

Appendix H. Monitoring Data Compendium

The following tables present chemical (Tables H-1 to H-6) and radionuclide (H-7 to H-9) contaminant levels that were detected in soil, surface water and groundwater samples and reported in monitoring reports at levels exceeding health-based standards or background levels. The data presented here were compiled from *various* monitoring reports identified in the Reference (Ref) column of each table. Contaminant detections are reported based on data reported for the 1964-2004 period and grouped by tables according to the sampling site locations. For example, Table H-1 lists chemicals detected onsite in Area I above background or standard levels. Chemicals detected onsite are presented in Tables H-1 to H-3, (Areas I, II and IV respectively); these detections were used to evaluate SSFL as a potential source of contaminants detected offsite. Chemicals detected offsite are presented in Tables H-4 to H-6; contaminants detected offsite were considered in exposure scenarios if detections occurred near potential areas of exposure. Rows in italics in these offsite tables are addressed within the body of the report. Each row contains the identity of the chemical detected, the media phase in which it was detected (air, water or soil), the standard or background comparison value, the detected concentration level or range, the sampling date, any report-specific sample identification presented with the data, the reference report from which data were derived, and reported comments specific to the detection.

Table H-1. Onsite Area I: Thermal Treatment Facility, Happy Valley, and Bowl, Canyon, and APTF Rocket Test Areas, 1964–2003

Chemical	Phase	Standard of Comparison	Concentration or Range	Date	Location/Sample Identification	Ref	Comments
Beryllium	A	0.01 µg/m ³	0.09 µg/m ³	12/4/64	Happy Valley	2	
Beryllium	A	0.01 µg/m ³	0.14–7.9 µg/m ³	1/65	Happy Valley	2	
Beryllium	A	0.01 µg/m ³	0.1–5.4 µg/m ³	3/67	Happy Valley	2	
Beryllium	A	0.01 µg/m ³	0.3 µg/m ³	8/18/67	Happy Valley	2	
Beryllium	A	0.01 µg/m ³	0.02–0.33 µg/m ³	7/68	Happy Valley	2	
Beryllium	A	0.01 µg/m ³	0.09–5.64 µg/m ³	12/68	Happy Valley	2	
Beryllium	A	0.01 µg/m ³	0.05–2.4 µg/m ³	7/69	Happy Valley	2	
Chromium (total)	S	21 mg/kg	290 mg/kg	6/17/93	TTF: 0–0.5' depth	3	
Chromium (total)	S	21 mg/kg	860 mg/kg	6/17/93	TTF: 0–0.5' depth	3	
Arsenic	S	0.39 mg/kg	1.3–7.3 mg/kg	6/16–6/17/93	TTF: 0–4.5' depth	3	64 samples in range
1,4-Dichlorobenzene	S	3.4 mg/kg	8.2 mg/kg	6/17/93	TTF: 4–4.5' depth	3	
Tetrachloroethene	S	1.5 mg/kg	4.8 mg/kg	6/17/93	TTF: 4–4.5' depth	3	
TCE	S	0.043 mg/kg	190 mg/kg	6/17/93	TTF: 4–4.5' depth	3	
Pentachlorophenol	S	3 mg/kg	4,000 mg/kg	6/17/93	TTF: 0–0.05' depth	3	
Benzidene	S	0.0021 mg/kg	<700 mg/kg	6/17/93	TTF: 0–0.05' depth	3	IDM
Benzidene	S	0.0021 mg/kg	<7 mg/kg	6/17/93	TTF: 0–4.5' depth	3	IDM
Benzidene	S	0.0021 mg/kg	<300 mg/kg	6/17/93	TTF: 4–4.5' depth	3	IDM
1,2-Dichlorobenzene	S	370 mg/kg	460 mg/kg	6/17/93	TTF: 4–4.5' depth	3	
Perchlorate	W	2 µg/L	16 µg/L	3/23/2000	Happy Valley	1	
Perchlorate	W	2 µg/L	13 µg/L	3/5/2000	Happy Valley	1	
Perchlorate	W	2 µg/L	8.2 µg/L	3/5/2000	Happy Valley	1	
Perchlorate	W	2 µg/L	9.4 µg/L	3/5/2000	Happy Valley	1	
Perchlorate	W	2 µg/L	8 µg/L	1/12/2001	Happy Valley	1	
Perchlorate	W	2 µg/L	5.5 µg/L	2/13/2001	Happy Valley	1	
Perchlorate	W	2 µg/L	4.2 µg/L	2/26/2001	Happy Valley	1	
Perchlorate	W	2 µg/L	5.3 µg/L	3/5/2001	Happy Valley	1	
Perchlorate	W	2 µg/L	4.9 µg/L	3/7/2001	Happy Valley	1	
Perchlorate	W	2 µg/L	5.2 µg/L	3/8/2001	Happy Valley	1	
Perchlorate	W	2 µg/L	4.8 µg/L	3/9/2001	Happy Valley	1	

