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EL CENTRO GEOTHERMAL TEST COMPONENT FACILITY SITE RESTORATION PHASE II REPORT

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EXECUTIVE SUMMARY

This purpose of this report is to present the findings from the Phase II site characterization activities conducted at the El Centro Geothermal Component Test Facility (GTF) in March 1993. Phase II activities were conducted to ascertain if specific areas were subjected to hazardous waste spills or contaminated with naturally occurring radioactive material (NORM) from past operations.

Most of the Phase II sampling results indicate little or no hazardous waste or hazardous waste contamination above applicable limits, and the radiological survey of the site surface soils revealed no NORM contamination. However, areas requiring consideration and possible corrective action prior to release of the site were identified as follows:

- Liquids that were combined from containers located at three separate areas (identified as GTF-1, GTF-3, and GTF-7 in the Phase II East Mesa GTF Site Characterization Plan)

- White tank located along the north fence of the site labeled "Flammable" that could not be properly sampled during Phase II site characterization activities due to a broken valve

- Pipe racks containing scale material

Petroleum hydrocarbons were detected in the combined liquids from the containers located at GTF-1, GTF-3, and GTF-7. This material should be disposed of offsite by an appropriate contractor to avoid potential contamination of onsite surficial soils and groundwater.

Removal of the white tank along the north fence may require special precautions. Due to the broken valve, gas sampling of the tank could not be performed. As a result, the identity and quantity of the gas constituents within the tank are unknown, however, a pressure indicator

registered no pressure in the tank. If a positive identification of the tank's contents cannot be performed, the tank may need to be removed by a contractor that is licensed and qualified to dispose of tanks with unknown and inaccessible constituents.

A representative sample of the scale material within the pipe racks located in the northeast area of the facility contained a radium concentration of 1,300 pCi/g. This concentration is above the DOE limit of 5 pCi/g for radium in soil. As a result, this material is classified as Class A low-level waste based on criteria specified in 10 CFR 61.55 and DOE Order 5820.2A. DOE's policy regarding low-level waste requires that either the material be disposed of on the site it was generated or be properly removed offsite to a proper DOE disposal facility. In order to release the site for unrestricted use, the scale material must be properly packaged and transported to a DOE disposal facility in accordance with applicable DOE, DOT, and state regulations.

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ACRONYMS

ACM	Asbestos-Containing Material
BLM	Bureau of Land Management
EPA	United States Environmental Protection Agency
DOE	United States Department of Energy
DOT	United States Department of Transportation
dpm	disintegrations per minute
GO	Golden Field Office
GTF	East Mesa Geothermal Component Test Facility
MAC	Maximum Allowable Concentration
MCL	Maximum Contaminant Level
μR/hr	micro-Roentgen per hour
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NORM	Naturally Occurring Radioactive Material
OSWER	EPA Office of Solid Waste and Emergency Response
PCB	Polychlorinated Biphenyl
pCi/g	picocuries per gram
RADCON	DOE Radiological Control Manual
RCA/ICA	Radiological Controlled and Internal Contamination Area
RCRA	Resource Conservation and Recovery Act
REM	Roentgen Equivalent Man
SVOC	Semi-Volatile Organic Compound
STLC	Soluble Threshold Limit Concentration
TPH	Total Petroleum Hydrocarbon
TTLC	Total Threshold Limit Concentration
VOC	Volatile Organic Compound

1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this report is to present the findings from the Phase II site characterization activities conducted at the El Centro Geothermal Component Test Facility (GTF) in March 1993. The activities were conducted in accordance with the Phase II Site Characterization Plan (Appendix A). Phase II activities were conducted to ascertain if specific areas were subjected to hazardous waste spills or contaminated with naturally occurring radioactive material (NORM) from past operations. The locations sampled and surveyed during Phase II activities had been identified during the Phase I Site Investigation/Securing as potentially containing hazardous or radioactive materials. Section 2 of this report summarizes Phase I activities while Section 3 gives the results of the Phase II sampling and survey activities.

