

To: John Jones and Stephanie Jennings, US Department of Energy (DOE)
From: David Collins, Mark Sherwin, Dixie Hambrick (MWH)
Cc: Dave Dassler (Boeing)
Date: September 4, 2013
Re: Rough Order of Magnitude Estimates for AOC Soil Cleanup Volumes in Area IV, and Associated Truck Transport Estimates based on DTSC Look-up Table Values - DRAFT

I. Introduction

In June 2013, United States Department of Energy (DOE) requested that MWH Americas, Inc. (MWH) use available Area IV soil sampling data and the Geographic Information System (GIS) to estimate rough-order-of-magnitude (ROM) soil cleanup volumes based on recently issued Lookup Table (LUT) values, and associated soil transport truckloads. This Technical Memorandum (TM) summarizes the evaluation, and presents ROM soil volumes and associated truckloads for three scenarios: Chemical Clearly Contaminated Areas (CCAs), Radiological Cleanup Areas, and Chemical LUT Cleanup Areas. Information presented below for the CCA and Radiological Cleanup Areas is the same as provided to DOE in April 2013, but included here for completeness and to provide contrast with the Chemical LUT estimate.

Prior to describing the applied cleanup criteria and evaluation results, the following describes the approach used to develop estimated soil volumes common to each case.

1. Cleanup footprints were drawn around locations where sampling results displayed in GIS exceeded the cleanup criteria established for each scenario (see below). As described below, all soil volume estimates exclude areas where volatile organic compounds (VOCs) exist alone since these are assumed to be remediated using different treatment technologies.
2. To estimate the average depth of cleanup for each footprint area, filterable analytical result datasets were used to evaluate the depth of exceedances in the cleanup footprints. The range of exceedance depths within each footprint area was used to estimate an average depth of soil above screening levels within each footprint. Average depths were multiplied by respective footprint areas to calculate *in situ* cleanup volumes. Also, additional GIS data displays have been prepared to aid in this evaluation as described below.
3. *In situ* soil volumes were converted to *ex situ* soil volumes using a 30% factor to account for soil volume expansion following excavation. *Ex situ* soil volumes are used in the summaries provided below.
4. In some cases topographic features, including surface water drainage pathways, lined and unlined channels, ponds, and bedrock extents, were evaluated to estimate cleanup footprints and volumes. In drainages and channels with multiple exceedances, large sections (or in some cases entire sections) of the drainage or the channel feature were used as the cleanup footprint. Sampling data within the banks of the drainage or sides of the channel were used to define lateral extent, and depth of bedrock was used to define vertical extent. If several exceedances occurred in a pond or surface water collection area, the entire footprint of the

feature was considered for cleanup. Bedrock outcrops were used to define lateral extent of cleanup volumes.

5. The extent of historical operational areas was also considered in estimating cleanup footprints and volumes. In areas with multiple exceedances and significant historical operations and chemical use (i.e., Sodium Reactor Experiment [SRE], Radioactive Materials Handling Facility [RMHF]), the cleanup area included the entire footprint of historical operations and the cleanup depth was assumed to be the deepest exceedance depth (also considering physical constraints such as depth to bedrock).
6. Geophysical anomalies mapped by United States Environmental Protection Agency (EPA) were considered in estimation of cleanup footprints and volumes in soil fill areas where fill was extensive and multiple exceedances were observed throughout (i.e., Building 4059 Systems for Nuclear Auxiliary Power [SNAP], SRE, Sodium Component Test Installation [SCTI], Building 4015 field).
7. Consideration of exclusion criteria as allowed by the Administrative Order on Consent (AOC) for federally protected species or cultural resources, or a 5% exclusion factor for yet-to-be-determined reasons, have not been applied to reduce the soil volume estimates presented in this TM. The amount of excluded soil based on these AOC allowances may be substantial for the Chemical LUT estimates provided below.

The estimated soil volumes presented in this TM represent ROM engineering estimates based on the information available to MWH in August 2013, and are considered accurate within a tolerance factor of +50/-30%. These estimates should only be used for project planning purposes, and are not meant to represent the final Area IV cleanup requirements.

II. Clearly Contaminated Cleanup Volume Estimates

As part of DOE's Phase 1 co-located sampling program with EPA, criteria were developed to identify CCAs that would require cleanup based on conservative assumptions regarding the range of anticipated values in the pending Chemical LUT. The CCA approach was utilized to limit EPA's radiological sampling and chemical co-located Phase 1 sampling since the CCAs would require cleanup in any case and further radiological sampling was not warranted.

Working with the California EPA Department of Toxic Substances Control (DTSC), the following criteria were established to identify the CCAs:

1. Chemical concentrations of previously identified risk-driving compounds are generally 10 times (10x) above DTSC-approved Interim Screening Levels (ISLs). Concentrations exceeding two times (2x) ISLs were considered on a case by case basis.
 - a. Data screening was conducted using ISLs and displayed in GIS using color coded ranges based on multiples of the ISL to represent exceedance levels.
 - b. Chemical classes considered in this evaluation include: Dioxins (TEQs), polyaromatic hydrocarbons (PAHs) (particularly benzo(a)pyrene [B(a)P]), polychlorinated biphenyls (PCBs), metals, perchlorate, pesticides, and herbicides.

- c. Total petroleum hydrocarbons (TPH) was only considered if co-located with other chemicals meeting the CCA criteria, and present at concentrations more than 10x the ISLs.
 - d. VOCs, phthalates, and metals considered essential nutrients (sodium, calcium, iron, etc.) were excluded from this evaluation.
2. The areas contain a high frequency and number of chemicals exceeding ISLs. Again, on a case-by-case basis, single chemical exceedances above 2x ISLs were considered.
 3. Chemical contaminant distribution was sufficiently defined for future planning of step-out samples or remedial planning.
 4. DOE agreed that the area would most likely require cleanup.

During the Phase 1 co-located sampling program, 50 CCAs were identified within Area IV. During the Phase 3 chemical sampling program, DOE requested that the above criteria be applied to any new sampling data available to identify any additional CCAs present within Area IV. This evaluation resulted in identification of four new CCAs and the combination of two previous CCAs into a single area (SRE Excavation Area).

The 53 CCAs are shown on Figure 1 and listed in Table 1, along with chemical concentration data, average depth of exceedance, and estimated *in situ* and *ex situ* soil volume estimates. In summary, the 53 CCAs represent approximately 238,000 cubic yards of soil requiring remedial treatment or disposal. The basis for estimating truckloads for transport offsite for this CCA soil volume are presented below and summarized in Table 4.

