833 EAST 8TH STREET STOCKTON, CALIFORNIA 95206 (209) 942-5333



May 29, 1991

Mr. Ravi Arulanantham, Ph.D., CHMM Senior Hazardous Materials Specialist Division of Hazardous Materials Department of Environmental Health 80 Swan Way, Room 350 Oakland, CA 94621

Dear Mr. Arulanantham:

Attached is Union Pacific Railroad Report of Incident which occurred at Hayward, CA on May 1, 1992, along with completed Alameda County Hazardous Materials Division Inspection Form.

Also attached are eight pages of labeled pictures taken at the scene.

Please give me a call if I can provide any further information.

Sincerely,

Steve Barkley

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UNION PACIFIC - HAYWARD DERAILMENT MITIGATION PLAN

Prepared for:

Union Pacific Railroad

Prepared by:

Radian Corporation 1990 North California Blvd. Suite 500 Walnut Creek, CA 94596

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Railroad Hayward Derailment

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#### 1.0 INTRODUCTION

On May 1, 1992, a west bound train on the Union Pacific railroad collided with a front-end loader near A Street, Hayward (see Figure 1.1). The engine was derailed and the train came to a stop on the main track adjacent to a rail siding near Sunset Boulevard. The fuel tanks of the locomotives were damaged during the collision and an estimated 1,000 to 2,000 gallons of diesel fuel were reportedly lost. On the same day, the Hayward Fire Department doused the spill site with water to control potential fire hazard. Union Pacific and Alameda County Department of Environmental Health determined that the diesel leak had affected a segment near and between the two tracks, starting 400 feet east from the east end of Sunset Boulevard and extending approximately 100 feet eastward.

On May 1 and 2, as an emergency response under the on-site direction of Alameda County Department of Environmental Health, Union Pacific excavated approximately 100 cubic yards of diesel-contaminated soil on the north side of the tracks along the 100 foot segment of spill affected area. The excavation reached a depth of approximately 8 feet below ground surface (BGS). The excavated soil displayed visual, olfactory, and tactile characteristics consistent with diesel contamination. Laboratory tests were conducted on samples of the excavated soil. Diesel was detected at concentrations between 55 and 223 milligrams per kilogram (mg/kg); benzene was not detected; ethylbenzene was detected at concentrations between 0.009 and 0.75 mg/kg; toluene between no detection and 0.31 mg/kg and xylenes, between 0.043 and 2.97 mg/kg. Prior to backfilling with clean fill, a French drain was installed in the excavation pit at the depth of 8 feet BGS as a precautionary measure to capture any free liquid that might be present in the vicinity. The French drain remains dry, indicating that the removal of diesel by excavation had been successful on the north side of the tracks.

Alameda County files indicate that there are four domestic/irrigation wells located within a 0.25 mile radius from the derailment site. The owners' names, locations, approximate distances to the derailment site, and perforation depths of the wells are summarized in Table 1.1. These wells draw water from shallow depths, between approximately 40 and 124 feet BGS.

On May 18 and 19, Radian Corporation conducted a site investigation at the derailment site. The purpose of the investigation was to determine the extent of the diesel contamination in the subsurface so that a cost-effective mitigation plan could be prepared.

#### 2.0 SITE INVESTIGATION

The site investigation was conducted based on surface stains and the accident scenario reported by Union Pacific and County officials (see Figure 2.1). Surface stains were found to be strongly correlated with organic vapor analyzer (OVA) readings; a surface stain typically was associated with an OVA reading of about 40 parts per million (ppm) above the ambient level. This confirmed that the stained surface soils are an effective indicator of contamination.

Seven exploratory boreholes were drilled with a hollow stem auger of seven inch outer diameter. Boreholes SB01 through SB06 were drilled at locations within and near the speculated edges of the contaminant plume as determined by the reported accident scenario, surface stains, OVA readings, and the cumulative observations of the subsurface during drilling. Additionally, SB07 was drilled at a location reported by a County official as the point where the diesel "hit the ground" during the spill from the derailed locomotive. The depths of the seven boreholes ranged from 21.5 to 58 feet BGS.

To eliminate cross contamination, the drilling equipment was steam-cleaned before the drilling of the first borehole and in-between boreholes. The stainless steel sample sleeves used for retrieving soil samples for laboratory analyses were steam-cleaned prior to use. The split spoon sampler was scrubbed with Alconox and steam-cleaned prior to each use. The waste water produced in the course of the steam-cleaning was collected and contained in seven 55-gallon drums. These drums were promptly removed by Union Pacific and disposed appropriately at a waste water facility. To preclude vertical cross-contamination, each borehole was immediately grouted with neat cement upon the completion of sampling.

Soil samples were retrieved with a split spoon sampler at generally 2.5 foot intervals for the first 10 feet BGS and 5 foot intervals thereafter. The soil samples were retrieved in stainless steel sleeves, sealed with polyethylene end-caps and teflon sheets, labelled, kept in a cooler with ice, transmitted within 24 hours to a State-certified laboratory under chain of custody, and tested for diesel using EPA Method 8015 (modified for diesel) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020. One water sample was collected at the bottom of SB01 for diesel and BTEX analyses. Upon determining on-site that the contaminated soil was adequately above groundwater depth, no additional water samples were collected. The water sample was labelled, kept in a cooler with ice, and transmitted within 24 hours to the laboratory under chain of custody. The sample for BTEX analysis was preserved in hydrochloric acid.

A total of sixty-three soil samples and one water sample were collected and submitted to the laboratory on May 18 and 19 for both volatile (EPA Method 8020) and extractable Total Petroleum Hydrocarbons (TPH; EPA Method 8015 modified) analyses. In addition, one trip blank was also submitted to assess the potential for cross-contamination of volatile organics among samples, the sample containers, and/or the shipping container. The trip blank did not have detectable concentrations of diesel or BTEX compounds. Matrix

spike/matrix spike duplicate samples were also analyzed by the laboratory at approximately a 5 percent frequency to assess both accuracy (the ability to recover analytes of interest) and precision (the ability to repeat the process and obtain similar results). The average spike recovery ranged from 85 to 120 percent for extractable TPH and from 94 to 101 for the volatile TPH spike samples. All of the Relative Percent Differences (difference between the spikes divided by the average) were well below the limit of 30 percent indicating good reproducibility. The data quality objectives for both precision and accuracy were met.

#### 3.0 RESULTS OF SITE INVESTIGATION

The soil descriptions and laboratory results of the seven boreholes are summarized in Tables 3.1 through 3.7. The diesel contamination at the derailment site has the following characteristics:

- No free product was encountered in any of the seven boreholes.
- At borehole SB01, first groundwater was encountered at depth of 49 feet BGS.
   A water sample was collected through the auger at a depth of 58 feet BGS using a steam-cleaned stainless steel bailer.
- Trace concentrations of diesel (87 micrograms per liter (μg/L)) and BTEX (0.6 μg/L, 0.7 μg/L, ND, and 0.9 μg/L, respectively) were detected in the groundwater sample collected at SB01. The concentrations are below the maximum contaminant levels (MCL) for benzene and xylenes and below the Department of Health Services Action Level (AL) for toluene. These trace detections are probably due to cross contamination caused by drilling equipment and do not represent the quality of groundwater at the site.
- The soil between the ground surface near and the groundwater level near 49 feet BGS is predominantly a silty clay containing moderate amounts of silt and fine sand. It is intersected by a thin lens of clayey fine sand, as observed at 15 feet BGS at SB04, SB07, SB03, and SB02.