Notes: Shallow zone wells: SH-11, RS-5, RS-11, RS-16, RS-18, RS-23-25, RS-27-28, RS-54, ES-31. Chatsworth Formation wells: RD-6-7, RD-13-25, RD-27-30, RD-34A, WS-7, WS-13, OS-16, OS-21. Offsite wells: RD-33A, RD-35A-B, RD-59A; **Phase Designations:** W=water; S=soil; A=air; **Location Designations:** TTF=Thermal Treatment Facility; **Comments:** IDM=insensitive detection method; MCL=maximum contaminant level; **References:** 1. Boeing, 2002. Most of these samples were monitored with non-sensitive equipment and had recorded values of <4 µg/L, while the MCL is 2 µg/L. 2. Fax transmittal from Michael Sullivan, Rocketdyne (8/25/99), "Industrial Hygiene Data from Solid Fuel Operations." 3. GRC, 1993.

Table H-2. Onsite Area II: Alpha, Bravo, Coca, and Delta Rocket Engine Test Areas, 1983–2003

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
TCE	W	5 µg/L	800 µg/L	6/83–8/83	Alpha II testing area	1	IT removed cont. soil/water (spill of 285–322 gal TCE; most in air; unknown)
TCE	S	0.43 mg/kg	200 mg/kg	6/83–8/83	Alpha II testing area	1	See above
Beryllium	A	0.01 µg/m ³	5,000 µg/m ³	6/12/92	Behind engine during test	2	5x10 ⁵ x > AAQS

References: 1. Rockwell letter dated August 17, 1983. 2. ABB Environmental Services, Inc., 1992.

Table H-3. Onsite Area IV: Sodium Disposal Facility, Radioactive Material Disposal Facility, 1987–2003

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
PCB (Aroclor 1254)	S	0.22 mg/kg	2.0–2.4 mg/kg	4/1/87	SDF: 0.5–1.0'	1	
PCB (Aroclor 1254)	S	0.22 mg/kg	1.0 mg/kg	4/1/87	SDF: 1.5'	1	Irregular distribution
PCB (Aroclor 1254)	S	0.22 mg/kg	2.6 mg/kg	4/1/87	SDF: 3.5–4.0'	1	
PCB (Aroclor 1254)	S	0.22 mg/kg	12 mg/kg	4/1/87	SDF: 4.5'	1	
PCB (Aroclor 1254)	S	0.22 mg/kg	1.1 mg/kg	4/1/87	SDF: 5.5–6.0'	1	55x > RSSL
Carbon tetrachloride	S	0.25 mg/kg	500 mg/kg	4/1/87	SDF: Building 886, 3.5–4.0'	1	2,000x > RSSL
1,2-DCA	S	0.28 mg/kg	430 mg/kg	4/1/87	3.5–4.0'	1	1,535x > RSSL
Ethylbenzene	S	8.9 mg/kg	44 mg/kg	4/1/87	3.5–4.0'	1	
Tetrachloroethylene	S	1.5 mg/kg	1.7 mg/kg	4/1/87	1.5'	1	
Tetrachloroethylene	S	1.5 mg/kg	1,200 mg/kg	4/1/87	3.5–4.0'	1	800x > RSSL
1,1,1-TCA	S	1,200 mg/kg	1,840 mg/kg	4/1/87	3.5–4.0'	1	
TCE	S	0.043 mg/kg	>40 mg/kg	4/1/87	3.5–4.0'	1	>930x > RSSL
TCE	S	0.043 mg/kg	34 mg/kg	4/1/87	5.5–6.0'	1	790x > RSSL
Toluene	S	520 mg/kg	800 mg/kg	4/1/87	3.5–4.0'	1	
Chromium (total)	W	50 µg/L	150 µg/L	4/1/87	BPL-8, SDF	1	
Chromium (total)	S	210 mg/kg	710 mg/kg	4/1/87	SDF, 3.5–4' depth	1	
Chromium (total)	S	210 mg/kg	320 mg/kg	4/2/87	SDF, 0.5–1' depth	1	
Chromium (total)	S	50 µg/L	150 µg/L	4/2/87	BPR-3, SDF	1	Sediment
Chromium (total)	W	50 µg/L	1,500 µg/L	4/2/87	BPR-3, SDF	1	
Lead	S	150 mg/kg	864 mg/kg	4/2/87	SDF, 0.5–1' depth	1	
Vinyl chloride	S	0.79 mg/kg	<15 mg/kg	4/2/87	3.0'	1	IDM
TCE	S	0.043 mg/kg	22 mg/kg	4/2/87	3.0'	1	511x > RRSL
1,1-DCA	W	5 µg/L	24 µg/L	12/4/87	GW: RS-18	1	
1,1-DCE	W	6 µg/L	33 µg/L	12/4/87	GW: RS-18	1	