III. Radiological Cleanup Volume Estimates

In December 2012, EPA published the Final Radiological Soil Characterization Report, including radiological results screened against Field Action Levels (FALs). FALs represent EPA's radiological background threshold value (BTV) and method detection concentration (MDC) screening levels, and do not include Method Uncertainty as recommended in EPA's LUT TM. They are based on BTVs and laboratory MDCs achieved during the EPA characterization program, and are in some cases more than the DTSC Provisional LUT value (e.g., Sr-90), and in some cases less than the Provisional LUT value (e.g., Cs-137). Thus, the ROM volume estimates provided in this TM are very preliminary.

Criteria applied to GIS displays of EPA data using FALs include:

1. EPA data for select radionuclides (as displayed on Figure 5.1 of their final report) were displayed in GIS, with individual radionuclides also available for evaluation.
2. The radionuclides included in this evaluation were: Americium-241, Curium-243/244, Cesium-137, Cobalt-60, Europium-152, Europium-154, Nickel-59, Plutonium-238, Plutonium-239/240, Tritium, and Strontium-90. These radionuclides were those identified by EPA as having activities equal to or exceeding the FAL and that resulted from historical operations.
3. Consistent with EPA's approach, naturally occurring radioactive material (NORM) exceedances were excluded from this evaluation.

4. The FAL exceedances displayed in GIS represent the composite of the individual radionuclide comparisons at any one sampling location. The results were not considered using a factored value above FAL value, rather GIS was used to only show ‘exceedance / non-exceedance’ screening results.

As a conservative assumption, all exceedance areas were included in the estimated ROM volumes, even if the result was equal to the FAL. The extent of radiological soil cleanup areas is shown on Figure 2 and listed in Table 2, along with estimated average depth of exceedance, and *in situ* and *ex situ* soil volume estimates.

In summary, the radiological soil cleanup areas based on EPA data represent approximately 82,000 cubic yards for treatment or disposal. The basis for estimated truckloads for transport offsite for this radiological soil volume are presented below and summarized in Table 4.

IV. Chemical LUT Cleanup Volumes

In June 2013, DTSC issued the Chemical LUT values for 125 chemicals most frequently detected within Area IV, including all background constituents and additional chemicals of interest to DTSC. These values were based on chemical BTVs and method reporting limits (MRLs), with background chemicals adjusted for analytical and decision error uncertainty.

Several of the final LUT values were less than previously estimated LUT values since they were based on the chemical background study BTVs and MRLs, rather than values routinely achievable by multiple laboratories. Also, TPH was included in the Chemical LUT, whereas the preliminary estimate did not include TPH since it was assumed it would be subject to soil treatability findings and would be remediated separately.

DTSC indicated that a second part of the Chemical LUT will be issued during summer 2013, and would reflect required MRLs for the remaining chemicals being investigated at the site. Since the second part of the Look-Up Table has not yet been issued by DTSC, MRLs achievable by several analytical laboratories, similar to or lower than the ISL MRLs, have been used in this evaluation for chemicals not included in the June 2013 Chemical LUT.

LUT Estimates using RFI / Phase 1, 2, and 3 Data

Chemical LUT values issued by DTSC were used to screen previous Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and recent AOC chemical sampling data and develop estimated cleanup footprints, called ‘Preliminary Remediation Areas’ (PRAs), and associated soil volumes. AOC data available for this evaluation included all Phase 1 and 2 data, and a partial Phase 3 dataset (including Subareas 5B, 5C, 3/6, and 7).

Criteria applied to GIS displays using the Chemical LUT values based on BTV or Multi-Lab MRLs include:

1. A comprehensive “all dot” in GIS was used to represent the maximum ratio of detected analytes at each location to their respective Chemical LUT values, comprehensive of included chemical groups.
2. Chemical groups included in this evaluation were: PAHs, B(a)P TEQ, semi-volatile organic compounds (SVOCs) (including phthalates), PCBs, Dioxin TEQ, metals, perchlorate, energetics, pesticides, herbicides, terphenyls, and TPH.

- a. Select metals considered essential nutrients (iron, calcium, phosphorous, etc.) were not included by DTSC in the Chemical LUT and were not used in this ROM volume estimate.
 - b. VOCs were excluded from this evaluation because they can be remediated using different technologies and may be related to groundwater contamination. Although excluded, this decision had no substantive impact on the estimated cleanup volumes since the vast majority (if not all) VOC exceedances are co-located with other chemical exceedances.
3. TPH was screened against the LUT values using a ‘light’ (gasoline) and combined ‘heavy’ (kerosene, diesel, and oil) fraction approach consistent to what had been required by DTSC for the RFI. This approach is conservative since in a few cases, the individual TPH results may be less than the LUT value, while the sum is above. This situation occurs rarely in areas impacted by TPH alone.
 - a. Areas where TPH had not been previously analyzed in samples, but that were surrounded by numerous TPH exceedances were included in PRA footprints even if the primary chemical class results were less than Chemical LUT values.
4. The “all dots” were displayed in GIS to represent a composite of individual chemical comparisons at each sampling location. The results were not considered using any factored value above the Chemical LUT value; rather GIS was used to only show ‘exceedance / non-exceedance’ of screening values.
5. GIS was used to display the depth of a LUT value exceedance at each location along with the depth of analysis at that location. This information was available both for the ‘all dot’ as well as the individual chemical classes. The maximum exceedance and analysis depths were used to help estimate depths for each of the PRA footprints.
6. Sporadic low-level exceedances in the Northern Buffer Zone (NBZ) were considered sufficiently localized to include in unique, small PRAs. These exceedances appear to result from concentrations of naturally occurring compounds or laboratory issues.
7. Volumes of soil that exceed Chemical LUT values and are contiguous and emanating from Area IV and the NBZ were included in this ROM estimate where data currently exist to define extent. Additional sampling is being proposed offsite and in Administrative Area III where necessary to define extent of Chemical LUT exceedances.

Chemical LUT soil cleanup PRAs are shown on Figure 3 and listed in Table 3, along with *in situ* and *ex situ* soil volume estimates and estimated average depth of exceedance. Table 3 also indicates where all or part of a radiological cleanup area is co-located with a PRA.

In summary, the Chemical LUT soil cleanup areas based on RFI and available AOC chemical data represent approximately 1,070,220 cubic yards for treatment or disposal (note: includes soil with co-located radiological exceedances). The basis for estimated truckloads for transport offsite for this Chemical LUT soil volume are presented below and summarized in Table 4.

Upper Range Evaluation

DOE also asked that the Chemical LUT soil volume evaluation consider what an upper-range of soil cleanup volumes might be since not all Phase 3 data were available at the time this ROM

estimate was prepared. The upper range evaluation was done considering the impact of recently available Phase 3 chemical data in Subareas 5B, 5C, 3/6, and 7 compared to the remaining portions of Area IV where Phase 3 data are not yet available. This comparison resulted in an approximate 35% increase in soil volumes compared to RFI and existing AOC data. It should be noted that the recent Phase 3 data showed exceedances of Chemical LUT values in almost the entire footprint of the historical operational areas within the subareas that had been sampled.