1.2 Site Summary

The GTF is located approximately 20 miles east of El Centro, California and approximately 140 miles east of San Diego and is owned by the United States Department of Energy (DOE). It is currently being managed by the DOE Golden Field Office (GO). The site consists of approximately 30 acres of land which is leased from the Bureau of Land Management (BLM).

The function of this site was to provide a geothermal resource for a variety of research projects. To help achieve this function, the site contained a fully equipped laboratory for chemical and materials analysis. Throughout its operational history, the facility was utilized by various groups which consisted of public, academic, and private organizations. More detailed information regarding the history and characteristics of the GTF site can be found in the Phase II Site Characterization Plan.

Access to the facility is via Interstate 8 which traverses the Imperial Valley from San Diego, California to Yuma, Arizona. The Van Der Linden Road exit from Interstate 8 provides access to Evan Hewes Road, which runs parallel to the interstate on the north side. The GTF sign can be seen off of Evan Hewes Road approximately one mile east of the interstate exit. The sign indicates the paved access road that runs to the GTF site. The access road is approximately 2 miles long and ends at the facility which is on the west side of the road. Figure 1-1 provides an overview of the site layout.

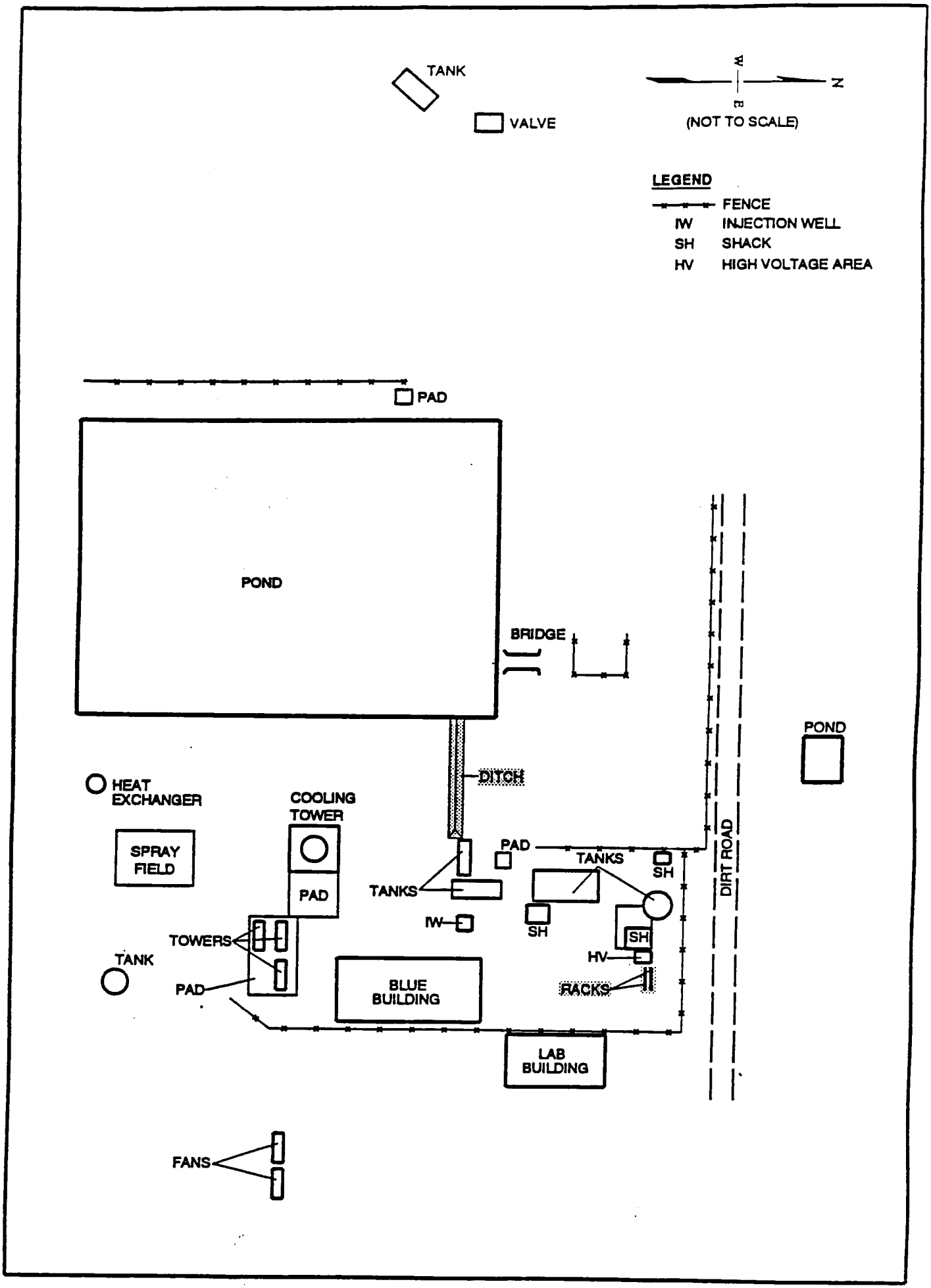

FIGURE 1-1 DETAILED SITE LAYOUT

2.0 PHASE I SITE CHARACTERIZATION ACTIVITIES AND RESULTS

Phase I activities were conducted in August of 1992. These activities consisted of the following: site securing; asbestos survey; hazardous material survey; and radiological surveys and removable residual sampling of piping and equipment to identify any naturally occurring radioactive material (NORM) contamination.

2.1 Site Securing

During the week of August 10, 1992, Dames & Moore personnel supervised the securing of physical hazards on the GTF site. The principal activities that took place included the following: lowering of the heat exchange tower and a tank-like tower; confirming that all electrical service to the site was inactive; and closing of any existing surface holes. Site securing activities are detailed in the Phase I Site Securing (Tasks 4, 5, and 6) letter report which is presented in Appendix B.

2.2 Asbestos Survey