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
TCE	W	5 µg/L	660 µg/L	12/4/87	GW: RS-18	1	132x > MCL
1,2-DCE	W	0.5 µg/L	5 µg/L	1/20/89	RD-23	4	
TCE	W	5 µg/L	208 µg/L	3/3/89	GW: RS-18	1	41x > MCL
TCE	W	5 µg/L	203 µg/L	3/3/89	GW: RS-18	1	41x > MCL
1,1-DCE	W	6 µg/L	26 µg/L	6/4/89	GW: RS-18	1	
1,1-DCE	W	6 µg/L	21 µg/L	6/4/89	GW: RS-18	1	
1,1-DCA	W	5 µg/L	22 µg/L	6/4/89	GW: RS-18	1	
1,1-DCA	W	5 µg/L	14 µg/L	6/4/89	GW: RS-18	1	
TCE	W	5 µg/L	390 µg/L	6/4/89	GW: RS-18	1	78x > MCL
TCE	W	5 µg/L	275 µg/L	6/4/89	GW: RS-18	1	55x > MCL
Chromium (total)	W	50 µg/L	280 µg/L	7/17/89	1.5–2.0' depth	1	
Lead	W	12 µg/L	17 µg/L	7/17/89	0.0–0.5'	1	
Lead	W	12 µg/L	1,090 µg/L	7/17/89	1.5–2.0'	1	72x > MCL
Lead	W	12 µg/L	26 µg/L	7/17/89	1.0–0.5'	1	
Lead	W	12 µg/L	33 µg/L	7/17/89	2.0–2.5'	1	
Mercury	W	2 µg/L	3.5 µg/L	7/17/89	1.5–2.0'	1	
Silver	W	100 µg/L	230 µg/L	7/17/89	1.5–2.0'	1	
Barium	W	1,000 µg/L	1,200 µg/L	7/17/89	SDF, 0–2' depth	1	
Barium	W	1,000 µg/L	1,850 µg/L	7/17/89	SDF, 2–2.5' depth	1	
TCE	W	5 µg/L	450 µg/L	9/12/89	GW: RD-21	3	90x > MCL
Carbon tetrachloride	W	0.5 µg/L	4 µg/L	9/12/89	GW: RD-21	1	8x > MCL
Manganese	W	50 µg/L	450 µg/L	9/13/89		2	
Trans,1,2-DCE	W	10 µg/L	15 µg/L	9/13/89	GW: RD-23	1	
TCE	W	5 µg/L	180 µg/L	9/13/89	GW: RD-23	1	36x > MCL
Benzene	W	1 µg/L	2 µg/L	9/13/89	RD-23	4	
Carbon tetrachloride	W	0.5 µg/L	7 µg/L	10/20/89	GW: RD-21	1	14x > MCL
Carbon tetrachloride	W	0.5 µg/L	5 µg/L	10/20/89	GW: RD-21	1	10x > MCL
Carbon tetrachloride	W	0.5 µg/L	5 µg/L	10/20/89	GW: RD-21	1	10x > MCL
TCE	W	5 µg/L	1,200 µg/L	10/20/89	GW: RD-21	1	240x > MCL
TCE	W	5 µg/L	940 µg/L	10/20/89	GW: RD-21	1	188x > MCL
TCE	W	5 µg/L	750 µg/L	10/20/89	GW: RD-21	1	150x > MCL
TCE	W	5 µg/L	200 µg/L	10/20/89	GW: RD-23	3	40x > MCL
1,2-DCA	W	0.5 µg/L	5 µg/L	10/20/89	GW: RD-23	1	10x > MCL
TCE	W	5 µg/L	1,800 µg/L	12/11/89	GW: RD-21	1	360x > MCL
TCE	W	5 µg/L	80 µg/L	12/11/89	GW: RD-23	1	
Carbon tetrachloride	S	0.25 mg/kg	500 mg/kg	1990	Lower Pond soil by SDF	1	Sampled by RWQCB; last delivery to pond 1972