A separate upper range estimate evaluation was performed to identify the difference in remedial footprints developed using the Chemical LUT, and the extent of soil within Area IV. This estimate was developed by mapping the extent of major bedrock outcrops shown in aerial photos as a layer in GIS, and assuming soil areas outside of the bedrock outcrops and existing PRA footprints would require remediation to a 2 foot depth. For this evaluation, the soil on the hill slope in the southern portion of Area IV was included in the upper range estimate since there are several chemical PRAs to the west and higher on the slope, radiological cleanup areas also exist in this area, and it is proximal to operational areas to the north. In contrast, the soil areas outside of PRAs within the NBZ were not included in the upper range estimate since the chemical PRAs in the NBZ are based on sporadic exceedances with no discernible pattern related to operational areas onsite, and only a few radiological cleanup areas were identified west or north of the Former Sodium Disposal Facility. This approach to developing an upper range estimate reflects 56% more soil that may have exceedances above the Chemical LUT.

Since the extent of soil outside current PRAs reflects a more conservative estimate for potential Area IV and NBZ AOC soil cleanup, it was used to display the Chemical LUT upper range soil cleanup areas and is shown on Figure 4. In summary, the Chemical LUT upper range soil cleanup areas based on this evaluation represent approximately 1,666,000 cubic yards for treatment or disposal (note: includes soil with co-located radiological exceedances). The basis for estimated truckloads for transport offsite for this Chemical LUT upper range soil volume are presented below and summarized in Table 4.

V. Truckload and Transport Estimates

For truckload transport planning, an average volume of 16 cubic yards per truckload has been assumed based on previous soil removal actions at SSFL. This basis is consistent with Boeing remediation estimates since some waste will be hauled off in 10- to 15-cubic yard capacity roll-off bins, and some will be hauled off in 16- to 18-cubic yard end-dump trucks. Although a more detailed transport/trucking estimate could be prepared, given the ROM nature of the soil volume estimates a more detailed trucking estimate does not seem warranted at this time.

The estimated duration needed for transport of these soil volumes has also been evaluated using a limit of 35 truckloads per day, 5 days per week, and 50 weeks per year. Estimated truckloads for the three soil cleanup scenarios described above are presented in Table 4.

VI. Additional Notes / Assumptions

1. Radiological screening using FALs may result in a conservative volume estimate since FALs do not include uncertainty. However, they are also laboratory dependent and

represent higher values for some radionuclides than published in the DTSC Provisional Radiological LUT (a non-conservative assumption).

2. This ROM volume evaluation was limited to data within Area IV, the NBZ, and adjacent areas currently considered potentially contiguous and emanating from LUT exceedances within Area IV and the NBZ. A portion of the NBZ contiguous with NASA property in Area II is not included in this estimate.
3. Characterization for radionuclides and chemicals is not complete.
4. Remediation exclusion criteria as outlined in the AOC have not been applied.
5. Inclusion of soil on the hillslope in the southern portion of Area IV is a conservative assumption for the upper range ROM estimate, while exclusion of soil in the NBZ is a non-conservative assumption. Both are large areas and the extents of cleanup in both (especially in Southern Area IV) are uncertain until additional data from proposed sampling are obtained.
 - a. As a counter balance to the conservative assumption to include soils on the southern hillslope, a depth of only 2 feet was assumed for the additional area even though soil depth is up to 10 feet thick.
 - b. DTSC has indicated that ‘lines of evidence’ can be put forward by DOE to identify non-operational Chemical LUT exceedances. This rationale may be applicable in both the southern hillslope area as well as in the NBZ.
6. Chemical PRAs were not extended offsite or into Area III unless previous data already existed above the Chemical LUT values. Additional volume estimates for additional offsite or Area III locations are not included in this TM.