- The groundwater, as observed at 49 feet BGS at SB01, occurs in a clayey fine sand.
- Site observations, including OVA, visual, olfactory, and tactile characteristics, indicate that the diesel contamination extends from ground surface to shallow depths (less than 2.5 feet) between the two tracks near SB07 and SB01 and to a depth of approximately 15 feet on the south side of the tracks near SB05 and SB06. The laboratory results (see Attachment A) confirm the site observations.
- Results of no-detections at SB04 and SB02 indicate that the contaminated area is bracketed by clean soils in the area between the tracks.
- Diesel was detected at concentrations between 16 and 4,800 mg/kg; benzene, between 5 and 87 micrograms per kilogram (μg/kg); ethylbenzene, between 7 and 1,200 μg/kg; toluene, between 5 and 1,100 μg/kg; and xylenes, between 6 and 6,300 μg/kg at SB01, SB05, SB06, and SB07.
- At SB01, 25 mg/kg of diesel and 19  $\mu$ g/kg of xylenes were detected at 1.2 feet BGS. The rest of the soil samples, from 5, 7.5, 10, 15, 20, 25, 30, and 49 feet BGS, were tested clean.
- At boreholes SB02, SB03, and SB04, there were no detections of diesel or BTEX in the soil samples. The three boreholes were each 41.5 feet deep. At each borehole, the first sample was taken at 2 or 2.5 feet BGS where soil is encountered underneath the ballast. The subsequent samples were taken 5, 7.5, 10, 15, 20, 25, 30, 35, and 40 feet BGS.
- At borehole SB05, diesel and BTEX were detected in the first five samples, collected at 2.5, 5, 7.5, 10, and 15 feet BGS; diesel concentrations ranged from 16 to 4,800 mg/kg; benzene, from 5 to 87 μg/kg; toluene, from 10 to 1,100 μg/kg; ethylbenzene, from 7 to 1,200 μg/kg; and xylenes, from 18 to 6,300 μg/kg. The subsequent samples collected at 20, 25, and 30 feet BGS were tested clean.
- At borehole SB06, diesel and BTEX were detected in the first four samples collected at 2, 5, 7.5, and 10 feet BGS; diesel concentrations ranged from 380 to 1,700 mg/kg; benzene, from no detaction to 7 μg/kg; toluene, from 27 to 90 μg/kg; ethylbenzene, from 31 to 210 μg/kg; and xylenes, from 6 to 1,100 μg/kg. The subsequent samples collected at 15 and 20 feet BGS were tested clean.

- At SB07, 290 mg/kg of diesel, 5  $\mu$ g/kg of toluene, 49  $\mu$ g/kg of ethylbenzene, and 320  $\mu$ g/kg of xylenes were detected at 2.5 feet BGS. The rest of the soil samples, from 5, 7.5, 10, 15, 20, 25, and 30 feet BGS, were tested clean.
- The deepest diesel contamination was found at 15 feet BGS at SB05. First groundwater was encountered at a depth 49 feet BGS at SB01. Site investigation and laboratory results indicate that the diesel contaminant plume is not in contact with the groundwater.
- The horizontal distances traveled by the diesel plume, from the middle of the tracks where the diesel spill occurred, to the south and north sides of the tracks where elevated concentrations of diesel in the soil were found, was apparently caused by the water flushing conducted by Hayward Fire Department a short time after the spill occurred. The absence of contamination at depths greater than 2.5 feet BGS between the tracks and the contamination detected at greater depths on the south side suggest that the diesel spill moved along the ground surface toward the edges of the tracks and seeped into the subsurface. This migration scenario is compatible with the standard design of Union Pacific tracks that causes water or other fluid to drain to the outside edges. On the north side of the tracks, migration of diesel to depth greater than 8 feet was prevented by the excavation of contaminated soil and installation of a French drain. On the south side of the tracks, diesel has migrated to a depth of approximately 15 feet.

#### 4.0 RECOMMENDATIONS

The clean-up objective for this site is to remove the diesel contaminated soil such that the quality of the underlying groundwater will not be jeopardized. A 100 ppm diesel clean-up level and a 0.03 ppm benzene clean-up level are selected; these clean-up levels are 10 times less than those derived from a leaching potential analysis outlined in the California State Water Resources Control Board Leaking Underground Fuel Tank (LUFT) Field Manual. Results of the site investigation showed that the diesel contamination caused by the derailment appears to be localized, shallow, slow-migrating, and adequately above the groundwater depth. The public health is therefore not in immediate danger and a phased approach to mitigation is appropriate. Moreover, long term health impact would be

eliminated by the prompt excavation and removal of the contaminated soil above clean-up levels; a health risk assessment is deemed unnecessary.

A two-phase site mitigation plan is recommended, as outlined below. This two-phased mitigation plan is to be promptly implemented upon receiving regulatory approvals from Alameda County Department of Environmental Health and the San Francisco Bay Regional Water Quality Control Board.

#### Phase 1:

- Scrape the soil surface between the two tracks near SB07 and SB01 to remove the soil with diesel stains to about 2.5 feet BGS.
- Excavate the soil with elevated diesel concentrations on the south side of the tracks within spill-affected segment to a depth of approximately 15 feet BGS near SB06, SB05, and east of SB05. The excavation will stop at soil with diesel and benzene concentrations below clean-up levels or at the Union Pacific property line (near the edge of Western Boulevard) and near the rail siding. This excavation area is shown on Figure 2-1.
- Leave in-place the soil with diesel contamination less than 100 ppm and benzene contamination less than 0.03 ppm.
- To determine the completion of mitigation or, alternatively, the scope of Phase 2 mitigation, collect soil samples from the walls and bottom of the excavation pit.
- After the excavation and back-filling are completed, install a monitoring well on the south side of the tracks to monitor the groundwater for diesel and BTEX to confirm the effectiveness of the mitigation in protecting the groundwater.

#### Phase 2:

• Phase 2 mitigation will be conducted only if the results of Phase 1 indicate the necessity. Phase 2 mitigation could entail an expanded scope of excavation, groundwater monitoring, and, if necessary, groundwater remediation.