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
Ethyl benzene	S	8.9 mg/kg	44–171 mg/kg	1990	Lower Pond soil by SDF	1	“
Toluene	S	520 mg/kg	5.4–3,000 mg/kg	1990	Lower Pond soil by SDF	1	“
1,1,1-TCA	S	1200 mg/kg	0.16–1,840 mg/kg	1990	Lower Pond soil by SDF	1	“
TCE	S	0.043 mg/kg	0.14–740 mg/kg	1990	Lower Pond soil by SDF	1	“
PCBs	S	0.22 mg/kg	1–2.6 mg/kg	1990	Lower Pond soil by SDF	1	“
Mercury	S	23 mg/kg	125 mg/kg	1990	Lower Pond soil by SDF	1	“
Arsenic	S	0.39 mg/kg	16.5 mg/kg	1/25/90	SDF, composite soil	1	
Arsenic	S	0.39 mg/kg	21.2 mg/kg	1/25/90	SDF, composite soil	1	
Arsenic	S	0.39 mg/kg	19.4 mg/kg	1/25/90	SDF, composite soil	1	
Chromium (total)	W	50 µg/L	300 µg/L	1/25/90	SDF, composite soil	1	
Chromium (total)	W	50 µg/L	200 µg/L	1/25/90	SDF, composite soil	1	
Lead	W	12 µg/L	5,700 µg/L	1/25/90	SDF, composite soil	1	
Lead	W	12 µg/L	300 µg/L	1/25/90	SDF, composite soil	1	
Lead	W	12 µg/L	500 µg/L	1/25/90	SDF, composite soil	1	
Mercury	S	23 mg/kg	125 mg/kg	1/25/90	SDF, composite soil	1	
Mercury	W	2 µg/L	5 µg/L	1/25/90	SDF, composite soil	1	
Vanadium	W	50 µg/L	400–500 µg/L	1/25/90	SDF, composite soil	1	
TCE	W	5 µg/L	38–200 µg/L	1/90–2/90	GW: RD-23	1	
TCE	W	5 µg/L	170–660 µg/L	1/90–2/90	GW: RS-18	1	
TCE	W	5 µg/L	450–1,900 µg/L	1/90–2/90	GW: RD-21	1	
1,1-DCE	W	6 µg/L	10 µg/L	3/27/90	GW: RS-18	1	
1,1-DCE	W	6 µg/L	9 µg/L	3/27/90	GW: RS-18	1	
TCE	W	5 µg/L	170 µg/L	3/27/90	GW: RS-18	1	34x > MCL
Cis-1,2-DCE	W	6 µg/L	21 µg/L	3/29/90	GW: RD-21	1	
1,2-DCA	W	0.5 µg/L	3 µg/L	4/6/90	GW: RD-23	1	
TCE	W	5 µg/L	38 µg/L	4/6/90	GW: RD-23	1	
1,2-DCE	W	0.5 µg/L	3 µg/L	4/6/90	RD-23	4	
1,1-DCA	W	5 µg/L	370–680 µg/L	5/13/97–8/18/99	RS-54	5	10 samples
1,1-DCE	W	6 µg/L	330–1,500 µg/L	5/3/97–8/18/99	RS-54	5	10 samples
1,1,1-TCA	W	200 µg/L	1,500–8,100 µg/L	5/3/97–8/18/99	RS-54	5	11 samples
TCE	W	5 µg/L	720–2,300 µg/L	5/3/97–8/18/99	RS-54	5	11 samples

Notes: Phase Designations: W = water; S = soil; A = air. Location Designations: SDF = Sodium Disposal Facility; GW = groundwater; RS-18 = Shallow Zone well, NW Area IV, near NW boundary of site, Building 886; RD-21 = GW from Chatsworth Formation, NW Area IV, S of Building 886; RD-23 = GW NW Area IV, W of Building 886. Comments: IDM = insensitive detection method; RSSL = Residential Soil Screening Level, EPA Region 9; MCL = maximum contaminant level. References: 1. GRC, 1990a. 2. Rocketdyne, NPDES Annual Reports, various years. 3. Boeing, 2002. 4. Rocketdyne, 1995. 5. GRC, 2000.

Table H-4. Offsite South: Ahmanson Ranch, Bell Canyon, Bell Creek and ²NPDES Outfalls 001 and 002, 1993–2003

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
Chromium	W	50 µg/L	75 µg/L	1/28/93	NPDES Outfall 002	2	
Pentachlorophenol	W	1 µg/L	<20 µg/L	1/94	NPDES Outfall 002	2	IDM
Nitrosodimethylamine	W	0.02 µg/L	<2 µg/L	1/25/94	NPDES Outfall 002	2	IDM—hydrazine byproduct
Hexachlorobenzene	W	1 µg/L	<3 µg/L	1/94–4/94	NPDES Outfall 002	2	IDM (10 tests)
2,4,6-Trichlorophenol	W	0.34 µg/L	<10 µg/L	1/94–4/94	NPDES Outfall 002	2	IDM (6 tests)
Pentachlorophenol	W	1 µg/L	<20 µg/L	2/94–6/6/94	NPDES Outfall 002	2	IDM (5 tests)
N-Nitrosodimethylamine	W	0.01 µg/L	<2 µg/L	7/11/94–8/2/94	NPDES Outfall 002	2	IDM
Nickel	W	100 µg/L	130 µg/L	12/6/94	NPDES Outfall 002	2	
N-Nitrosodimethylamine	W	0.01 µg/L	<2 µg/L	1/3/95–12/23/95	NPDES Outfall 002	2	IDM (19 tests)
Dieldrin	W	0.01 µg/L	< 0.1 µg/L	1/3/95–4/19/95	NPDES Outfall 002	2	IDM (8 tests)
Lead	W	12 µg/L	40 µg/L	1/9/95	NPDES Outfall 001/ Perimeter Pond	2	
Heptachlor	W	0.01 µg/L	>0.01 µg/L	3/10/95 and 3/21/95	NPDES Outfall 002	2	Concentration over standard not quantified
Pentachlorophenol	W	1 µg/L	<20 µg/L	3/10/95–5/15/95	NPDES Outfall 002	2	IDM (5 tests)
Heptachlor	W	0.01 µg/L	>0.01 µg/L	3/21/95	NPDES Outfall 002	2	
Beryllium	S	150 mg/kg	500–1,000 mg/kg	8/6/96	Bell Canyon 0.5–1.0' depth	3	3-6x> RSSL
Hexachlorobenzene	W	1 µg/L	<3 µg/L	3/95–1/97	NPDES Outfall 001	2	IDM (6 tests)
Pentachlorophenol	W	1 µg/L	<3 µg/L	12/96–1/97	NPDES Outfall 001	2	IDM (10 tests)
Arsenic	S	0.39 mg/kg	14 mg/kg	1998	Bell Canyon along surface runoff	4	Residential area
Arsenic	S	0.39 mg/kg	8 mg/kg	1998	Bell Canyon along Bell Creek	4	Residential area
Arsenic	S	0.39 mg/kg	9 mg/kg and 14 mg/kg	1998	Unidentified Bell Canyon resident yards	4	Residential area; 2 samples
Arsenic	S	0.39 mg/kg	1 mg/kg	10/30/98	Las Virgenes Creek @ Sheen	3	
Arsenic	S	0.39 mg/kg	3 mg/kg	10/30/98	Las Virgenes Creek @ Bell Canyon	3	
Lead	S	150 mg/kg	383 mg/kg	6/7/99	Bell Canyon	1	Residence

