2084

NuTECH Enterprises, Inc.

SOLAR ONE PROJECT
TESTING PROTOCOLS AND
SITE EVALUATION PLAN

LOCATED AT:
SOLAR ONE FACILITY
DAGGET, CALIFORNIA

PREPARED FOR:
CUNNINGHAM-DAVIS COMPANY
11062 MULBERRY AVENUE
FONTANA, CALIFORNIA 92335

NOVEMBER 1993

4749 Oceanside Blvd., Ste. J, Oceanside, CA 92056
(619) 631-0631 • (800) 722-8896 • FAX: (619) 631-0636

TABLE OF CONTENTS

I. SITE DESCRIPTION

1.1 Solar One Site

The Solar One project site is located in central Daggett, California. Daggett is located in the County of San Bernardino, four miles east of the city of Barstow, Ca.

The site is home to an experimental power plant operated by Southern California Edison (SCE) in cooperation with nine other Power/Water related associates.

1.2 Potential Environmental Risks

A) Air Quality: Due to the low volatility of Caloria HT43^{tm} Oil, no air quality impacts should occur during decommissioning procedures.

B) Soils and Groundwater: U.S. Geologic Survey Investigations obtained on groundwater sources relative to the demolition area places it at 90 to 100 feet below ground surface (bgs). The maximum depth of excavation projected for the site is 20-25 feet bgs. This would occur below the Thermal Storage Tank (TST).

Risks to soils could be impacted by oil spilled during demolition or loading and off-loading of tanker trucks. Attempts are to be made to transfer oil and operate de-contamination of piping and related equipment within the existing concrete containment areas. Any minor spills will be isolated, logged and tested for concentration levels prior to Final Closure Report. Verification data of spill removal efforts will be included in Final Report.

Ponds, streams, or surface water run-off impacts are not considerations on this particular site. Prevention and containment procedures are to be followed in any spill or potential spill areas.

they are now because of the rock pile

II. SITE INVESTIGATION AND SEGREGATION PLAN

2.1 Field Investigation, Characterization and Site Profiling

Field investigation of the Solar One Facility has revealed the following potentials for short and long-term human health and environmental risks:

A) Insulation materials;
B) Heptane storage and processing equipment;
C) Propane storage and related equipment; and
D) Caloria Oil product, and cross-contaminated Thermal Storage reservoir sand/gravel as well as related equipment.

All items outlined above are to be categorized and certified as non-regulated/non-hazardous materials and as such will be recycled or disposed of according to all regulatory limits by the State of California and Federal EPA mandates. Profile sheets certifications of classification, manifests and/or Bill of Lading will be included in the Final Site Report.

2.2 Segregation Plan of Contaminated Materials

During demolition and removal procedures all precautions will be employed to ensure the mitigation of contamination or contaminated materials.

A) Spill containment pad for off-loading of Caloria Oil onto tanker trucks.

B) Rinsing of heat exchangers, boilers, pumps and related equipment with bio-degradable surfactant solution.

C) Disposal of rinseate waters by containment and vacuum trucks to be transported off-site for recycle.

D) Segregation of contaminated rags, insulation and/or soils and drumming of waste in D.O.T. approved containers.

E) Segregation of contaminated concrete from non-contaminated concrete for steam-cleaning and disposal to a Class II Landfill.

All contaminated materials will be segregated to a specified decon area and treated as needed with surfactants, steam cleaning, physical expulsion or a combination of all as required to certify Environmental Compliance.

III. OIL/WATER SEPARATOR THERMAL STORAGE TANK AND UST PROFILING

3.1 UST Decommissioning/Disposal

The Fram^{tm} oily-water separation tank is manufactured of steel and is approximately 10 feet wide x 18 feet long x 9 feet in depth, and is buried on site. The tank is to be triple-rinsed and vacated of all liquids by use of vacuum-trucks and hand squeeging. Tank will then be removed once certified as RCRA rinsed for demolition. Steel is to be sheered and disposed of as scrap-metal for recycle.

Plastic separation grates are to be removed and triple-rinsed with surfactant and steam high-pressure cleaning. They will then be certified as disposable to a Class III Landfill.