Table 1
Summary of Area IV Clearly Contaminated Areas - Draft
Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Area Number	Clearly Contaminated Area ¹	Chemical Summary ²										Volume Summary ³			
		SVOCs/PAHs	TPH	Metals	Dioxins	PCBs	PCTs	Perchlorate	Pesticides/Herbicides	Chemical Drivers	Comments	Area (ft ²)	Ave Depth (ft)	Volume (yd ³)	Disposal Volume (±30%) (yd ³)
Subarea 3															
1	HSA 3 Debris Area	Benzo(a)pyrene - 1700 ppb	TPH - Lubricant Oil - 82000 ppm	Ag - 49.9 ppm Cd - 3.2 ppm Cu - 631 ppm Hg - 0.24 ppm Pb - 152 ppm Zn - 712 ppm		Arcochlor 1260 - 49000 J ppb Arcochlor 1254 - 8090 ppb				PAHs, metals, PCBs, dioxins	The chemical contamination area extent was based on sampling data.	13,262	4	1,960	2,550
Subarea 3A															
2	B4541 Dioxin Area		TPH - Diesel - 190 ppm TPH - Lube Oil - 710 ppm	Pb - 2890 ppm Ni - 538 ppm Hg - 0.377 ppm Cd - 18.6 ppm Cr - 699 ppm Cu - 699 ppm Hg - 4.45 ppm	TCDD TEQ - 231.1 ppt	Arcochlor 1254 - 150 ppb Arcochlor 1260 - 120 ppb				dioxins, metals, PCBs, TPH	The chemical contamination extent was based on sampling data.	1,637	4	240	310
3	Eastern Hummocky Area			Ba - 176 J ppm Be - 1.3 ppm Cr - 45.8 ppm Cu - 70.7 ppm Pb - 120 ppm Li - 53.9 ppm Hg - 86.4 ppm Th - 2.4 ppm	TCDD TEQ - 82.1 ppt	Arcochlor 1254 - 220 ug/kg				metals, dioxins, PCBs	The chemical contamination area was based on sampling data and extent of hummocky terrain in this portion of Subarea 3A.	23,743	2	1,760	2,290
4	PDU	Chrysene - 2700 ppb	TPH - G - 6.6 ppm			Arcochlor 1260 - 120 ppb				metals, PAHs, TPH, and PCBs	The chemical contamination area was based on sampling data and extent of operational activities at this site.	24,298	4.5	4,050	5,270
5	PDU Coal Storage Area 1	Fluoranthene - 2900 ppb Pyrene - 2500 ppb Benzo(a)Pyrene - 660		Pb - 100 ppm Ni - 80.4 ppm Cu - 63.2 ppm Cd - 5.68 ppm Ag - 2.18 ppm Hg - 0.233 ppm	TCDD TEQ - 36.6 ppt					PAHs, dioxins, metals	The chemical contamination area extent was based on sampling data in the area and the edge of the paved storage yard.	273	6	60	80
6	PDU Coal Storage Area 2	Benzo(a)fluoranthene - 240 ppb Phenanthrene - 230 ppb Benzo(a)Pyrene - 85 ppb			TCDD TEQ - 9.1 ppt	Arcochlor 1260 - 170 ppb				PAHs, dioxins, PCBs	The chemical contamination area extent was based on sampling data in the area and the edge of the paved storage yard.	442	5	80	100
Subarea 3b															
7	Building 4010 Area	Benzo(a)anthracene - 187 ppb Benzo(a)pyrene - 112 ppb Benzo(b)fluoranthene - 190 ppb Benzo(a,b)pyrene - 100 ppb Chrysene - 450 ppb Fluoranthene - 457 ppb Naphthalene - 170 ppb Phenanthrene - 315 ppb Pyrene - 708 ppb	TPH (Diesel Range C21-C30) 71 ppm TPH (Diesel Range C30-C40) 240 ppm	Sb - 11.8 ppm Cr - 43.5 ppm Cu - 126 ppm Pb - 149 ppm Hg - 0.162 ppm Se - 2.43 ppm Ag - 1.04 ppm V - 93.3 ppm Zn - 428 ppm	TCDD TEQ - 191.5 ppt	Arcochlor 1248 - 34 ppb Arcochlor 1254 - 60 ppb		21.3 J ppm	2,4-D8 - 6.5 J ppb (present but not a driver)	PAHs, metals, PCBs, dioxins, perchlorate	The chemical contamination area extent was based on sampling data.	4,441	8	1,320	1,720
8	17th Street Pond and Drainage	Benzo(a)anthracene - 16000 J ppb Benzo(a)pyrene - 10000 J ppb Benzo(b)fluoranthene - 26000 J ppb Benzo(a,b)pyrene - 90000 J ppb Benzo(a)fluoranthene - 15000 J ppb Chrysene - 22000 J ppb Dibenz(a,h)anthracene - 1600 ppb Fluoranthene - 32000 J ppb Indeno(1,2,3-cd)pyrene - 77000 J ppb Phenanthrene - 14000 J ppb Pyrene - 2700 J ppb	TPH (Kerosene Range C15-C20) - 138 J ppm TPH (Diesel Range C20-C30) 260 J ppm TPH (Diesel Range C21-C30) 1200 ppm TPH (Diesel Range C30-C40) 5.9 ppm	Cd - 2.9 ppm Cr - 85.4 ppm Cu - 60 ppm Hex Cr - 3.4 ppm Pb - 97.4 ppm Hg - 23.6 ppm Ni - 120 ppm Ag - 420 ppm Zn - 1860 ppm	TCDD TEQ - 292.4 ppt	Arcochlor 1248 - 340 ppb Arcochlor 1254 - 500 ppb Arcochlor 1260 - 1300 ppb	Arcochlor 5460 - 110 J ppb	4,4'-DDE - 350 ppb 2,4-D8 - 83.7 ppb	PAHs, metals, PCBs, dioxins, pesticides, herbicides	The chemical contamination area extent was based on sampling data and the extent of the former drainage ditch along F Street and the existing drainage ditch along 17th Street.	95,596	5	17,700	23,010	
9	Building 4011 Leach Field	Anthracene - 320 ppb Benzo(a)anthracene - 410 ppb Benzo(a)pyrene - 360 ppb Benzo(b)fluoranthene - 460 ppb Benzo(a,b)pyrene - 200 ppb Benzo(a)fluoranthene - 220 ppb Fluoranthene - 1100 ppb Indeno(1,2,3-cd)pyrene - 200 ppb Phenanthrene - 1100 ppb Pyrene - 1000 ppb	TPH (Diesel Range C21-C30) 31 ppm TPH (Diesel Range C30-C40) 87 ppm	Al - 30500 ppm Be - 1.17 ppm Cr - 39.4 ppm Pb - 66.8 ppm Li - 53.9 ppm Ni - 1010 ppm Hg - 0.127 ppm Th - 0.495 ppm	TCDD TEQ - 2.68 ppt (present but not a driver)	Arcochlor 1260 - 4.2 ppb (present but not a driver)				PAHs and metals	The chemical contamination area extent was based on sampling data in the area.	6,456	7	1,670	2,170