Notes:

Phase Designations: W = water; S = soil; A = air.

Comments: IDM = insensitive detection method; RSSL = Region 9 Residential Soil Screening Level.

References: 1. CA EPA, 2000. 2. Boeing, 1990–2003. 3. Masry and Vititoe, 1998. 4. Ogden, 1998, Figure 4. Environmental and Energy Services, 10/05/98.

Table H-5. Offsite East: Woolsey and Dayton Canyons and Chatsworth, 1994–2003

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Reference	Comments
Manganese	W	50 µg/L	390 µg/L	3/94	RD-32	1	Northeast (Sage Ranch)
Manganese	W	50 µg/L	35 mg/L	?	2N/17R-21R2	2	Northeast Chatsworth Mutual Water Co. owner
Lead	W	12 µg/L	50 µg/L	12/94	RD-43	1	East (Woolsey Canyon)
Lead	W	12 µg/L	59–2,239 µg/L	3/24/04	B-4W; B-3W	3	Chatsworth Reservoir
Arsenic	W	50 µg/L	72.7–3,217 µg/L	3/24/04	B-4W; B-3W	3	Chatsworth Reservoir
Beryllium	W	4 µg/L	7–123 µg/L	3/24/04	B-4W; B-3W	3	Chatsworth Reservoir
Perchlorate	V	20 mg/kg	32–57 mg/kg	6/20/05	Dayton Canyon Creek	4	Leaves and plant debris

Notes:

Phase Designations: W = water; S = soil; A = air; V = vegetation.

Location Designations: RD-32, 43A = Sage Ranch and Woolsey Canyon Wells, respectively.

Comments: AAQS = Ambient Air Quality Standards; IDM = insensitive detection method.

References: 1. CHDS, 1999. 2. Ventura County Public Works, Water Resources Dept. Well Data Files. 3. DWP, 2004. 4. Allwest Remediation, Inc, 2005.

Table H-6. Offsite North: BBI, SMMC, NPDES Outfalls 003–008 and Simi Valley, 1986–2003

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
Chloromethane	W	1.5 µg/L	19 µg/L	4/10/86	OS-5	2	12x > TWSL; livestock well
Chloride	W	0.15 µg/L	7,000 µg/L	1/13/90	SBP1—NPDES	2	NPDES analysis
Chloride	W	0.15 µg/L	6,000 µg/L	1/13/90	SBP2—Outfall 006	2	
Bis(2-ethylhexyl) phthalate (DEHP)	W	6 µg/L	66 µg/L	1/13/90	SBP1	2	Surface water
Bis(2-ethylhexyl) phthalate (DEHP)	W	6 µg/L	109 µg/L	1/13/90	SBP2	2	Surface water; EPA priority analysis
Chloride	W	0.15 µg/L	8,000 µg/L	1/17/90	SBP1	2	NPDES analysis
Bis(2-ethylhexyl) phthalate (DEHP)	W	6 µg/L	170 µg/L	1/17/90	SBP1	2	Surface water
Fluoride	W	2,000 µg/L	4,600–5,400 µg/L	1/90–2/90	OS-2	1	Livestock Well
Chloride	W	0.15 µg/L	3,500 µg/L	2/17/90	SBP2	1	
Bis(2-ethylhexyl) phthalate (DEHP)	W	6 µg/L	70 µg/L	2/17/90	SBP1	1	Surface water
Bis(2-ethylhexyl) phthalate (DEHP)	W	6 µg/L	97 µg/L	2/17/90	SBP2	1	Surface water; EPA priority analysis