3.2 Soils Profiling

Profiling of under tank solids and soils will be performed in accordance with acceptable protocol as required by the County of San Bernardino - UST Removal Guidelines. Because the TST is 60 feet diameter 12 soil samples will be taken from beneath the tank at depths of 3-5 feet below tank bottom in 6 sectors. Testing will be performed utilizing EPA Testing Method 418.1 for Total Petroleum Hydrocarbons. Samples will be archived and tested for acceptable deviations.

7' concrete below tank bottom

In accordance with County of San Bernardino requirements, one sample will be taken at 20 foot intervals for any piping related to the thermal storage tank. Sampling will be specified at any joints or manifolds and will be taken at a depth of one foot below pipe trench bottom. All samples will be tested for EPA Method 418.1 for Total Petroleum Hydrocarbons and will be archived.

3.3 Mitigation Efforts

After excavation of tank and related piping any visibly stained soils will be removed and stockpiled for verification of contamination levels. It has been revealed by SCE Engineers that an overflow of oily water was released to the surface area surrounding the UST. Confirmatory samples will be collected verifying complete removal of contaminated materials. Typically these will be obtained by hand auger approximately 5 feet into undisturbed soils along the four walls and within the excavation bottom. These samples will be tested for TRPH as US EPA Methods 418.1. Samples will be archived. The segregated contaminated sandy-soils will then be incorporated into asphaltic concrete or road base mix along with the TST materials.

IV. VERIFICATION TESTING FOR FINAL CLOSURE

4.1 Sample Grid

Enclosed is drawing Figure No. "A", titled Random Sample Grid. This drawing is divided into five 20 foot square grid areas. Each area was segregated by either functions performed in that area, equipment utilized in that area or physical changes in elevation or surface materials, for example sand vs. concrete. They are as follows:

1. "Stockpile Area"

This is a native soil area that was utilized for the crushing and washing of the TST sand and gravel contents. This area is to be protected by a petroleum resistant liner material. All seams are to be welded and the area bermed for containment of end product.

2. "TST Tank Area"

This is the concrete lined area under and surrounding the TST and Heptane reservoir.

3. "Pipe Chase Area"

This is the native soil area known as the "Pipe Chase" and concrete lined pipe alley ways.

4. "Equipment Pad Area"

This is the concrete lined equipment pad location.