A visual site survey was conducted on August 24-26, 1992 by Dames & Moore to identify locations of suspected asbestos containing material (ACM). Asbestos was identified in nine of the eighteen samples collected from the suspected locations. Nine of the samples tested positive for asbestos. Loose and potentially hazardous ACM was collected and properly stored at the GTF site by a certified abatement contractor. The bagged ACM was removed from the site on January 6, 1993 by a licensed transporter, and disposed at the U.S. Pollution Control site in Clive, Utah. For more detailed information regarding these activities, please refer to the Phase I Asbestos and Potential Hazards (Tasks 2 and 3) letter report which is presented in Appendix C.

2.3 Hazardous Material Survey

On August 24-26, 1992, a visual survey of the site was conducted to identify locations suspected of containing hazardous materials or areas potentially contaminated from past facility operations. The locations that were delineated in the survey are described in the Phase II Site Characterization Plan (Appendix A). More detailed information regarding the Phase I survey and its results can be found in the Phase I Asbestos Survey & Potential Hazards Survey (Tasks 2 and 3) letter report which is presented in Appendix C.

2.4 Naturally Occurring Radioactive Material Surveys and Sampling

Naturally occurring radioactive material (NORM) surveys were performed on August 24-25, 1992. Using external radiation detection instruments, GTF piping and equipment were surveyed for NORM. In addition, samples of pipe scale were collected to characterize the radioactive constituents. With two exceptions, the survey and sampling results did not indicate detectable radioactive material in the GTF production piping and a majority of the equipment on the site. However, external radiation levels were detected at approximately 15-30 times above normal background levels ($\approx$8-12 micro-Roentgen per hour [μR/hr]) at approximately one inch from a GTF non-production pipe "rack" located in the north-west area of the facility. A second pipe rack also exhibited elevated radiation levels that were 3-5 times above background levels. External radiation levels at one foot above ground surface were observed at 2-6 times above normal background levels in a ditch that runs from north to south into the brine pond. Detailed information regarding the Phase I survey and results are provided in the Phase I NORM Surveys (Task 7) letter report which is presented in Appendix D and the Phase II Site Characterization Plan presented in Appendix A.