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
<i>TCE</i>	W	5 µg/L	10 µg/L	3/11/92	SMMC: well by gate	1	
Lead	S	150 mg/kg	280 mg/kg	1992	SMMC by shooting range	1	
<i>Arsenic</i>	S	0.39 mg/kg	24 mg/kg	1992	BBI	1	61.5x>SSL
<i>Arsenic</i>	S	0.39 mg/kg	8.2 mg/kg	1992	SMMC	1	
Residual chlorine	W	0.1 to 0.01 mg/L	44 mg/L	2/8/93	Outfall 006	5	SBP2
Residual chlorine	W	0.1 to 0.01 mg/L	129 mg/L	2/18/93	Outfall 006	5	SBP2
Residual chlorine	W	0.1 to 0.01 mg/L	100 mg/L	2/26/93	Outfall 006	5	SBP2
Residual chlorine	W	0.1 to 0.01 mg/L	91 mg/L	3/25/93	Outfall 006	5	SBP2
<i>PCB-1254</i>	W	0.5 µg/L	120 µg/L	2/4/94	Outfall 005	7	240x>MCL
<i>PCB-1254</i>	W	0.5 µg/L	92 µg/L	2/4/94	Outfall 006	7	184x>MCL
Lead	W	12 µg/L	210 µg/L	2/17/94	Outfall 003	5	14x>MCL
<i>Vinyl chloride</i>	W	0.5 µg/L	64 µg/L	3/94	RD-56A	6	128x>MCL
<i>TCE</i>	W	5 µg/L	670 µg/L	8/94	RD-38A	6	134x> MCL
<i>Benzene</i>	W	1 µg/L	3.8 µg/L	11/94	RD-38A	6	
<i>Carbon tetrachloride</i>	W	0.5 µg/L	4.5 µg/L	2/95	RD-59A	6	>9x MCL; northwest (west of Area IV RMDF)
Lead	W	12 µg/L	30 µg/L	1/3/95	Outfall 006	5	
<i>Beryllium</i>	W	4 µg/L	8 µg/L	5/15/95	Outfall 006	5	
Chromium (total)	W	100 µg/L	240 µg/L	5/15/95	Outfall 006	5	
Lead	W	12 µg/L	45 µg/L	5/15/95	Outfall 005	5	
<i>Benzene</i>	W	1 µg/L	5.6 µg/L	5/15/95	Outfall 005	5	
Lead	W	12 µg/L	16 µg/L	5/15/95	Outfall 003	5	
Lead	W	12 µg/L	45 µg/L	5/15/95	Outfall 003	5	
Lead	W	12 µg/L	75 µg/L	5/15/95	Outfall 006	5	
Nickel	W	100 µg/L	170 µg/L	5/15/95	Outfall 006	5	
<i>Beryllium</i>	W	4 µg/L	5 µg/L	1/31/96	Outfall 006	5	
Lead	W	12 µg/L	47 µg/L	1/31/96	Outfall 006	5	
Cadmium	W	3.7 µg/L	5 µg/L	1/31/96	Outfall 006	5	
Zinc	W	110 µg/L	420 µg/L	1/31/96	Outfall 006	5	
<i>1,1-DCE</i>	W	6 µg/L	19 µg/L	5/96	RD-38A	6	
Trans-1,2-DCE	W	10 µg/L	38 µg/L	5/96	RD-56A	6	
1,1-DCA	W	5 µg/L	6.5 µg/L	11/96	RD-38A	6	
<i>Cis-1,2-DCE</i>	W	6 µg/L	27 µg/L	11/96	RD-38A	6	

Chemical	Phase	Standard	Concentration	Date	Location/Sample Identification	Ref	Comments
<i>TCE</i>	W	5 µg/L	250–570 µg/L	8/9/95– 2/2/97	RD-38A (NE of Area I Offsite, Sage Ranch)	8	9 samples
Perchlorate	W	4 µg/L	5 µg/L	8/98	RD-59A	6	Northwest (west of Area IV RMDF)
Perchlorate	W	2 µg/L	4.26 µg/L	5/5/98	Outfall 006	6	
<i>TCE</i>	W	5 µg/L	130–570 µg/L	8/7/97– 8/18/99	RD-38A (NE of Area I Offsite, Sage Ranch)	8	6 samples
<i>Cis-1,2-DCE</i>	W	6 µg/L	75–630 µg/L	3/18/84– 2/4/99	RD 56 A N of Area III	8	19 samples
Trans-1,2-DCE	W	10 µg/L	22–82 µg/L	3/18/84– 2/4/99	RD 56 A N of Area III	8	18 samples
<i>TCE</i>	W	5 µg/L	330–900 µg/L	3/18/84– 2/4/99	RD 56 A N of Area III	8	19 samples
<i>Perchlorate</i>	W	2 µg/L	4–19 µg/L	1999	Simi Valley	9	15/66 wells positive for perchlorate
Perchlorate	W	2 µg/L	<500 µg/L	3/8/2000	Outfall 003	6	IDM
Perchlorate	W	2 µg/L	<500 µg/L	3/8/2000	Outfall 004	6	IDM
Perchlorate	W	2 µg/L	<500 µg/L	3/8/2000	Outfall 006	6	IDM
Perchlorate	W	2 µg/L	<500 µg/L	3/8/2000	Outfall 007	6	IDM
<i>Perchlorate</i>	W	2 µg/L	34–150 µg/L	2/12/2003	Bathtub Well #1, BBI	4	Livestock well (closed)
<i>Perchlorate</i>	W	2 µg/L	50–60 µg/L	2003	Runckle Canyon Development	10	DTSC update

Notes:

Phase Designations: W = water; S = soil; A = air.