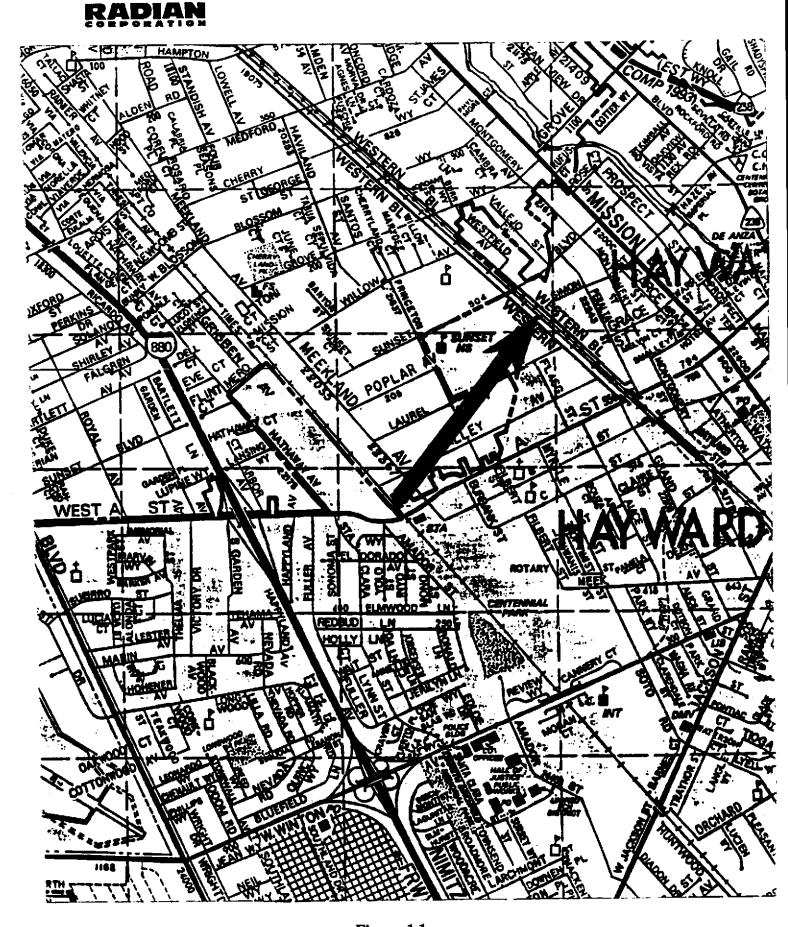


Figure 1.1
Site Location

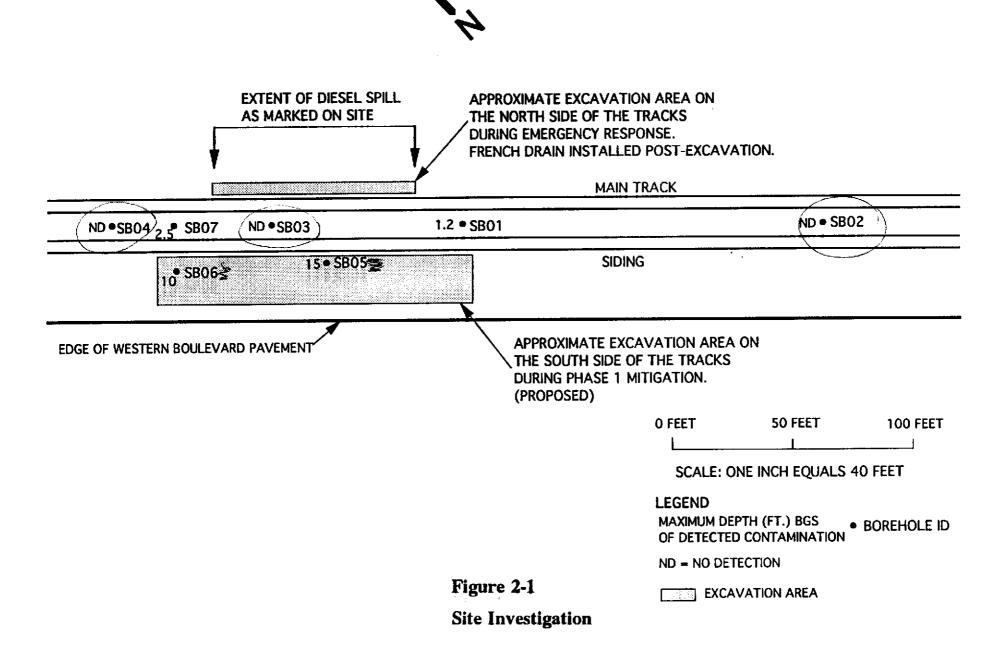




Table 1-1

Nearby Wells Within a 0.25 mile Radius of Derailment Site

Well ID	Owner and Location	Approximate Distance from Site (mile)	Perforation Depths, BGS (feet)	Use
E1	Hayward Unified School District Sunset High School	0.2, west	60 to 124	Irrigation
F1	King 504 Laurel Ave. Hayward	0.15, southwest	unknown; well total depth is 59 feet	Unknown
G1	E. Cheves 22270 Peralta Hayward	0.18, northeast	40 to 80	Unknown
C1	G.H. Lake 21702 Vallejo St. Hayward	0.25, north	55 to 93	Domestic



### Table 3-1

#### Results of Soil Sampling at SB01 Conducted on May 18 and 19, 1992, Union Pacific Railroad Hayward Derailment

Fore Holm: SEU1 Total Depuis = 58 feet EGS				
Depth BGS (feel)	Soil Desc	riplica	Lab Remits	
1.2	CL	Silty Clay (clay with about 10% of silt and about 10% of fine sand); dark brown; damp; moderate cohesion.	SB01-01 d: 25 mg/kg	
	OVA Sample	indicates presence of organic vapor.  SB01-01 taken at 1.2 feet.	B,T,E: ND X: 19 μg/kg	
5	CL.	same as above; damp.	SB01-02	
	OVA	indicates NO presence of organ vapor.	4: ND B,T,E,X: ND	
7.5	Sample CL	SB01-02 taken at 5 feet. same as above; damp.	SB01-03	
	OVA	indicates NO presence of organic vapor.	d: ND B,T,E,X: ND	
	Sample	SB01-03 taken at 7.5 feet.		
10	CL	Silty Clay (clay with about 10% of silt and about 10% of fine sand); light brown; damp; moderate cohesion.	SB01-04 d: ND	
	OVA	indicates NO presence of organic vapor.	B,T,E,X: ND	
	Sample	SB01-04 taken at 10 feet.		
15	CI.	same as above; moist.	SB01-05	
		No stain or odor of hydrocarbon.	d: ND B,T,E,X: ND	
	Sample	SB01-05 taken at 15 feet.	, - ,,	
20	CL	same as above; damp.	SB01-06	
		No stain or odor of hydrocarbon.	d: ND B,T,E,X: ND	
	Sample	SB01-06 taken at 20 feet.		
25	CL	same as above; damp.	SB01-07	
		No stain or odor of hydrocarbon.	d: ND B,T,E,X: ND	
	Sample	SB01-07 taken at 25 feet.		