3.0 PHASE II SITE CHARACTERIZATION ACTIVITIES AND RESULTS

Phase II site characterization activities were conducted on March 24-26, 1993. These activities consisted of four parts: sampling and analysis of locations suspected of containing hazardous materials; radiological sampling and analysis of a pipe "rack" and the ditch that runs north to south into the brine pond; surveying for NORM contamination in the surface soils within the facility; and surveying for removable radiological surface contamination within site piping. The technical approach to the Phase II activities are detailed in Appendix A, the Phase II Site Characterization Plan.

3.1 Sampling and Analysis for Hazardous Materials

Samples were collected from thirteen locations identified during Phase I activities as being potentially contaminated with hazardous materials. Three locations could not be sampled due to insufficient amounts of liquid, gas, or solid media. Descriptions and illustrations of the selected sampling locations are provided in the Phase II Site Characterization Plan, attached to this report as Appendix A.

As delineated in the Phase II Site Characterization Plan, detected sample concentrations were compared to California Soluble Threshold Limit Concentrations (STLC) and Total Threshold Limit Concentrations (TTLC) to assess whether or not a material could be considered a hazardous waste. If observed contaminant concentrations exceeded the constituent-specific limits, the material would be classified as being hazardous. Where California STLC values were not available for constituents in liquids, EPA maximum contaminant levels (MCLs) were used. Where EPA MCLs or California TTLC/STLC values were not available for contaminants in solids or liquids, maximum allowable concentrations (MACs), which are guideline values for specific constituents that were developed by the EPA Office of Solid Waste and Emergency Response (OSWER), were then used. MACs are based on a public health risk of $1x10^{-6}$ (unitless probability of an individual developing cancer) resulting from exposure to a contaminant (EPA 1990). Contaminant concentrations exceeding the MAC values will yield a risk exceeding $1x10^{-6}$

and would classify the material as being hazardous. TTLC, STLC, MCL, and MAC values are presented in Appendix E.

The following sections describe the samples taken and their respective analysis results. Phase II Site Characterization Plan identification labels for each sampling location are given with the location title in parentheses. The results of the laboratory sample chemical analyses are provided in Appendix F. Table 3-1 presents the maximum contaminant concentrations detected in the representative samples along with their corresponding regulatory limits.

Evaporative Spray Area Located East of the Brine Pond (CHR-1)

Four soil samples were taken which were analyzed for the following: volatile and semi-volatile organic compounds (VOCs and SVOCs); total threshold limit concentration (TTLC) metals; herbicides; pesticides; and toxicity (California bioassay test). Several inorganics were detected in the samples; however, the inorganic concentrations are less than the California STLC and TTLC limits. Organic compounds, pesticides, and herbicides were not detected in any of the samples. All of the samples analyzed in the California bioassay analyses tested negative for toxicity.

Salt Blocks Stacked on Pallets (CHR-2)

Solid samples were composited from the salt blocks to form two representative samples. These samples were analyzed for potassium, sodium, calcium, chlorides, and corrosivity. The corrosivity test was performed on the samples to determine if the salt is characteristically hazardous. The pH values of both samples were found to be approximately 8 which is acceptable. If a material exhibits a pH of less than 2 or greater than 12, then it is considered corrosive.

Old Transformer Site Located by the Salt Blocks (CHR-3)
Old Transformer Site Located at the Dismantled Substation (CHR-6)
Old Transformer Site Located Near the White "Flammable" Tank (CHR-7)

Two composite soil samples were collected from the area surrounding each of the transformers and were analyzed for polychlorinated biphenyls (PCBs). The laboratory results indicate that no PCBs were not present in the samples. However, technical chlordane, a pesticide, was detected in a sample taken at CHR-6 while technical chlordane, gamma-chlordane, and alpha-chlordane were detected in the samples taken at CHR-7. The concentrations of these chemicals, however, are below the California STLC and TTLC limits.