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		SVOCs/PAHs	TPH	Metals	Dioxins	PCBs	PCTs	Perchlorate	Pesticides/Herbicides	Chemical Drivers	Comments	Area (ft ²)	Ave Depth (ft)	Volume (yd ³)	Disposal Volume (±30%) (yd ³)
Subarea 5C															
10	SFTF Northeast PCB Area					Aroclor 1260 - 334 ppb				PCBs	The chemical contamination area was based on sampling data in the area.	1,712	2	130	170
11	Building 4015 Field Fill Area	Benzo(a)anthracene - 38 ppb Benzo(a)pyrene - 41 ppb Benzo(b)fluoranthene - 76 ppb Benzo(g,h,i)perylene - 72 ppb Benzo(k)fluoranthene - 0.056 ppb Fluoranthene - 44 ppb Indeno(1,2,3-cd)pyrene - 69 ppb	TPH (Diesel Range C21-C30) - 860 ppm	Ba - 321 ppm Cd - 1.6 ppm Cr - 44.4 ppm Cu - 90 ppm Hg - 0.21 ppm Mg - 13.3 ppm V - 82.6 ppm Zn - 333 ppm		Aroclor 1254 - 130 ppb Aroclor 1260 - 50 ppb	Aroclor 5460 - 170 ppb	45.4 ppb		PAHs, PCBs, metals, dioxins, perchlorate	The chemical contamination area was based on sampling data in the area, the extent of observed fill, and the drainage pathway.	52,957	4	7,760	10,090
12	Area West of the Building 4383 Leach Field					Aroclor 1254 - 76 ppb				metals (Hg), PCBs	The chemical contamination area was based on sampling data in the area.	595	5	110	140
13	Drainage East of Building 4015 Field	Benzo(a)anthracene - 130 ppb Benzo(a)pyrene - 130 ppb Benzo(b)fluoranthene - 170 ppb Chrysene - 180 ppb Dibenz(a,h)anthracene - 45 ppb Fluoranthene - 290 ppb Phenanthrene - 200 ppb Pyrene - 200 ppb		Ba - 158 ppm S - 17.9 ppm Hg - 0.058 ppm Th - 0.486 ppm V - 63.2 ppm		Aroclor 1254 - 51 ppb Aroclor 1260 - 75 ppb		4,4'-DDT - 11 ppb (present but not a driver)		PAHs, metals, dioxins, PCBs	The chemical contamination area was based on sampling data in the area and the drainage pathway.	6,662	3	740	960
14	Ridge East of Building 4015 Field	Benzo(a)anthracene - 3000 ppb Benzo(b)pyrene - 1800 ppb Benzo(b)fluoranthene - 2700 ppb Benzo(g,h,i)perylene - 570 ppb Benzo(k)fluoranthene - 1100 ppb Chrysene - 3400 ppb Fluoranthene - 8400 ppb Indeno(1,2,3-cd)pyrene - 620 ppb Phenanthrene - 3000 ppb Pyrene - 7600 ppb		Al - 31900 ppm Ba - 200 ppm Cr - 38.3 ppm V - 81.1 ppm (present possible driver dependent on BG)	TCDO TEQ - 2.98 ppt (present but not a driver)	Aroclor 1254 - 1100 ppb Aroclor 1260 - 51 ppb				PAHs, PCBs, dioxins	The chemical contamination area was based on sampling data in the area.	1,181	2	90	120
Subarea 5D North															
15	PCBs North of Building 4020					Aroclor 1260 - 334 ppb				PCBs	The chemical contamination area was based on sampling data in the area.	264	2	20	30
48	B4373 Area									Dioxins, metals (Hg), PAHs, TPH	The chemical contamination area was based on sampling data in the area and footprint of each field.	6,370	5	1,180	1,530
49	B4363 Area 1									Dioxins, metals (Hg), TPH	The chemical contamination area was based on sampling data in the area.	692	4	100	130
50	B4363 Area 2									Dioxins, metals (Hg), TPH	The chemical contamination area was based on sampling data in the area.	1,318	4	490	640
Subarea 6															
16	Mercury Release Area	Benzo(a)pyrene - 113 ppb Benzo(a)anthracene - 16.9 ppb Benzo(b)fluoranthene - 155 ppb Benzo(k)fluoranthene - 70.8 ppb Chrysene - 121 ppb Indeno(1,2,3-cd)pyrene - 65.2 ppb		Hg - 35 ppm						metals (Hg), PAHs	The chemical contamination area extent was based on sampling data in the area.	27,268	5.5	5,550	7,220
17	SRE Northern Drainage Ditch	Benzo(a)anthracene - 1000 ppb Benzo(a)pyrene - 2300 ppb Benzo(b)fluoranthene - 2900 ppb Benzo(g,h,i)perylene - 2100 ppb Chrysene - 1200 ppb Fluoranthene - 3000 ppb Indeno(1,2,3-cd)pyrene - 1800 ppb Phenanthrene - 1600 ppb Pyrene - 2200 ppb	TPH C15-C20 - 44 ppm TPH (Diesel Range C21-C30) - 1300 ppm TPH C30-C40 - 5100 ppm	Cd - 2.39 ppm Cr - 344 ppm Cu - 27 ppm Cu - 76.1 ppm Hex Cr - 4.8 ppm Pb - 14.8 ppm Se - 0.84 ppm Zn - 796 ppm	TCDO TEQ - 201 ppt	Aroclor 1254 - 2600 ppb Aroclor 1260 - 78 ppb	Aroclor 5460 - 3300 ppb	4,4'-DDT - 200 ppb		PCBs, PCTs, PAHs, metals, dioxins, pesticides, TPH	The chemical contamination area extent was based on sampling data, the extent of the former drainage ditch, and bedrock outcrops.	3,740	3	420	550

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		SVOCs/PAHs	TPH	Metals	Dioxins	PCBs	PCTs	Perchlorate	Pesticides/Herbicides	Chemical Drivers	Comments	Area (ft ²)	Ave Depth (ft)	Volume (yd ³)	Disposal Volume (±30%) (yd ³)
19	SRE Hillside	Benzo[a,h]perylene - 320 ppb Benzo[a]anthracene - 360 ppb Indeno[1,2,3-cd]pyrene - 360 ppb Chrysene - 460 ppb Benzo[b]fluoranthene - 630 ppb B[a]P - 770 ppb Benzo[k]fluoranthene - 1500 ppb	TPH (C10-C40) - 1500 ppm	Cd - 2.05 ppm (2.1x) Hg - 2.5 ppm (28x)	TCDD TEQ - 3.73 ppt	Aroclor 1254 - 70 ppb				PAHs, dioxins, PCBs, metals, TPH	The chemical contamination area was based on sampling data.	7,938	3	880	1,140
18	SRE Excavation	Benzo[b]fluoranthene - 690 ppb Benzo[a]anthracene - 630 ppb Fluoranthene - 3200 ppb Phenanthrene - 2600 ppb Pyrene - 1900 ppb		Hg - 7.2 ppm	TCDD TEQ - 28.4 ppt	Aroclor 1254 - 980 ppm				PAHs, dioxins, PCBs, metals	The chemical contamination area extent was based on sampling data and SRE excavation footprint / depth.	93,620	17	58,950	76,640
20	SRE Southern Drainage	Benzo[a,h]perylene - 97 ppb		Zn - 558 ppm Co - 94.3 ppm	TCDD TEQ - 25.4 ppt	Aroclor 1248 - 660 ppm				PAHs, metals, PCBs, dioxins	The chemical contamination area extent was based on sampling data in the area and the extent of the drainage ditch.	1,575	3	180	230
21	SRE Pond	Benzo[a]pyrene - 0.24 ppm Benzo[a]anthracene - 0.24 ppm Benzo[b]fluoranthene - 0.54 ppm Indeno[1,2,3-cd]pyrene - 0.2 ppm	TPH - Lubricant Oil - 240 ppm	Cd - 4.6 ppm Cu - 130 ppm Pb - 89.6 ppm Hg - 1.4 ppm Zn - 1460 ppm Hex Cr - 2 ppm	2,3,7,8-TCDD TEQ - 276 ppt	Aroclor 1260 - 180 ppb Aroclor 1254 - 110 ppb	Aroclor 5460 - 145 ppb	4,4'-DDT - 24 ppb		metals, PCBs, PCTs, dioxins, PAHs, pesticides, TPH	The chemical contamination area extent was based on sampling data and the limits of the pond.	8,121	6	1,800	2,340
22	SRE Drainage	Benzo[b]fluoranthene - 47 ppb		Cu - 36.9 ppm Hg - 0.25 ppm Zn - 378 ppm Cd - 1.5 ppm Pb - 49 ppm	2,3,7,8-TCDD TEQ - 329 ppt	Aroclor 1254 - 59.2 ppb				metals, PCBs, dioxins, PAHs	The chemical contamination area extent was based on sampling data, the presence of debris below the pond dam, and the drainage pathway.	4,886	4	720	940
23	SRE Leach Field	Benzo[a]pyrene - 15,000 ppb Benzo[a]anthracene - 14,000 ppb Benzo[b]fluoranthene - 16,000 ppb Benzo[a]fluoranthene - 15,000 ppb Dibenz[a,h]anthracene - 3900 ppb Indeno[1,2,3-cd]pyrene - 6400 ppb Phenanthrene - 11,000 ppb	TPH - Diesel - 340 ppm			Aroclor 1260 - 380 ppb Aroclor 1254 - 430 ppb				PAHs, Hg, Ag, Cr(VI)	The chemical contamination area extent was based on sampling data and the limits of the leach field.	3,931	8	1,160	1,510
24	Building 4003 Southern Transformer					Aroclor 1260 - 380 ppb Aroclor 1254 - 430 ppb				PCBs	The chemical contamination area extent was based on sampling data.	658	2	50	70
25	Building 4003 Eastern Transformer					Aroclor 1260 - 7800 ppb				PCBs	The chemical contamination area extent was based on sampling data.	909	2	70	90
26	Building 4003 Oil Stain		TPH - Diesel - 470 ppm			Aroclor 1254 - 121 ppb				PCBs, TPH	The chemical contamination area extent was based on sampling data and visual limits of the stained soil.	232	2	20	30
27	Northern Storage PCB Area 1	Benzo[a]pyrene - 190 ppb OCBS1082 outside the CCA area i.e. 2-Methylnaphthalene - 12,000ppb 1-Methyl naphthalene - 7,000 ppb				Aroclor 1254 - 88.8 ppb Aroclor 1260 - 15.7 ppb Aroclor 1248 - 120 ppb				PCBs, PAHs	The chemical contamination area is located northeast of the former storage area and drains northeasterly, and was based on sampling data and observed debris locations.	1,954	2	140	180
28	Northern Storage PCB Area 2		TPH (Gasoline Range) - 3 ppm			Aroclor 1248 - 24,000 ppm Aroclor 1254 - 5400 ppb Aroclor 1260 - 630,000 ppb				PCBs	The chemical contamination area is located northwest of the former storage area and drains northwesterly, and was based on sampling data and observed debris locations.	3,950	2	290	380
29	Atomics International (AI) Yard		TPH - Diesel - 8300 ppm TPH (Lubricant Range) - 8300 ppm	Hg - 0.16 ppm		Aroclor 1254 - 2200 ppb				PCBs, TPH, metals (Hg)	The chemical contamination area extent was based on sampling data and visual limits of the former storage pad.	10,580	4	1,570	2,040