Table 3-1

### (Continued)

	Bors Hole: SBO1 Total Depth = 58 feet BGS				
Depth BGS (feet)	Soil Desc	riplios	Lab Results		
30	SC Sample	Clayey Sand (fine sand with about 40% clay and silt); light brown; damp; little cohesion.  No stain or odor of hydrocarbon.  SB01-08 taken at 30 feet.	SB01-08 d: ND B,T,E,X: ND		
35	CL Sample	Silty Clay (clay with about 25% of silt and about 10% of fine sand); light brown; damp; moderate cohesion.  No stain or odor of hydrocarbon.			
40	CL Sample	Same as above; damp.  No stain or odor of hydrocarbon.  None			
44	SC Sample	Clayey Sand (fine sand with about 40% clay and silt); light brown; damp; little cohesion.  No stain or odor of hydrocarbon.  None			
49	SC Sample	Clayey Sand (fine sand with about 30% clay and silt); light brown; saturated - groundwater first encountered at 49 feet; little cohesion.  No stain or odor of hydrocarbon.  SB01-09 taken at 49 feet.  Water sample 01 taken between 49 and 58 feet. Observed minor contact with soil cutting near ground surface during sampling.	SB01-09  d: ND B,T,E,X: ND  Water 01 d: 87 \mu_g/L B: 0.6 \mu_g/L T: 0.7 \mu_g/L E: ND X: 0.9 \mu_g/L		

Note:

d=diesel; B=benzene; T=toluene; E=ethybenzene; X=xylene; ND=no detection.

Detection Limits: for soil sample, d=10 mg/kg; BTEX=3 \mu g/kg;
for water sample, d=50 \mu g/L; BTEX=0.3 \mu g/L;



### Table 3-2

#### Results of Soil Sampling at SB02 Conducted on May 18 and 19, 1992, Union Pacific Railroad Hayward Derailment

	Bore Hole: 8F02 Total Depth = 41.5 feet FCS			
Dapth BGS (feet)	Soil Desc	Figures	Lab Results	
2	CL	Silty Clay (clay with about 10% of silt and about 10% of fine sand); dark brown; damp; moderate cohesion.	SB02-01 4: ND	
	OVA	indicates NO presence of organic vapor.	B,T,E,X: ND	
	Sample	SB02-01 taken at 2 feet.		
5	CL	same as above; damp.	SB02-02	
	OVA	indicates NO presence of organ vapor.	d: ND B,T,E,X: ND	
	Sample	SB02-02 taken at 5 feet.		
7.5	CL	same as above; damp.	SB02-03	
	OVA	indicates NO presence of organic vapor.	d: ND B,T,E,X: ND	
<u></u>	Sample	SB02-03 taken at 7.5 feet.		
10	GL.	Silty Clay (clay with about 10% of silt and about 10% of fine sand); light brown; damp; moderate cohesion.	SB02-04 d: ND	
		No stain or odor of hydrocarbon.	B,T,E,X: ND	
	Sample	SB02-04 taken at 10 feet.		
15	SC	Clayey Sand (fine sand with about 20% silt and clay); light brown; moist; little cohesion.	SB02-05	
		No stain or odor of hydrocarbon.	B,T,E,X: ND	
	Sample	SB02-05 taken at 15 feet.		
20	CL.	Silty Clay (clay with about 10% of silt and about 10% of fine sand); light brown; damp; moderate cohesion.	SB02-06	
		No stain or odor of hydrocarbon.	B,T,E,X: ND	
	Sample	SB02-06 taken at 20 feet.		
25	aL	same as above; damp.	SB02-07	
		No stain or odor of hydrocarbon.	d: ND B,T,E,X: ND	
	Sample	SB02-07 taken at 25 feet.		



Table 3-2

### (Continued)

Bore Hole: SB02 Total Depth # 41.5 feet FKS				
Depth BGS (feet)	Soil Description		Lab Results	
30	SC Sample	Clayey Sand (fine sand with about 20% clay and silt); light brown; moist; little cohesion.  No stain or odor of hydrocarbon.  SB02-08 taken at 30 feet.	SB02-08 d: ND B,T,E,X: ND	
35	SC Sample	same as above; moist.  No stain or odor of hydrocarbon.  SB02-09 taken at 35 feet.	d: ND B,T,E,X: ND	
40	SC Sample	same as above; moist.  No stain or odor of hydrocarbon.  SB02-10 taken at 35 feet.	SB02-10 d: ND B,T,E,X: ND	

Note:

d=diesel; B=benzene; T=toluene; E=ethybenzene; X=xylene; ND=no detection.

Detection Limits: for soil sample, d=10 mg/kg; BTEX=3 µg/kg;



Table 3-3

#### Results of Soil Sampling at SB03 Conducted on May 18 and 19, 1992, Union Pacific Railroad Hayward Derailment

Bore Hole: SE Total Depth =		KUS	
Depth BGS (feet)	Soil Desc	ription	Lab Results
2	CL OVA Sample	Silty Clay (clay with about 10% of silt and 10% of fine sand); dark brown; damp; moderate cohesion. indicates presence of organic vapor. SB03-01 taken at 2 feet.	SB03-01 d: ND B,T,E,X: ND
5	CL OVA Sample	same as above; damp. indicates NO presence of organ vapor. SB03-02 taken at 5 feet.	SB03-02 4: ND B,T,E,X: ND
7.5	CL OVA Sample	same as above; damp. indicates NO presence of organic vapor. SB03-03 taken at 7.5 feet.	SB03-03 d: ND B,T,E,X: ND
10	CL OVA Sample	Silty Clay (clay with about 10% of silt and about 10% of fine sand); light brown; damp; moderate cohesion. indicates NO presence of organic vapor. SB03-04 taken at 10 feet.	SB03-04 d: ND B,T,E,X: ND
15	SC Sample	Clayey Sand (fine sand with about 40% silt and clay); light brown; moist; little cohesion.  No stain or odor of hydrocarbon.  SB03-05 taken at 15 feet.	SB03-05  & ND B,T,E,X: ND
20	CL Sample	Silty Clay (clay with about 10% of silt and about 10% of fine sand); light brown; damp; moderate cohesion.  No stain or odor of hydrocarbon.  SB03-06 taken at 20 feet.	SB03-06 d: ND B,T,E,X: ND
25	CL Sample	same as above; damp.  No stain or odor of hydrocarbon.  SB03-07 taken at 25 feet.	SB03-07 d: ND B,T,E,X: ND



Table 3-3

### (Continued)

	Bore Hole: SEC3 Total Depth # 41.5 feet EKS					
Depth BGS (feet)	Soll Des	Lab Results				
30	SC Sample	Clayey Sand (fine sand with about 10% clay and siit); light brown; damp; little cohesion.  No stain or odor of hydrocarbon.  SB03-08 taken at 30 feet.	SB03-08 d: ND B,T,E,X: ND			
35	CL Sample	Silty Clay (clay with about 20% of silt and about 10% of fine sand); light brown; damp; moderate cohesion.  No stain or odor of hydrocarbon.  SB03-09 taken at 35 feet.	SB03-09 d: ND B,T,E,X: ND			
40	CL Sample	same as above; damp.  No stain or odor of hydrocarbon.  SB03-10 taken at 40 feet.	SB03-10 d: ND B,T,E,X: ND			

Note:

d=diesel; B=benzene; T=toluene; E=ethybenzene; X=xylene; ND=no detection.