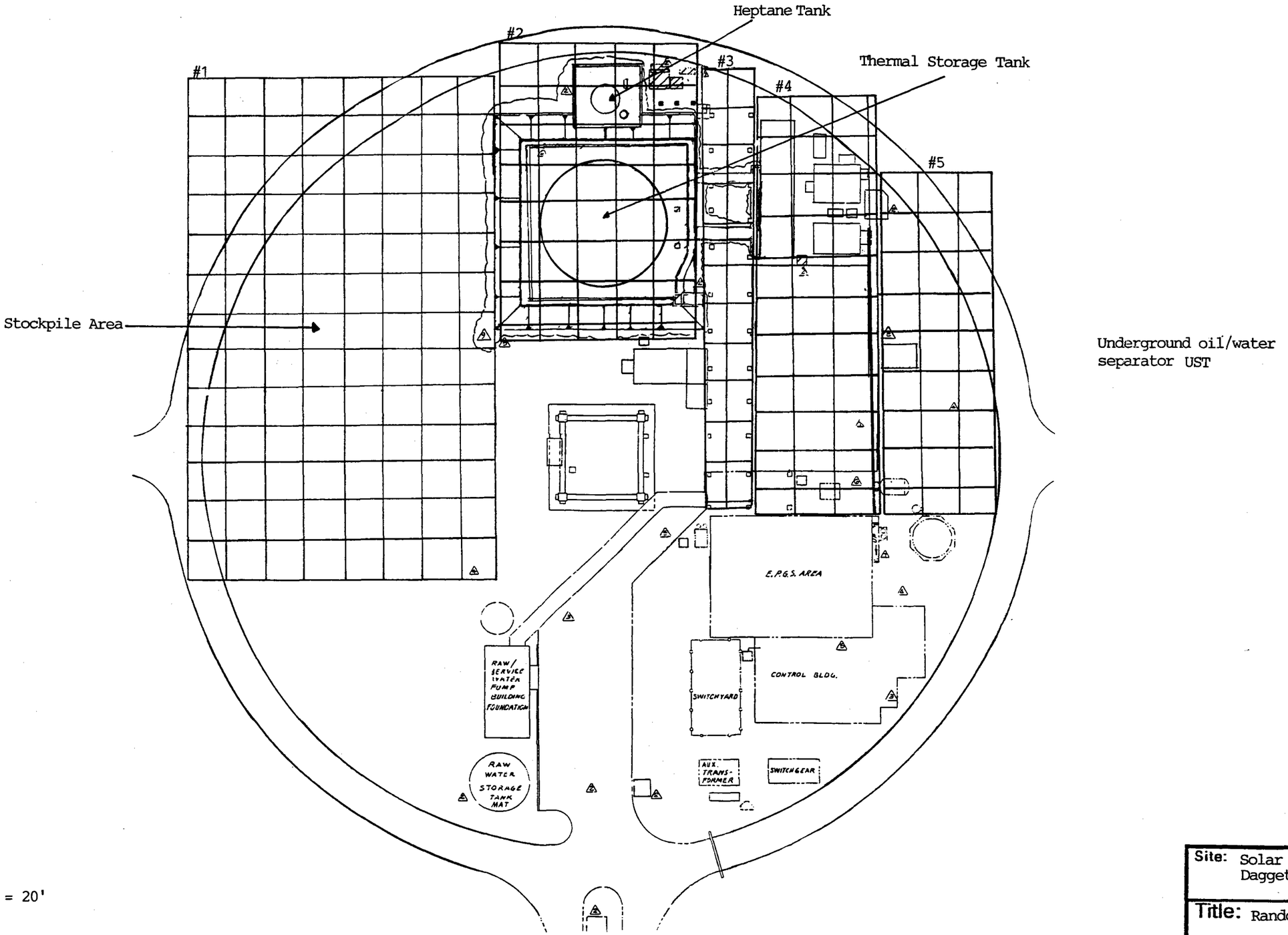
5. "UST Area"

This is a native soil area surrounding the oily/water separator UST.

4.2 Lab Testing for Final Closure

After excavation of all visibly stained soils, confirmatory samples will be collected and analyzed for the purpose of verifying complete removal of contaminated materials from Areas 1 through 5.

Sampling will be for 418.1 Total Petroleum Hydrocarbons with testing being performed by MacDonald-Stephens Laboratories of Laguna Hills, California. The 418.1 testing background has been established at this lab for Caloria Oil detection limits and fingerprints.



Scale: 3/8" = 20'

Site: Solar One - Edison Daggett, CA	
Title: Random Sample Grid	
Figure No.: 5	NU TECH Enterprises, Inc.

Sampling will be done following these protocols:

A) As needed on visual inspection of soils that appear tainted by Caloria Oil or an odor of such is detected;

B) Below any piping, concrete or suspect areas divulged by the history of the site or physical excavations during demolition of designated areas.

C) On a "Random" basis as dictated in accordance with California Code of Regulations, Title 22, Section 66694 entitled "Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods, SW-846, Third Edition," U.S. EPA Publication, 1986. (See enclosed Appendix A)

This worksheet is based on information found in Volume II, Part III, Chapter 9, of "SW-846" and is provided as an aid for site characterization.

Using a similar modeling tool, a sampling plan will be generated for the mitigated soils.

Thus, it is calculated that discrete samples will be obtained and tested for TPH Caloria Oil with US EPA method 418.1 of the five designated areas. Of the discrete samples, the highest (or 25%) will be analyzed for BTX&E with US EPA Method 8020. The discrete samples will be obtained using the number shown below:

Area	No. of Samples	25%
Area 1	24 Discrete	(6)
Area 2	12 Discrete	(3)
Area 3	6 Discrete	(2)
Area 4	8 Discrete	(2)
Area 5	8 Discrete	(2)

The discrete samples will be obtained using random numbers assigned to grids within each tests area. Grids and sample points will be generated using a computer map generated through a dimensional axis. The sample grid and random numbers will be included in the Final Report.