Table 1
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Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Area Number	Clearly Contaminated Area ¹	Chemical Summary ²										Volume Summary ³			
		SVOCs/PAHs	TPH	Metals	Dioxins	PCBs	PCTs	Perchlorate	Pesticides/Herbicides	Chemical Drivers	Comments	Area (ft ²)	Ave Depth (ft)	Volume (yd ³)	Disposal Volume (±30%) (yd ³)
30	Northern Bench Area	Benz[a]pyrene - 38.2 j ppb Benzofluoranthene - 219 j ppb Benzofluoranthene - 42.6 j ppb Chrysene - 250 ppb Fluoranthene - 127 ppb Indeno(1,2,3-cd)pyrene - 46.3 j ppb Pyrene - 114 ppb	TPH C12-C14 - 36 ppm TPH (Kerosene Range C15-C20) - 350 ppm TPH (Diesel Range C21-C30) 600 ppm TPH C30-C40 - 690 ppm	Cd - 3.54 j ppm Cr - 131 j ppm Cu - 96.3 j Pb - 380 ppm Hg - 0.863 j ppm Ni - 81.4 j ppm Zn - 471 j ppm	TCDD TEQ - 53.4 ppt	Arctor 1248 - 260 ppb Arctor 1254 - 9100 ppb Arctor 1260 - 4100 j ppb	Arctor 5460 - 1300 ppb	99.6 ppb		PAHs, PCBs, TPH, metals Pb, perchlorate	The chemical contamination area extent was based on sampling data and observed debris/soil fill material.	14,510	4	2,150	2,800
31	Central Transformer					Arctor 1248 - 1900 ppb Arctor 1254 - 660 ppb				PCBs	The chemical contamination area extent was based on sampling data.	1,556	5	290	380
32	Southeast Transformer					Arctor 1254 - 240 ppb Arctor 1260 - 110 ppb				PCBs	The chemical contamination area extent was based on sampling data.	652	3	70	90
33	Telephone Pole Storage Area	Benzofluoranthene - 29 ppm			2,3,7,8-TCDD TEQ - 184 ppt					dioxins	The chemical contamination area extent was based on sampling data and the observed pole storage area.	1,442	3	160	210
34	Eastern Debris Area	Benzofluoranthene - 34 ppb Chrysene - 22 ppb		Sb - 17.5 ppm Cd - 3 ppm Cr - 44 ppm Pb - 143 ppm Ag - 10.8 ppm Zn - 729 ppm Cu - 10.4 ppm	2,3,7,8-TCDD TEQ - 52 ppt	Arctor 1254 - 94 ppb Arctor 1260 - 20 ppb				dioxins, metals, PCBs, PAHs	The chemical contamination area extent was based on sampling data, observed debris locations, and bedrock outcrops.	18,369	5	3,400	4,420
35	Old Con/New Con Drainage	Benzofluoranthene - 340 ppb Benzofluoranthene - 280 ppb Benzofluoranthene - 460 ppb Benzofluoranthene - 380 ppb Chrysene - 500 ppb Indeno(1,2,3-cd)pyrene - 100 ppb	TPH (C20-C30) - 920 j ppm TPH (C30-C40) - 130 ppm	Hex Cr - 2.9 ppm Pb - 48 ppm Ag - 12 ppm Pb - 41 ppm Cd - 2.2 ppm Hg - 5.3 ppm Zn - 180 ppm	TCDD TEQ - 650 ppt	Arctor 1254 - 560 ppb Arctor 1260 - 216 ppb Arctor 1248 - 180 ppb				PCBs, dioxins, metals, PAHs, TPH	The chemical contamination area extends from the southern portion of the Old Con site to the south below the New Con site, and was based on sampling data and the drainage pathway.	27,050	3	3,010	3,910
36	Building 4040 Ash Pile Area			Ba - 1000 ppm Pb - 77 ppm Ag - 150 ppm Zn - 3400 ppm	TCDD TEQ - 66 ppt					dioxins, metals	The chemical contamination area extent was based on sampling data in the area and visual observation of the ash pile.	8,981	2	670	870
37	New Con Yard South	Benzofluoranthene - 28.3 j ppb Benzofluoranthene - 20.8 ppb Chrysene - 23.8 ppb		Cd - 20 ppm Cu - 200 ppm Pb - 100 ppm Ni - 130 ppm Ag - 5 ppm Zn - 1100 ppm		Arctor 1254 - 3560 ppb				PCBs, metals	The chemical contamination area extent was based on sampling data in the southern portion of the yard.	2,901	2	160	210
51	South of SCE Substation Road	Phenanthrene - 54.2 ppb Benzofluoranthene - 117 ppb Pyrene - 76.4 ppb Benzofluoranthene - 55.9 ppb Chrysene - 74.7 ppb	TPH (C21-C30) - 122 ppm	Ag - 6000 ppm Cd - 1300 ppm Ni - 29000 ppm Cu - 2500 ppm Mo - 78 ppm		Arctor 1254 - 275 ppb Arctor 1260 - 212 ppb	Arctor 5460 - 343 j ppb			PAHs, PCBs, PCTs, metals, TPH	The chemical contamination area was based on sampling data and storage observed in aerial photos.	10,352	5	1,920	2,500
Subarea 7															
38	RMHF Southern Fenceline	Fluoranthene - 5100 ppb Pyrene - 4300 ppb Benzofluoranthene - 1700 ppb Benzofluoranthene - 1200 ppb	TPH - Lube Oil - 170 ppm		TCDD TEQ - 43.9 ppt	Arctor 1242 - 392 ppb Arctor 1254 - 231 ppb Arctor 1260 - 6730 ppb				PCBs, PAHs, dioxins, TPH	The chemical contamination area extent was based on sampling data, bedrock outcrops, and asphalt pavement at RMHF.	4,595	2	340	440
39	RMHF Northern Fenceline and Catch Basin	Fluoranthene - 29000 ppb Pyrene - 23000 ppb Benzofluoranthene - 4800 ppb Benzofluoranthene - 4600 ppb	TPH - Lube Oil - 1200 ppm	Cd - 5.03 ppm Pb - 115 ppm Cu - 48 ppm Ni - 24.6 ppm Be - 1.6 ppm	TCDD TEQ - 81.4 ppt					PAHs, dioxins, TPH, metals	The chemical contamination area extent was based on sampling data and asphalt pavement at RMHF.	34,441	5	6,380	8,290
40	Area West of B4133			Hg - 0.984 ppm Cr - 184 ppm	TCDD TEQ - 50.4 ppt	Arctor 1254 - 970 ppb Arctor 1260 - 72 ppb Arctor 5460 - 910 ppb				dioxins, metals, PCBs	The chemical contamination area extent was based on sampling data.	1,075	3	120	160
52	Slope North of SNAP Operations	Phenanthrene - 470 ppb Benzofluoranthene - 190 ppb Fluoranthene - 140 ppb Pyrene - 110 ppb Benzofluoranthene - 110 ppb Chrysene - 110 ppb	TPH (C21-C30) - 1200 ppm TPH (C30-C40) - 8700 ppm		TCDD TEQ - 28.0 ppt	Arctor 1254 - 66 ppb Arctor 1260 - 37 ppb				PAHs, PCBs, dioxins, TPH	The chemical contamination area was based on sampling data.	32,256	3	3,580	4,650