Detection Limits: for soil sample, d=10 mg/kg; BTEX=3 µg/kg;



### Table 3-4

### Results of Soil Sampling at SB04 Conducted on May 18 and 19, 1992, Union Pacific Railroad Hayward Derailment

***************************************	Bose Holis: SBC4 Total Depth = 41.5 feet BCS				
Depth BGS (feet)	Soil Desc	rptice	Lab Results		
2.5	CL OVA Sample	Silty Clay (clay with about 10% of silt and 10% of fine sand); dark brown; damp; moderate cohesion.  indicates NO presence of organic vapor.  SB04-01 taken at 2 feet.	SB04-01 d: ND B,T,E,X: ND		
5	CL OVA Sample	same as above; damp. indicates NO presence of organ vapor. SB04-02 taken at 5 feet.	SB04-02 d: ND B,T,E,X: ND		
7.5	CL OVA Sample	Silty Clay (clay with about 10% of silt and about 10% of fine sand); light brown; damp; moderate cohesion. indicates NO presence of organic vapor. SB04-03 taken at 7.5 feet.	SE04-03 d: ND B,T,E,X: ND		
10	CL OVA Sample	same as above; damp. indicates NO presence of organic vapor. SB04-04 taken at 10 feet.	SB04-04 d: ND B,T,E,X: ND		
15	CL OVA Sample	Sandy Clay (clay with about 10% of silt and about 20% of fine sand); light brown; moist; moderate cohesion. indicates NO presence of organic vapor.  SB04-05 taken at 15 feet.	SB04-05 & ND B,T,E,X: ND		
20	CL OVA Sample	Silty Clay (clay with about 10% of silt and about 10% of fine sand); light brown; damp; moderate cohesion. indicates NO presence of organic vapor. SB04-06 taken at 20 feet.	SB04-06 d: ND B,T,E,X: ND		
25	CL OVA Sample	same as above; damp. indicates NO presence of organic vapor. SB04-07 taken at 25 feet.	SB04-07 d: ND B,T,E,X: ND		



Table 3-4

### (Continued)

Bore Hole: SB04 Total Depth = 41.5 feet BGS				
Depth BOS (feet)	Soil Desc	Soil Description		
30	CL	same as above; damp.	SB04-08	
	OVA	indicates NO presence of organic vapor.	d: ND	
	Sample	SB04-08 taken at 30 feet.	B,T,E,X: ND	
35	CL	same as above; damp.	SB04-09	
		No stain or odor of hydrocarbon.	d: ND B,T,E,X: ND	
	Sample	SB04-09 taken at 35 feet.	B,1,6,A: ND	
40	CL.	same as above; damp.	SB04-10	
		No stain or odor of hydrocarbon.	d: ND	
	Sample	SB04-10 taken at 40 feet.	B,T,E,X: ND	

Note:

d=diesel; B=benzene; T=toluene; E=ethybenzene; X=xylene; ND=no detection.

Detection Limits: for soil sample, d=10 mg/kg; BTEX=3 µg/kg;



Table 3-5

### Results of Soil Sampling at SB05 Conducted on May 18 and 19, 1992, Union Pacific Railroad Hayward Derailment

	Bore Holis: SE05 Total Depth = 31.5 feet BGS				
Depth BGS (feet)	Sail Desc	ription	Lab Results		
2.5	CL	Silty Clay (clay with about 10% of silt and 10% of fine sand); dark brown; damp; moderate cohesion.	SB05-01		
	OVA	indicates presence of organic vapor.	d: 600 mg/kg B: 15 μg/kg T: 52 μg/kg		
	Sample	SB05-01 taken at 2.5 feet.	E: 72 μg/kg X: 340 μg/kg		
5	CL.	same as above; damp.	SB05-02 d: 16 mg/kg		
	OVA Sample	indicates NO presence of organ vapor.  SB05-02 taken at 5 feet.	B: 6 μg/kg T: 18 μg/kg E: 9 μg/kg		
	Sample	SDAD-02 taken at 3 teer	X: 33 μg/kg		
7.5	CL	Silty Clay (clay with about 10% of silt and 10% of fine sand); light brown; damp; moderate cohesion.	SB05-03 d: 65 mg/kg		
	OVA	indicates NO presence of organic vapor.	B: 5 μg/kg T: 10 μg/kg		
	Sample	SB05-03 taken at 7.5 feet.	E: ND X: 18 μg/kg		
10	CL	same as above; damp.	\$B05-04		
	OVA	indicates presence of organic vapor.	d: 4800 mg/kg B: 87 µg/kg		
	Sample	SB05-04 taken at 10 feet.	T: 1100 µg/kg E: 1200 µg/kg X: 6300 µg/kg		
15	CL	same as above; moist.	SB05-05		
	OVA	indicates presence of organic vapor.	d: 830 mg/kg B: ND		
	Sample	SB05-05 taken at 15 feet.	T: 5 µg/kg E: 7 µg/kg X: 47 µg/kg		
20	CL	same as above; damp.	SB05-06		
	OVA	indicates NO presence of organic vapor.	d: ND B,T,E,X: ND		
	Sample	SB05-06 taken at 20 feet.			



Table 3-5

### (Continued)

Bors Hole: SE Total Depth #		eGS	
Depth BOS (Teet)	Soil Des	cription	Lab Results
25	αL	same as above; damp.	SB05-07
	OVA	indicates NO presence of organic vapor.	d: ND B.T.E.X: ND
	Sample	SB05-07 taken at 25 feet.	
30	CL	Sandy Clay (clay with about 10% of silt and about 25% of fine sand); light brown; damp; moderate cohesion.	SB05-08
	OVA	indicates NO presence of organic vapor.	B,T,E,X: ND
	Sample	SB05-08 taken at 30 feet.	

Note:

d=diesel; B=benzene; T=toluene; E=ethybenzene; X=xylene; ND=no detection.

