Dichloroethene		ug/kg	<240
trans-1,3-Dichloropropene		ug/kg	<240
Trichloro ethene		ug/kg	<240
Vinyl chloride		ug/kg	<240

Notes:

Detected results are **bolded**
mg/kg: milligrams per kilogram
ug/kg: micrograms per kilogram
J = Estimated result
< = Non detect at the reporting limit