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Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Area Number	Clearly Contaminated Area ¹	Chemical Summary ²										Volume Summary ³			
		SVOC/PAHs	TPH	Metals	Dioxins	PCBs	PCTs	Perchlorate	Pesticides/Herbicides	Chemical Drivers	Comments	Area (ft ²)	Ave Depth (ft)	Volume (yd ³)	Disposal Volume (±30%) (yd ³)
Subarea B (North)															
41	F50F Southeast			Hg - 0.25 ppm		Aractor 1254 - 360 ppb		1.6 ppm		Perchlorate, PCBs, PAHs, metals (pg)	The chemical contamination area was based on sampling data in the area.	5,972	5	1,870	2,430
42	F50F West	Benzo(a)pyrene - 6.3 ppb not a driver but present		Hg - 6.1 ppm		Aractor 1254 - 19 ppb				Hg, PCBs	The chemical contamination area was based on sampling data and bedrock outcrops that define the extent of the surface water drainage.	9,466	2	330	430
43	F50F Pistol Range			Pb - 420 ppm Hg - 0.35 ppm						Pb, Hg	The chemical contamination area was based on sampling data and the visual extent of lead shot.	1,793	3	720	940
44	CSADA Pistol Range			Pb - 27,000 ppm Sb - 870 ppm As - 350 ppm						Pb, Sn, As	The chemical contamination area was based on sampling data, the visual extent of lead shot, and the extent of the hillside that was used for target practice.	4,668	4	780	1,010
45	Building 56 Mt East Ramp		TPH - 107 ppm			Aractor 1248 - 246 ppb Aractor 1254 - 134 ppb				PCBs, TPH	The chemical contamination area was based on sampling data and the extent of debris identified in the area.	2,511	2	90	120
46	Building 56 Landfill	Benzo(a)pyrene - 960 ppb (split sample value) Benzo(a)anthracene - 750 ppb Chrysene - 2800 ppb	TPH - 23,000 ppm (lubricant oil)	Cu - 130 ppm Pb - 94 ppm Hg - 1.7 ppm Hex Cr - 0.3 ppm		Aractor 1254 - 1000 ppb Aractor 1260 - 200 ppb				PCBs, PAHs, metals, TPH	The chemical contamination area was based on sampling data and the extent of landfill materials identified using field investigation techniques and review of historical aerial photographs.	81,263	2 to 20	37,940	49,320
47	Building 4100 Northern Slope	Benzo(a)pyrene - 130 ppb Benzo(b)fluoranthene - 170 ppb Benzo(g,h,i)perylene - 93 ppb Fluoranthene - 100 ppb Indeno(1,2,3-cd)pyrene - 53 ppb Phenanthrene - 65 ppb Pyrene - 150 ppb		Cd - 7.19 ppm Cr - 54 ppm Hex Cr - 4 ppm Pb - 270 ppm Hg - 0.237 ppm Mn - 50.6 ppm Se - 0.727 ppm Zn - 1250 ppm	TCDD TEQ - 229.3 ppt	Aractor 1254 - 68 ppb Aractor 1260 - 70 ppb				PAHs, PCBs, Dioxins, Metals	The chemical contamination area was based on sampling data.	580	3	60	80
53	F50F Drainage		TPH (C10-C40) - 35 ppm	Hg - 0.2 ppm	TCDD TEQ - 1.84 ppt	Aractor 1254 - 390 ppb Aractor 1260 - 130 ppb		perchlorate - 6.21		PCBs, dioxins, metals	The chemical contamination area was based on sampling data and drainage pathway.	20,926	10	7,750	10,080
												TOTAL		183,050	238,010