Blue Tank Along North Fence Line with No Markings (CHR-4/GTF-4)

A sample was collected from the standing liquid in the tank and was analyzed for organic compounds. This sample drained the remainder of the liquid that was left in the tank. Acetone was qualitatively identified in the sample below the instrument quantitation limit. The concentration of this chemical was compared to the OSWER risk-based MAC for acetone in which it was found to pose public health risk of less than $1x10^{-6}$.

A composite soil sample was taken directly below the tank while another was taken near the tank perimeter. These samples were analyzed for VOAs, SVOAs, and TTLC metals. There were no chemicals detected in the sample taken beneath the tank. However, several inorganics along with acetone, methylene chloride, toluene, and xylenes (total) were detected in the sample taken near the tank perimeter. All of the inorganic concentrations are below the California STLC and TTLC limits. The concentrations of acetone, methylene chloride, toluene, and xylenes (total) were compared to their respective OSWER risk-based MACs in which they were found to pose a public health risk of less than $1x10^{-6}$.

Table 3-1 Maximum Detected Concentrations and Applicable Regulatory Limits

Chemical	Maximum Concentration Solids (mg/kg)	Maximum Concentration Liquids (mg/L)	Regulatory Limit Solids (mg/kg)	Regulatory Limit Liquids (mg/L)
Acetone	0.01	0.029	517 (MAC)	25 (MAC)
Arsenic	34	0.0032	500 (TTLC)	5 (STLC)
Barium	130	0.12	10,000 (TTLC)	100 (STLC)
Beryllium	0.4	------	75 (TTLC)	0.75 (STLC)
Chromium	7.8	------	500 (TTLC)	5 (STLC)
Cobalt	3.4	------	8,000 (TTLC)	80 (STLC)
Copper	72	0.074	2,500 (TTLC)	25 (STLC)
Ethylbenzene	------	0.0068	4984 (MAC)	0.7 (MCL)
Lead	18	0.38	1,000 (TTLC)	5 (STLC)
Methylene Chloride	0.0082	------	0.23 (MAC)	0.032 (MAC)
Molybdenum	1.7	0.05	3,500 (TTLC)	350 (STLC)
Nickel	6.4	0.02	2,000 (TTLC)	20 (STLC)
Technical Chlordane	0.460	------	2.5 (TTLC)	0.25 (STLC)
Toluene	0.023	0.0066	11,730 (MAC)	1 (MCL)
Vanadium	7.9	0.011	2,400 (TTLC)	24 (STLC)
Xylenes (total)	0.027	0.044	217,700 (MAC)	10 (MCL)
Zinc	790	0.98	5,000 (TTLC)	250 (STLC)
alpha-Chlordane	0.0102	------	2.5 (TTLC)	0.25 (STLC)
beta-Chlordane	0.0093	------	2.5 (TTLC)	0.25 (STLC)
4,4'-DDD	0.0092	------	1 (TTLC)	0.1 (STLC)

White Tank Along North Fence Labeled "Flammable Gas" (CHR-5/GTF-5)

A gas sample could not be taken of the tank because the valve cock broke off while attempting to open the valve. The pressure gauge on the tank read 0 psi which may indicate that there is little or no gas left. However, the gauge could have malfunctioned during the time between Phase I and Phase II activities.