Detection Limits: for soil sample, d=10 mg/kg; BTEX=3 \(\mu\_g/kg\);



Table 3-6

#### Results of Soil Sampling at SB06 Conducted on May 18 and 19, 1992, Union Pacific Railroad Hayward Derailment

	Bore: Hole: SB05 Total Depth = 21.5 feet BCS				
Depth BGS (feet)	Sail Desc	ription	Lab Results		
2.5	Fill Mater	rial. Poor recovery.	SB06-01		
	OVA	indicates presence of organic vapor.	d: 1700 mg/kg B: ND		
	Sample	SB06-01 taken at 2 feet.	T: 90 μg/kg E: 210 μg/kg X: 1100 μg/kg		
5	Fill Mater	rial. Poor recovery.	SB06-02 d: 380 mg/kg		
	OVA	indicates presence of organ vapor.	B: 7 μg/kg Τ: 27 μg/kg		
	Sample	SB06-02 taken at 5 feet.	E: 31 μg/kg X: 160 μg/kg		
7.5	CL	Silty Clay (clay with about 10% of silt and about 10% of fine sand); dark brown; damp; moderate cohesion.	SB06-03		
	OVA	indicates presence of organic vapor.	d: 710 mg/kg B: 7 µg/kg		
	Sample	SB06-03 taken at 7.5 feet.	T: 47 μg/kg E: 71 μg/kg X: 340 μg/kg		
10	CIL	Silty Clay (clay with about 10% of silt and about 10% of fine sand);	SB06-04		
	OVA	light brown; damp; moderate cohesion. indicates NO presence of organic vapor.	d: ND mg/kg B,T,E: ND X: 6 µg/kg		
	Sample	SB06-04 taken at 10 feet.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
15	CL	same as above; moist.	SB06-05		
	OVA	indicates NO presence of organic vapor.	d: ND mg/kg B,T,E,X: ND		
	Sample	SB06-05 taken at 15 feet.			
20	CL	same as above; damp.	SB06-06		
	OVA	indicates NO presence of organic vapor.	d: ND B,T,E,X: ND		
	Sample	SB06-06 taken at 20 feet.			

Note:

d-diesel; B-benzene; T-toluene; E-ethybenzene; X-xylene; ND-no detection.

Detection Limits: for soil sample, d=10 mg/kg; BTEX=3 μg/kg;



### Table 3-7

### Results of Soil Sampling at SB07 Conducted on May 18 and 19, 1992, Union Pacific Railroad Hayward Derailment

Bore Hale: S Total Depth		CB	
Depth BGS (feet)	Soil Desc	ri <del>pl</del> ios	Lab Results
2.5	CL OVA Sample	Silty Clay (clay with about 10% of silt and 10% of fine sand); dark brown; damp; moderate cohesion. indicates presence of organic vapor. SB07-01 taken at 2.5 feet.	SB07-01 d: 290 mg/kg B: ND T: 5 µg/kg E: 49 µg/kg X: 320 µg/kg
5	CL OVA Sample	same as above; damp. indicates NO presence of organ vapor. SB07-02 taken at 5 feet.	SB07-02 d: ND B,T,E,X: ND
7.5	CL OVA Sample	same as above; damp. indicates NO presence of organic vapor. SB07-03 taken at 7.5 feet.	SB07-03 d: ND B,T,E,X: ND
10	CL OVA Sample	Silty Clay (clay with about 10% of silt and 10% of fine sand); light brown; damp; moderate cohesion.  indicates NO presence of organic vapor.  SB07-04 taken at 10 feet.	SB07-04 d: ND B,T,E,X: ND
15	CL OVA Sample	Sandy Clay (clay with about 10% of silt and 20% of fine sand); light brown; damp; moderate cohesion. indicates NO presence of organic vapor. SB07-05 taken at 15 feet.	SB07-05 d: ND B,T,E,X: ND
20	CL OVA Sample	same as above; damp. indicates NO presence of organic vapor. SB07-06 taken at 20 feet.	SB07-06 d: ND B,T,E,X: ND
25	CL OVA Sample	Silty Clay (clay with about 10% of silt and 10% of fine sand); light brown; damp; moderate cohesion. indicates NO presence of organic vapor. SB07-07 taken at 25 feet.	SB07-07 d: ND B,T,E,X: ND



Table 3-7

### (Continued)

Born Hole: St Total Depth: #		ics .	
Depth BGS (feet)	Soil Desc	riptios.	Lab Results
30	CL	same as above; damp.	SB07-08
	OVA	indicates NO presence of organic vapor.	d: ND B,T,E,X: ND
	Sample	SB07-08 taken at 30 feet.	

Note:

d=diesel; B=benzene; T=toluene; E=ethybenzene; X=xylene; ND=no detection.

Detection Limits: for soil sample, d=10 mg/kg; BTEX=3 µg/kg;



### Attachment

Laboratory Results and Chain of Custody Forms



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54819

DATE RECEIVED: 05/18/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/19/92

CLIENT JOB NO.: UNION PACIFC

#### ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/kg) Diesel Range
1	SB01-01	25
2	SB01-02	ND<10
3	SB01-03	ND<10
4	SB01-04	ND<10
5	SB01-05	ND<10
6	SB01-06	ND<10
7	SB01-07	ND<10
8	SB01-08	ND<10
9	SB01-00 SB01-09	ND<10

mg/kg - parts per million (ppm)

Minimum Detection Limit for Diesel in Soil: 10mg/kg

QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15% MS/MSD Average Recovery =85 %: Duplicate RPD =6.7 %

FNATH

Richard, Srna, Ph.D.



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54819

DATE RECEIVED: 05/18/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/19/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB			Concentration(ug/kg) Ethyl		
#	Sample Identification	Benzene	Toluene	Benzene	Xylenes
1	SB01-01	ND<3	ND<3	ND<3	19
2	SB01-02	ND<3	ND<3	ND<3	ND<3
3	SB01-03	ND<3	ND<3	ND<3	ND<3
4	SB01-04	ND<3	ND<3	ND<3	ND<3
5	SB01-05	ND<3	ND<3	ND<3	ND<3
6	SB01-06	ND<3	ND<3	ND<3	ND<3
7	SB01-07	ND<3	ND<3	ND<3	ND<3
8	SB01-08	ND<3	ND<3	ND<3	ND<3
9	SB01-09	ND<3	ND<3	ND<3	ND<3

ug/kg - parts per billion (ppb)

Minimum Detection Limit in Soil: 3 ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15% MS/MSD Average Recovery =96 %: Duplicate RPD =6.9 %

Comments:

Richard Srna, Bh.D



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54834

DATE RECEIVED: 05/18/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/19/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

LAB # 	Sample Identification	Concentration (ug/L) Diesel Range
1	0.1	87

ug/L - parts per billion (ppb)

Minimum Detection Limit for Diesel in Water: 50ug/L

QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15% MS/MSD Average Recovery =110 %: Duplicate RPD =8.2 %

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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54834

DATE RECEIVED: 05/18/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/19/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB			Concentration(ug/L) Ethyl			
#	Sample	Identification	Benzene	Toluene	Benzene	Xylenes
1 2	01 TRIP	BLANK	0.6 ND<0.3	0.7 ND<0.3	ND<0.3 ND<0.3	0.9 ND<0.3

ug/L - parts per billion (ppb)

Minimum Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15% MS/MSD Average Recovery =102 %: Duplicate RPD =2.0 %

Comments:

Laboratory Director

Richard Srna,



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54820

DATE RECEIVED: 05/18/92

CLIENT: RADIAN CORPORATION CLIENT JOB NO.: UNION PACIFC

DATE REPORTED: 05/19/92

# ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

LAB	· ·	Concentration (mg/kg)
#	Sample Identification	Diesel Range
1	SB02-01	ND<10
2	SB02-02	ND<10
3	SB02-03	ND<10
4	SB02-04	ND<10
5	SB02-05	ND<10
6	SB02-06	ND<10
7	SB02-07	ND<10
	SB02-08	ND<10
8	<del></del>	ND<10
9	SB02-09	ND<10
10	SB02-10	