Location Designations: SMMC = Santa Monica Mountains Conservancy; OS-2-5 = offsite wells used for livestock NW of SSFL at BBI; RD 56A, RD-38A = SSMC wells; RD-59A; BBI = Brandeis-Bardin Institute.

Comments: IDM = insensitive detection method; SSL = soil screening level; AAQS = Ambient Air Quality Standards; TWSL = Region 9 Tap Water Screening Level.

References: 1. McLaren/Hart, 1993, Vol. 2. 2. GRC, 1990a. 3. CDHS, 1999. 4. Ogden, 1995. 5. Rocketdyne, NPDES Annual Reports, various years. 6. Boeing, 2002. 7. Rocketdyne, 1995. 8. GRC, 2000. 9. DTSC Fact Sheet. Update on Perchlorate Investigation in Simi Valley, 9/2003. 10. DTSC Public Meeting, July 15, 2003.

Table H-7. Radiological Contaminants, Onsite (Area IV): Sodium Disposal Facility, Radioactive Material Disposal Facility and NPDES Outfalls 003–008: 1988–2003

Radionuclide	Phase	Standard or Background	Concentration	Date	Location/Sample Identification	Ref	Comments
Gross beta	S	¹ 25 pCi/g*	59±6.3 to 4970±176.9	8/25/88	RMDF Leachfield	3	6 samples
Gross alpha	W	15 pCi/L	27.6 ±8.4 pCi/L	6/4/89	RS-18	3	UF
Gross beta	W	50 pCi/L	56.1 ±0.5 pCi/L	9/12/89	RS-25	3	F
Gross alpha	W	15 pCi/L	29.9±3.0 pCi/L	9/20/89	RD-29		F
Gross alpha	W	15 pCi/L	42.3 ±7.5 pCi/L	9/27/89	RS-28	3	UF
Gross beta	W	50 pCi/L	49.3 ±1.3 pCi/L	9/27/89	RS-28	3	F

Notes: Background concentration (GRC, 1990c).

Phase Designations: W = water; S = soil; A = air. **Location Designations:** RMDF = Radioactive Materials Disposal Facility

Comments: IDM = insensitive detection method; RSSL = Residential Soil Screening Level, EPA Region 9; MCL = maximum contaminant level; UF = unfiltered groundwater; F = filtered groundwater; NE = not established; RS = shallow wells; RD = deep wells. **References:** 1. NPDES Annual Monitoring Reports. 2. EPA, 2000. 3. GRC, 1990b.

Table H-8. Radiological Contaminants, Offsite South: Ahmanson Ranch, Bell Canyon, Bell Creek, and NPDES Outfalls 001 and 002: 1993–2003

Chemical	Phase	Standard or Background*	Maximum Concentration	Date	Location/Sample Identification	Ref	Comments
Radium Combined (226/228)	W	5 pCi/L	<500 pCi/L	2/8/93	NPDES Outfall 002	3	IDM
Thorium-228	S	0.38 pCi/g*	1.8 pCi/g	1998	Bell Canyon	4	
Thorium-230	S	3.49 pCi/g	1.4 pCi/g	1998	Bell Canyon	4	
Thorium-232	S	0.37 pCi/g*	1.5 pCi/g	1998	Bell Canyon	4	
Tritium	S	0.01 pCi/g	0.36 pCi/g	1998	Bell Canyon	4	
Uranium-233/234	S	15 pCi/g	1 pCi/g	1998	Bell Canyon	4	
Uranium-235	S	0.205 pCi/g	0.07 pCi/g	1998	Bell Canyon	4	
Uranium-238	S	4.46 pCi/g	1.1 pCi/g	1998	Bell Canyon	4	
Potassium-40	S	12.9 pCi/g*	8.3–23 pCi/g	1/27/00	Ahmanson Ranch—0.5' deep	2	
Cadmium-109	S	NE	1.5–2.8 pCi/g	1/27/00	Ahmanson Ranch—0.5' deep	2	
Radium-226	S	5 pCi/g [#]	0.82–2.2 pCi/g	1/27/00	Ahmanson Ranch—0.5' deep	2	
Thorium-228	S	0.38 pCi/g*	0.5–0.90 pCi/g	1/27/00	Ahmanson	2	