55-Gallon Drum (GTF-2)
Partially Filled Gallon Container at the Entrance to the Blue Building (GTF-1)
1/2 Full Red 5-Gallon Bucket West of the Blue Building (GTF-3)
Partially Filled 5-Gallon Containers and Pan (GTF-7)

The liquids from the containers located at GTF-1, GTF-3, and GTF-7 were composited. Although planned as part of the composite, a sample could not be taken of the 55-gallon drum because the drum contained no liquid. No exothermic reaction or gas emission was observed as the liquids from the three locations were mixed together. This combined sample was analyzed for VOAs, SVOAs, TTLC metals, and total petroleum hydrocarbons (TPH). Several inorganics were detected in the sample; however, all of the inorganic results are below the California STLC and TTLC limits. VOAs and SVOAs were not detected. Total petroleum hydrocarbons were detected in the sample with a concentration of 2,270 mg/L.

Raised Tank with Attached Hose at the West End of the Site (CHR-11/GTF-11)

A sample could not be collected from this location because the tank apparently contained no liquid. The valve to the tank was fully opened while attempting to sample it but no liquid flowed out. A more thorough check of the tank confirmed that it was empty.

Area Directly North of the Spray Pond (CHR-22)

Two composite soil samples were taken in locations north of the spray pond where contamination may have occurred. These samples were analyzed for VOAs, SVOAs, and TTLC

metals. Several inorganics were detected in the sample; however, all of the inorganic results were below the California STLC and TTLC limits. VOAs and SVOAs were not detected in the samples.

Tank [which appears to have had its top cut off] (CHR 9 & 10/GTF 9 & 10)

One liquid and two solid samples were taken from the bottom of the tank. These samples were analyzed for VOAs, SVOAs, TTLC metals, and toxicity (California bioassay test). One of the solid samples was also tested for corrosivity. Several inorganics were detected in the samples; however, all of the inorganic results were below the California STLC and TTLC limits. VOCs and SVOCs were not detected in the samples. The sample that was tested for corrosivity had a Ph of 7.7 indicating the material is not corrosive. Both samples also tested negative for toxicity.

Buried Tank Estimated to be 24" Diameter by 150'-170' Deep (CHR-8)

A liquid sample was taken from the "tank" using a PVC bailer. This sample was analyzed for VOAs, SVOAs, and TTLC metals. Several inorganics were detected in the sample; however, all of the inorganic results were below the California STLC and TTLC limits. Toluene, ethylbenzene, and xylenes (total) were also detected in the samples. The concentrations of these chemicals were compared to their respective EPA MCLs and were found to be below these limits.

Chemical Shed (GTF-6A)

One composite soil sample was collected at a side of the shed in an area where contamination may have occurred. This sample was analyzed for VOAs, SVOAs, TTLC metals, pesticides, herbicides, and toxicity (California bioassay test). Several inorganics along with 4,4'-DDD, alpha-chlordane, and gamma-chlordane were detected in the sample; however, the chemical

concentrations were below the California STLC and TTLC limits. The sample also tested negative for toxicity.

3.2 Sampling and Analysis for Radioactive Materials

Samples were collected at two locations that were identified during Phase I activities as being potentially contaminated with NORM. Descriptions and illustrations of the sampling locations can be found in the Phase II Site Characterization Plan (Appendix A). The following sections describe the samples and their respective analysis results. Phase II Site Characterization Plan identification labels for each sampling location are given with the location title in parentheses. The results of the radiological sample analyses can be found in Appendix G.

Ditch that Runs North to South into the Brine Pond (CHR-14)

Two composite soil samples were taken in an area within the ditch that were found to have elevated external gamma radiation levels of 15-60 μR/hr during Phase I activities. Four other composite soil samples were taken at 10 meter intervals along the centerline of the ditch. A seventh sample was collected in a soil area outside the ditch that had background external gamma radiation levels (less than 10 μR/hr). All of these samples were analyzed with alpha and gamma spectroscopy. The detected radionuclides concentration values for each sample were used in the DOE RESRAD modeling program to estimate the doses that could potentially be received by a future onsite resident as a result of exposure to the soil contained in the ditch. One RESRAD modeling run was performed for each sample radionuclide set. The results of the RESRAD models show that the maximum dose that could be received by a future onsite resident in a year as a result of exposure to the radionuclides in the ditch's surface soils would be less than 20 mREM/yr, which is well below the 100 mREM/yr limit. Thus, the radionuclide concentrations are below the soil guidelines per the criteria specified in Section 2a, Chapter 4 of DOE Order 5400.5. The seven RESRAD model evaluations are presented in Appendix H.