Minimum Detection Limit for Diesel in Soil: 10mg/kg

QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15 MS/MSD Average Recovery = 107%: Duplicate RPD = 2.3 %

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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54820

DATE RECEIVED: 05/18/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/19/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

				Concentration(ug/kg) Ethyl		
LAB #	Sample I	dentification	Benzene	Toluene	Benzene	Xylenes
1	SB02-0	)1	ND<3	ND<3	ND<3	ND<3
2	SB02-0		ND<3	ND<3	ND<3	ND<3
3	SB02-0		ND<3	ND<3	ND<3	ND<3
4	SB02-0		ND<3	ND<3	ND<3	ND<3
5	SB02-0		ND<3	ND<3	ND<3	ND<3
6	SB02-0		ND<3	ND<3	ND<3	ND<3
7	SB02-0		ND<3	ND<3	ND<3	ND<3
8	SB02-0		ND<3	ND<3	ND<3	ND<3
	SB02-0		ND<3	ND<3	ND<3	ND<3
9	<del>-</del>		ND<3	ND<3	ND<3	ND<3
10	SB02-3	TO	כישא	HD / 3	414P . P.	

ug/kg - parts per billion (ppb)

Minimum Detection Limit in Soil: 3 ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15 MS/MSD Average Recovery = 101%: Duplicate RPD =1.3%

Comments:

Richard Srna, Ph.D.

Laboratory Director

Certified Laboratories



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#### ANALYSIS CERTIFICATE OF

LABORATORY NO.: 54821

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/20/92

CLIENT JOB NO .: UNION PACIFC

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/kg) Diesel Range
1	SB03-01	ND<10
2	SB03-02	ND<10
3	SB03-03	ND<10
4	SB03-04	ND<10
5	SB03-05	ND<10
6	SB03-06	ND<10
7	SB03-07	ND<10
8	SB03-08	ND<10
9	SB03-09	ND<10
10	SB03-10	ND<10

mg/kg - parts per million (ppm) Minimum Detection Limit for Diesel in Soil: 10mg/kg

QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15% MS/MSD Average Recovery = 100%: Duplicate RPD = 18%

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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54821

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/21/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB			Concentr	ation(ug/ Ethyl	kg)
#	Sample Identification	Benzene	Toluene	Benzene	Xylenes
1	SB03-01	ND<3	ND<3	ND<3	ND<3
2	SB03-02	ND<3	ND<3	ND<3	ND<3
3	SB03-03	ND<3	ND<3	ND<3	ND<3
4	SB03-04	ND<3	ND<3	ND<3	ND<3
5	SB03-04 SB03-05	ND<3	ND<3	ND<3	ND<3
6	SB03-06	ND<3	ND<3	ND<3	ND<3
	SB03-00 SB03-07	ND<3	ND<3	ND<3	ND<3
7		ND<3	ND<3	ND<3	ND<3
8	SB03-08	ND<3	ND<3	ND<3	ND<3
9	SB03-09	=	ND<3	ND<3	ND<3
10	SB03-10	ND<3	MIN	117/2	.,

ug/kg - parts per billion (ppb)
Minimum Detection Limit in Soil: 3 ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15% MS/MSD Average Recovery = 94%: Duplicate RPD = 2.7%

Comments:

Laboratory Director

Richard Srna,



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### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54822

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/21/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES

by EPA SW-846 Methods 5030 and 8020

LAB	••		Concentr	ation(ug/ Ethyl	kg)	
#		Benzene	Toluene	Benzene	Xylenes	
1	SB04-01	ND<3	ND<3	ND<3	ND<3	
2	· <del>-</del>	ND<3	ND<3	ND<3	ND<3	
	<del></del>	ND<3	ND<3	ND<3	ND<3	
		ND<3	ND<3	ND<3	ND<3	
5	SB04-05	ND<3	ND<3	ND<3	ND<3	
6	SB04-06	ND<3	ND<3	ND<3	ND<3	
7	SB04-07	ND<3	ND<3	ND<3	ND<3	
8	SB04-08	ND<3	ND<3	ND<3	ND<3	
9	SB04-09	ND<3	ND<3	ND<3	ND<3	
10	SB04-10	ND<3	ND<3	ND<3	ND<3	

ug/kg - parts per billion (ppb)
Minimum Detection Limit in Soil: 3 ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15% MS/MSD Average Recovery = 97%: Duplicate RPD = 4.5%

Comments:

Laboratory Director

Richard Syng



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54822

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/21/92

CLIENT JOB NO.: UNION PACIFC

## ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/kg) Diesel Range
π 		
1	SB04-01	ND<10
2	SB04-02	ND<10
3	SB04-03	ND<10
4	SB04-04	ND<10
5	SB04-05	ND<10
6	SB04-06	ND<10
7	SB04-07	ND<10
8	SB04-08	ND<10
9	SB04-09	ND<10
10	SB04-10	ND<10

mg/kg - parts per million (ppm)
Minimum Detection Limit for Diesel in Soil: 10mg/kg

QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15% MS/MSD Average Recovery = 120%: Duplicate RPD = 7.9%

Laboratory Director

Richana /Srna,



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54823

CLIENT: RADIAN CORPORATION

CLIENT JOB NO.: UNION PACIFC

DATE RECEIVED: 05/19/92

DATE REPORTED: 05/20/92

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB	••		Concentration(ug/kg) Ethyl							
# 	Sample Identification	Benzene	Toluene	Benzene	Xylenes					
1	SB05-01	15	52	72	340					
2	SB05-02	6	18	9	33					
3	SB05-03	5	10	ND<3	18					
4	SB05-04	87	1100	1200	6300					
5	SB05-05	ND<3	5	7	47					
6	SB05-06	ND<3	ND<3	ND<3	ND<3					
7	SB05-07	ND<3	ND<3	ND<3	ND<3					
8	SB05-08	ND<3	ND<3	ND<3	ND<3					

ug/kg - parts per billion (ppb)
Minimum Detection Limit in Soil: 3 ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15% MS/MSD Average Recovery = 94%: Duplicate RPD = 2.7%

Comments:

Laboratory Director

Richard Srna,

Certified Laboratories



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54823

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/21/92

CLIENT JOB NO.: UNION PACIFC

# ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/kg) Diesel Range
1	SB05-01	600
2	SB05-02	16
3	SB05-03	65
4	SB05-04	4800
5	SB05-05	830
6	SB05-06	ND<10
7	SB05-07	ND<10
8	SB05-08	ND<10

mg/kg - parts per million (ppm)
Minimum Detection Limit for Diesel in Soil: 10mg/kg

#### QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15% MS/MSD Average Recovery = 92%: Duplicate RPD = 3.4%

Richard, Srna, /Ph.D.