Chemical	Phase	Standard or Background*	Maximum Concentration	Date	Location/Sample Identification	Ref	Comments
					Ranch—0.5' deep		
Thorium-232	S	0.37 pCi/g*	0.54–0.97 pCi/g	1/27/00	Ahmanson Ranch—0.5' deep	2	
Cesium-137	S	0.11 pCi/g*	ND–0.32 pCi/g	1/27/00	Ahmanson Ranch—0.5' deep	2	4 of 6 samples positive
Total Alpha	W	15 pCi/L	33.39 pCi/L	6/02–8/02	MW P3	1	
Total Alpha	W	15 pCi/L	28.03 pCi/L	6/02–8/02	MWP6	1	
Total Alpha	W	15 pCi/L	72.34 pCi/L	9/02–11/02	MW P1	1	
Total Alpha	W	15 pCi/L	28.3 pCi/L	9/02–11/02	MW P2	1	
Total Alpha	W	15 pCi/L	15.81 pCi/L	9/02–11/02	MW P3	1	
Total Alpha	W	15 pCi/L	28.54 pCi/L	9/02–11/02	MW P5	1	
Total Alpha	W	15 pCi/L	18.78 pCi/L	9/02–11/02	MW P6	1	

Notes: ND = not detected; * = Background samples; # = DHS-based health comparisons. **Phase Designations:** W = water; S = soil; A = air. **Location Designations:** MW = monitoring wells at Las Virgenes Creek and East Las Virgenes Creek in Ahmanson Ranch. **Comments:** IDM = insensitive detection method. **References:** 1. PSOMAS, 2003. 2. Klinefelder, 2000. 3. NPDES Reports. 4. Ogden Inc., 1998a.

Table H-9. Radiological Contaminants, Offsite North: Brandeis-Bardin Institute, Santa Monica Mountains Conservancy, Canoga Park and NPDES Outfalls 003–008, 1949–2003

Chemical	Phase	Standard or Background*	Concentration or Range	Date	Location/Sample Identification	Ref	Comments
Cesium-137	S	0.11 pCi/g*	0.23 pCi/g	1992	BB-17 above Building 59 watershed at BBI	2	
Cesium-137	S	0.11 pCi/g*	0.23 pCi/g	1992	BB-19 above SRE watershed at BBI	2	
Cesium-137	S	0.11 pCi/g*	0.34 pCi/g	1992	BB-16 in RMDf watershed at BBI	2	
Cesium-137	S	0.11 pCi/g*	0.2–0.3 pCi/g	1992	BB-19 above SRE watershed at BBI	2	2 samples
Plutonium-238	S	0.02 pCi/g*	0.19 pCi/g	1992	BB-17 above Building 59 watershed at BBI	2	
Plutonium-238	S	0.02 pCi/g*	0.22 pCi/g	1992	BB-15 above RD-51 watershed at BBI	2	Currently in buffer zone
Radium (total 226 and 228)	W	5 pCi/L	15±25 pCi/L	12/29/92	Outfall 004	3	
Strontium-90	W	8 pCi/L	<500 pCi/L	12/29/92	Outfall 004	3	IDM
Strontium-90	W	8 pCi/L	9.4±3 pCi/L	1/7/93	Outfall 006	3	
Radium (total 226 and 228)	W	5 pCi/L	23±2.3 pCi/L	12/14/93	Outfall 003	3	

Chemical	Phase	Standard or Background*	Concentration or Range	Date	Location/Sample Identification	Ref	Comments
Cesium-137	S	0.11 pCi/g*	0.60 pCi/g	1993	RMDF watershed at BBI	2	
Cesium-137	S	0.11 pCi/g*	0.22–0.39 pCi/g	1994	BB-17 above Building 59 watershed at BBI	2	8 samples
Strontium-90	W	8 pCi/L	8±11 pCi/L	1/4/95	Outfall 003	3	IDM
Strontium-90	W	8 pCi/L	5.1 ± 5.7 pCi/L	1/10/95	Outfall 003	3	IDM
Radium (total 226 and 228)	W	5 pCi/L	3.6±2.8 pCi/L	2/14/95	Outfall 004	3	
Radium (total 226 and 228)	W	5 pCi/L	3.4±3.8 pCi/L	3/21/95	Outfall 004	3	
Cesium-137	S	0.11 pCi/g*	0.016–0.27 pCi/g	6/97	Canoga Park SSFL Recreation Center (Lawn from NE build)	1	
Gross alpha	W	15 pCi/L	14±4 pCi/L	3/14/98	Outfall 005	3	

Notes: * Background samples. If water is not used for drinking purposes or soil was not in residential or agricultural areas, then health-based environmental standards for radionuclides developed by the Nuclear Regulatory Commission were used (10 CFR). These are concentrations of radioactive material released in groundwater, surface water, air, soil, plants, or animals that do not exceed an annual dose equivalent of 25 mrem whole body (75 mrem max to thyroid, and 25 mrem max to any other organ).

Phase Designations: W = water; S = soil; A = air; **Location Designations:** BBI = Brandeis-Bardin Institute.

References: 1. Lawrence Livermore National Laboratory, 1997. 2. McLaren/Hart, 1993 and 1995. 3. NPDES Annual Monitoring Reports.