Once verification test locations have been established, discrete soil samples will be obtained from each location and logged in Chain of Custody Forms as they are obtained. Each sample will require a washed (TSP and triple rinse with DI water) hand trowel tool to place and pack soils into a Glass Jar, to eliminate head space. The jars will then be capped with Teflon lined lids, sealed with electrical tape, and

labeled for time, location and sample point number. Stored in a closed container on ice, the samples will be transported to MacDonald-Stephens Laboratories in Laguna Hills, California, a California DHS certified lab for testing.

When data is available it will be displayed along with a statistical analysis to demonstrate contaminant removal efficiencies. The display will be submitted to Cunningham-Davis along with a request to proceed to Final Closure of the site. Once permission is obtained to proceed, the test areas and treated soils will be decommissioned.

V. LIMITATIONS

5.1 Workplan Limitations

Evaluations stated in this workplan are the corroboration of information provided to NuTECH Enterprises from earlier reports by Dames & Moore, Southern California Edison, Sandia Labs and U.S. Department of Energy and its representatives. The information in this Report is limited to current knowledge of testing performed on Caloria Oil and the MSDS sheets provided to NuTECH Enterprises.

Such information is assumed to be correct and representative. NuTECH Enterprises expressly disclaims any responsibility for any inaccuracy of information supplied by others in the preparation of this Report.

Changes in applicable or appropriate standards may also occur as a result of legislation or the broadening of knowledge. As a consequence, the findings of this Report may be entirely or partially invalidated by changes beyond NuTECH's control.

The opportunity to be of service is sincerely appreciated. Questions regarding this report may be directed to NuTECH at (619) 631-0631.

Submitted by,

Peter Lavelle
Senior Project Manager
NuTECH Enterprises, Inc.

* * *

STOCKPILE STATISTICS WORKSHEET
SIMPLE RANDOM SAMPLING AND SYSTEMATIC RANDOM SAMPLING

1	List sample results from laboratory Analytical Method _____ Units (i.e. mg/kg) _____	1	2	3
		4	5	6
		7	8	9
2	Determine number of sample values n		n =	
3	Calculate sample mean With n = number of sample measurements $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$		$\bar{x}$ =	
4	Calculate sample variance $s^2 = \frac{\sum_{i=1}^{n} x_i^2 - \frac{(\sum_{i=1}^{n} x_i)^2}{n}}{n-1}$		s^2 =	
5	Calculate sample standard deviation $s = \sqrt{s^2}$		s =	
6	Calculate degrees of freedom $df = n-1$		df =	
7	Calculate standard error of the mean $s_{\bar{x}} = \frac{s}{\sqrt{n}}$		$s_{\bar{x}}$ =	
8	Obtain student's 't' value corresponding to the degree of freedom value determined in #6 above. (See attached Table reproduced on the back of this page.)		$t_{.20}$ =	
9	Calculate the confidence interval $CI = \bar{x} \pm t_{.20}\, s_{\bar{x}}$		CI =	
10	Obtain regulatory threshold for the contaminant of concern RT		RT =	
11	Calculate $\Delta = RT - \bar{x}$		Δ =	
12	Estimate minimum number of samples $n_{min} = \frac{t_{.20}^2\, s^2}{\Delta^2}$		n_{min} =	

TABULATED VALUES OF STUDENT'S '*t*' FOR EVALUATING SOLID WASTES

Degrees of Freedom *df* [1] (*n*-1)	Tabulated $t_{.20}$ value [2] (80% confidence interval)
1	3.078
2	1.886
3	1.638
4	1.533
5	1.476
6	1.440
7	1.415
8	1.397
9	1.393
10	1.372
11	1.363
12	1.356
13	1.350
14	1.345
15	1.341
16	1.337
17	1.333
18	1.330
19	1.328
20	1.325
21	1.323
22	1.321
23	1.319
24	1.318
25	1.316
26	1.315
27	1.314
28	1.313
29	1.311
30	1.310
40	1.303
60	1.296
120	1.289

[1] Degrees of freedom (*df*) are equal to the number of samples (*n*) collected less one.

[2] Tabulated '*t*' values are for a two-tailed confidence interval and a probability of 0.20, (80% confidence level) the same values are applicable to a one-tailed confidence interval and a probability of 0.10 (90% confidence level).