Two of the seven samples taken from the ditch were also analyzed for RCRA 8 metals. Arsenic, lead, chromium, barium, and mercury were detected in the samples. However, the concentrations of these inorganics were below the California STLC and TTLC limits.

Rusted Pipe Rack [potentially contaminated with NORM] (CHR-21)

Two samples were taken from one of a pair of rusted pipe "racks" that were identified during Phase I activities as potentially posing a radiological health threat. The first sample was a three inch section of pipe that was cut from the rack in an area with the highest external gamma radiation levels (15-32 times above background levels). The second sample consisted of the scale material that was removed from the 3" pipe section. Analytical results indicate that the radionuclide concentrations within the 3" pipe section metal are below applicable DOE guideline limits. However, the results of the pipe scale analysis indicate a radium (Ra-226) concentration of 1,300 pCi/g. This concentration is above the DOE soil guideline limit of 5 pCi/g for Ra-226 (DOE 1992).

3.3 NORM Survey of Site Surface Soils

A radiological survey was conducted throughout the site to determine if NORM contamination existed in the surface soils. External gamma radiation readings were taken at approximately one foot above ground surface at ten meter intervals along north-south and east-west lines within the perimeter of the site. All of the measurements were found to be below the administrative external radiation exposure limit of 50 μR/hr (all of the measurements were below 20 μR/hr which includes background levels of 8-12 μR/hr) which is based on the criteria defined in Chapter 14 of the Louisiana Radiation Regulations for NORM (Louisiana is the only state that has established NORM regulations).

3.4 Radiological Surface Contamination Surveys of Site Piping

Thirty-two wipe samples were collected from accessible piping scattered around the site. A sample was collected by wiping a 1.75" diameter smear across 100 cm^2 (approximately 4 in^2) of the interior of a pipe. Each smear was analyzed for alpha activity using an Eberline Model ESP-II scaler instrument coupled with a Ludlum Model 43-10 alpha sample counter. The results of the wipe sample analyses are presented in Table 3-2. All of the wipe samples had activities less than 15 disintegrations per minute (dpm) per 100 cm^2. These results are less than the DOE removable contamination guidelines that are presented in Table 3-3.

A wipe sample was taken of the interior of the 3" pipe section that was cut out of the pipe rack. The sample was taken after the scale material had been removed. The activity of the material on the wipe was less than 15 dpm per 100 cm^2 which is less than the DOE removable contamination guidelines presented in Table 3-3.

TABLE 3-2
WIPE SAMPLE RESULTS

Wipe Sample Number	Item Sampled	Activity (dpm/100 cm^2)	Wipe Sample Number	Item Sampled	Activity (dpm/100 cm^2)
1	Pipe	< 15	18	Pipe	< 15
2	Pipe	< 15	19	Pipe	< 15
3	Pipe	< 15	20	Pipe	< 15
4	Pipe	< 15	21	Pipe	< 15
5	Pipe	< 15	22	Pipe	< 15
6	Pipe	< 15	23	Pipe	< 15
7	Pipe	< 15	24	Pipe	< 15
8	Pipe	< 15	25	Pipe	< 15
9	Pipe	< 15	26	Pipe	< 15
10	Pipe	< 15	27	Pipe	< 15
11	Pipe	< 15	28	Pipe	< 15
12	Pipe	< 15	29	Pipe	< 15
13	Pipe	< 15	30	Pipe	< 15
14	Pipe	< 15	31	Pipe	< 15
15	Pipe	< 15	32	Pipe	< 15
16	Pipe	< 15	33	Pipe Rack	< 15
17	Pipe	< 15			