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54824

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/20/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB	••		Concentr	Concentration(ug/kg) Ethyl							
#	Sample Identification	Benzene	Toluene	Benzene	Xylenes						
					<del>-</del>						
1	SB06-01	ND<3	90	210	1100						
2	SB06-02	7	27	31	160						
3	SB06-03	7	47	71	340						
4	SB06-04	ND<3	ND<3	ND<3	6						
5	SB06-05	ND<3	ND<3	ND<3	ND<3						
6	SB06-06	ND<3	ND<3	ND<3	<b>ND</b> <3						

ug/kg - parts per billion (ppb)
Minimum Detection Limit in Soil: 3 ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15% MS/MSD Average Recovery = 94%: Duplicate RPD = 2.7%

Comments:

Richard Srna, Ph.D.



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54824

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/21/92

CLIENT JOB NO.: UNION PACIFC

# ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

Sample Identification	Concentration (mg/kg) Diesel Range
SB06-01	1700
SB06-02	380
_	710
	ND<10
	ND<10
SB06-06	ND<10
	Sample Identification SB06-01 SB06-02 SB06-03 SB06-04 SB06-05

mg/kg - parts per million (ppm)
Minimum Detection Limit for Diesel in Soil: 10mg/kg

#### QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15% MS/MSD Average Recovery = 92%: Duplicate RPD = 3.4%



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#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54825

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/21/92

CLIENT JOB NO.: UNION PACIFC

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB			Concentr	ation(ug/ Ethyl	g/kg)	
#	Sample Identification	Benzene	Toluene	Benzene	Xylenes	
1	SB07-01	ND<3	5	49	320	
2	SB07-02	ND<3	ND<3	ND<3	ND<3	
3	SB07-03	ND<3	ND<3	ND<3	ND<3	
4	SB07-04	ND<3	ND<3	ND<3	ND<3	
5	SB07-05	ND<3	ND<3	ND<3	ND<3	
6	SB07-06	ND<3	ND<3	ND<3	ND<3	
7	SB07-07	ND<3	ND<3	ND<3	ND<3	
8	SB07-08	ND<3	ND<3	ND<3	ND<3	
9	SB07-09	ND<3	4	ND<3	7	
10	SB07-10	ND<3	ND<3	ND<3	ND<3	

ug/kg - parts per billion (ppb)
Minimum Detection Limit in Soil: 3 ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15% MS/MSD Average Recovery = 97%: Duplicate RPD = 4.5%

Comments:

Laboratory Director

Richard Srna,



1555 Burke, Unit I • San Francisco, California 94124 • [415] 647-2081 / fax (415) 821-7123

#### CERTIFICATE OF ANALYSIS

LABORATORY NO.: 54825

DATE RECEIVED: 05/19/92

CLIENT: RADIAN CORPORATION

DATE REPORTED: 05/20/92

CLIENT JOB NO.: UNION PACIFC

## ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 8015

LAB	•	Concentration (mg/kg)
#	Sample Identification	Diesel Range
1	SB07-01	290
2	SB07-02	ND<10
3	SB07-03	ND<10
4	SB07-04	ND<10
5	SB07-05	ND<10
6	SB07-06	ND<10
7	SB07-07	ND<10
8	SB07-08	ND<10
9	SB07-09	ND<10
10	SB07-10	83

mg/kg - parts per million (ppm)
Minimum Detection Limit for Diesel in Soil: 10mg/kg

QAQC Summary:

Daily Standard run at 200mg/L: %DIFF Diesel = <15% MS/MSD Average Recovery = 92%: Duplicate RPD = 3.4%

Richard Srna, Ph.D.

CHAIN OF CUSTODY AND ANALYSIS REQUEST NO. 54819 Superior Precision Analytical Radian Corporation Reporting Deadline Deliverables 1990 North California Blvd. 1555 Burke, Unit I COA Walnut Creek, CA 94596 Same Day San Francisco, CA 94124 Summary Table 24 Hours (510) 932-7120 (415) 647-2081 .DBF Files 48 Hours FAX (408) 932-7130 FAX (415) 821-7123 **ASCII** 72 Hours Contact: Philip Tang Surfer Contact: Rich Phaler Normal 5 Day Project No.: Union Pacific, Hayward Alternate contact: Bob Booher (510) 229-2932 \*\* 24 HOUR RUSH TOLP Metal Sample Identification 5/B/92 0940 1 SB01-01 0944 X SO X 2 SB01-0Z SO X X 3 SB01-03 0954 SO X 4 SB01-04 1006 SO X 5 SB01-05 1017 SO X 6 SB01-06 1019 SO X 7 SB01-07 1027 SO 8 SB01-08 **Laboratory Checklist** Date/Time 5//8/92 Received by Relinquished by Organization Exc Organization Samples stored in ice Appropriate containers Date/Time Received by Relinquished by □ No Samples preserved Organization Organization No headspace **DNA** Date/Time Received by Relinquished by Comments Organization Organization

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San Francisco, CA 94124		W		k, CA 94596	Same Day 24 Hours	Summary Table
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Alternate contact: Bob Booher (510)	29-2932	-		Pacific, Hayward		
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San Francisco, CA 94124 Walnut Creek, CA 94596 Same Day	ָ בר
(415) 647-2081 (510) 932-7120 24 Hours DBF Files	• 0
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Contact: Rich Phaler Contact: Philip Tang Normal 5 Day Surfer  Alternate contact: Bob Booher (510) 229-2932 Project No.: Union Pacific, Hayward	
Alternate contact: Bob Booher (510) 229-2932 Project No.: Union Pacific, Hayward  ** 24 HOUR RUSH **	
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CHAIN	OF	CUSTODY	AND	ANALYSIS	REQUEST.	NO.
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## Superior Precision Analytical

### Radian Corporation

1555 Burke, Unit I San Francisco, CA 94124 (415) 647-2081 FAX (415) 821-7123 Contact: Rich Phaler

1990 North California Blvd. Walnut Creek, CA 94596 (510) 932-7120 FAX (408) 932-7130 Contact: Philip Tang

Alternate contact: Bob Booher (510) 229-2932 Proje

Project No.: Union Pacific, Hayward

### \*\* 24 HOUR RUSH \*\*

<u>Sample</u> Identification	SO - Boli WG - Groundwater	Ď	Mod BUZU - BIEX	Mod BOTS - Ges	8010	6240	CAM17	TOLP Metals	Metale	418.1 - TPH by R	OH & Grease	908¢			Time Sempled	Number of	Centatries	(Ves Q 10)
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4 SB06-04	so	X	X	_	<u> </u>		<u> </u>	<u> </u>							145)		Ш	
5 SB06-05	SO	×	X	<u> </u>	]	<u>.</u>	<u> </u>	<u> </u>	L	<u> </u>					1505		Ш	
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#### **Laboratory Checklist**

Samples stored in ice	œ
Appropriate containers	
Samples preserved	
No headspace	
Comments	

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