TABLE 3-3
SURFACE CONTAMINATION GUIDELINES

Radionuclides[2]	Allowable Total Residual Surface Contamination (dpm/100 cm²)[1]		
	Average[3,4]	Maximum[4,5]	Removable[4,6]
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231.	Reserved[8] (100)	Reserved[8] (300)	Reserved[8] (20)
Th-Natural, Sr-90, I-126, I-131, I-133, Ra-223, Ra-224, U-232, Th-232.	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay product, alpha emitters.	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.[7]	5,000	15,000	1,000

Reference: (DOE 1992)

Notes:

1 As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

2 Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

3 Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

4 The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

5 The maximum contamination level applies to an area of not more than 100 cm^2.

6 The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

7 This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

8 The acceptable surface contamination levels for this category are not defined by DOE. The values listed in parentheses were taken from Nuclear Regulatory Commission guidelines (NRC 1982)

4.0 CONCLUSION AND RECOMMENDATIONS

Most of the Phase II sampling results indicate little or no hazardous waste or hazardous waste contamination above applicable regulatory limits, and the radiological survey of the site surface soils revealed no NORM contamination. However, areas requiring consideration and possible corrective action prior to release of the site were identified as follows:

- Combined liquids that were taken from the containers located at GTF-1, GTF-3, and GTF-7 (Section 3.1.6).
- White tank along the north fence labeled "Flammable Gas" (CHR-5/GTF-5) (Section 3.1.5)
- Pipe racks containing scale material (CHR-21) (Section 3.2.2)

Each of these items, along with recommended actions are discussed below.

Combined Liquids from Containers at Locations GTF-1, GTF-3, and GTF-7

Petroleum hydrocarbons were detected in the combined liquids that were taken from the containers located at GTF-1, GTF-3, and GTF-7. This material cannot be disposed of onsite because it may potentially contaminate soils and groundwater. This liquid should be taken offsite by an appropriate contractor to be properly treated, recycled, or disposed.

White Tank Along the North Fence Labeled "Flammable Gas" (CHR-5/GTF-5)

Removal of the white tank along the north fence labeled "Flammable Gas" may require special precautions. As a result of being unable to sample the tank due to the broken valve, the identity and quantity of the gas constituents within the tank are unknown. The pressure gauge on the tank displays a reading of 0 psi which would indicate that the tank contains little or no

gas. However, this gauge may not be working properly and may be giving a false pressure reading. An attempt should be made to fix the valve which would be followed by gas sampling of the tank. If this is not possible, a contractor that is licensed and properly qualified to dispose of tanks with unknown and inaccessible contents may be required to remove the white tank from the GTF site.

Pipe Racks Containing Scale Material (CHR-21)

The sample taken of the scale material from the rack with radiation levels 15-32 times above background was found to have a radium concentration of 1,300 pCi/g which is significantly higher than the DOE limit of 5 pCi/g (DOE 1990). As a result, this material is classified as Class A low-level waste based on the criteria specified in 10 CFR 61.55 and Attachment 2 of DOE Order 5820.2A (DOE 1988). DOE's policy regarding low-level waste, as defined in DOE Order 5820.2A (DOE 1988), dictates that the waste "shall be disposed of on the site at which it is generated, if practical, or if on-site disposal capability is not available, at another DOE disposal facility." Disposal of the scale material onsite would not allow for the site to be released without restriction. In order to release the GTF site for unrestricted use, the scale material must be properly shipped in accordance with applicable DOE, DOT, and state regulations to a proper DOE disposal facility.

The area where the pipe racks are located should be clearly designated as a Radiological Controlled and Internal Contamination Area (RCA/ICA) as defined by the DOE Radiological Control (RADCON) Manual (DOE 1992). Radiological posting requirements should also be implemented as specified in the RADCON manual to warn individuals of the radiological hazards associated with the pipe racks and scale material (DOE 1992).

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