Notes

- Criteria used to identify Clearly Contaminated Areas include:
 - Chemical concentrations of previously identified risk-driving compounds are generally 10 times above DTSC approved Interim Screening Levels (ISLs). Concentrations that exceeded two times ISLs were considered on a case by case basis. Chemical classes considered in the evaluation include dioxin TEQs, PAHs, PCBs, metals, perchlorate, pesticides, and herbicides. TPH was only considered if co-located with other chemicals meeting the CCA criteria, and present at concentrations above 10 times the ISLs. VOCs, phthalates, and metals considered essential nutrients (sodium, calcium, iron, etc.) were excluded from the evaluation.
 - The areas contain a high frequency and number of chemicals exceeding ISLs. Areas with single chemical exceedances above 2x ISLs were considered.
 - Chemical contaminant distribution was sufficiently defined for future planning of step-out samples or remedial planning.
 - DOT agreed that the area would most likely require cleanup.
- Max detections noted for areas; not all detections included for each chemical class.
- Depth and volume estimates are considered preliminary, working draft values that will need refinement during remedial planning.
- The table contains four new CCAs that have not been published to DTSC or presented to the public as of February 28, 2013 (most recent public meeting).

Table 2
Summary of Area IV Radiological Soil Volumes - Draft
Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Radiological Area ¹	Area (ft ²)	Ave Depth (ft)	Volume ² (yd ³)	Disposal Volume [+30%] (yd ³)
Subarea 3				
South of SCE Substation	818	5	150	200
Subarea 5A				
Eastern Hummocky Area	1,028	2	80	100
Area West of PDU	867	4.5	140	180
B4023 Area 1	344	2	30	40
B4023 Area 2	3,042	2	230	300
B4073 Area	538	2	40	50
B4093 Area 1	423	5	80	100
B4093 Area 2	682	4	100	130
Subarea 5B				
Building 4010 Area	5,370	2	400	520
Area Southeast of B4010	790	2	60	80
17th Street Pond and Drainage	26,484	5	4,900	6,370
Building 4011 Area	6,720	5	1,240	1,610
South of B4006	1,025	2	80	100
B4026 Area	4,990	2	370	480
Area North of B4356	4,110	2	300	390
Area North of B4019	3,750	5	690	900
Subarea 5C				
Southern Portion of Building 4015 Field Fill Area	662	2	50	70
South of B4100	574	5	110	140
B100 Trench	2,915	2	220	290
Subarea 5D				
Building 4020 Area	29,022	5	5,370	6,980
Parking Lot East of B4009	820	2	60	80
Area North of B4055	1,168	5	220	290
Area Southeast of B4055	1,090	2	80	100
B4373 Area	820	2	60	80
B4363 Area 1	1,260	5	230	300
Field East of B4363	340	2	30	40

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Radiological Area ¹	Area (ft ²)	Ave Depth (ft)	Volume ² (yd ³)	Disposal Volume [+30%] (yd ³)
South of B4353 Area 1	272	5	50	70
South of B4353 Area 2	454	2	30	40
South of B4353 Area 3	631	2	50	70
Base of Hillslope South of B4363 - Area 1	267	2	20	30
Base of Hillslope South of B4363 - Area 2	312	5	60	80
Southern Portion of Pond Dredge	253	5	50	70
North of Area IV Borrow Pit	4,334	5	800	1,040
South of Area IV Borrow Pit - Area 1	1,492	2	110	140
South of Area IV Borrow Pit - Area 2	336	2	20	30
South of Area IV Borrow Pit - Area 3	2,220	2	160	210
South of Area IV Borrow Pit - Area 4	507	2	40	50
South of Area IV Borrow Pit - Area 5	816	2	60	80
Subarea 6				
Mercury Release Area	607	2	40	50
SRE Hillslope	15,066	3	1,670	2,170
West of SRE Hillslope	3,863	3	430	560
West of Temporary Hot Waste Storage Area	6,690	2	500	650
SRE Southern Drainage	276	3	30	40
SRE Pond	9,066	6	2,010	2,610
South of SRE Pond	1,031	2	80	100
SRE Drainage	1,745	2	130	170
Drainage in NBZ leading from SRE	1,407	2	100	130
East of SRE Leach Field	1,038	2	80	100
SRE Cooling Tower	1,285	2	100	130
Sodium Cleaning Pad	6,540	2	480	620
South of Building 4003	630	2	50	70
Walkway Southwest of B4003	473	2	40	50
Northern Bench Area	552	1	20	30
Area South of SCE Substation Road	1,477	1	50	70

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Radiological Area ¹	Area (ft ²)	Ave Depth (ft)	Volume ² (yd ³)	Disposal Volume [+30%] (yd ³)
Old Con / New Con Drainage	33,614	2	2,490	3,240
Area SW of Building 4040 Ash Pile	4,495	1	170	220
B4040 South Area 1	14,201	2	790	1,030
B4040 South Area 2	354	2	20	30
East of B4064 Leach Field	638	2	40	50
Field West of B4064	2,318	2	130	170
Subarea 7				
RMHF Operational Area, Fenceline, Northern Slope, and Catch Basin	164,265	5	30,420	39,550
East of B4021 Leach Field	470	1	20	30
RMHF Drainage 1	100	1	4	10
RMHF Drainage 2	100	3	10	10
RMHF Drainage 3	854	1	30	40
Area North of B1433	2,990	2	220	290
Hillslope West of B1433 - Area 1	7,487	2	550	720
Hillslope West of B1433 - Area 2	1,722	3	190	250
ISF and Downslope Area	17,422	3	1,940	2,520
Southwest of RMHF Catch Basin Area 1	500	2	40	50
Southwest of RMHF Catch Basin Area 2	322	4	50	70
Southwest of RMHF Catch Basin Area 3	1,100	3	120	160
Subarea 8				
B4056 Landfill 1	294	5	50	70
B4056 Landfill 2	300	5	60	80
FSDF Ponds	172	5	30	40
FSDF Western Storage Yard	960	5	180	230
Road to RD-22	110	2	10	10
FSDF Drainage	875	3	100	130
West of FSDF	908	2	70	90
North of FSDF	90	2	10	10
West of B4814	212	2	20	30

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Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Radiological Area ¹	Area (ft ²)	Ave Depth (ft)	Volume ² (yd ³)	Disposal Volume [+30%] (yd ³)
ESADA Storage Yard	150	5	30	40
North of ESADA Storage Yard	136	5	30	40
Drainage North of B4009 Leach Field	3,192	2	240	310
Area East of B4009	410	2	30	40
Area Northeast of B4009	288	5	50	70
B4009 Leach Field	187	2	10	10
Area West of Solar Concentrator Facility	455	2	30	40
Area Northeast of Solar Concentrator Facility	256	2	20	30
Area Southwest of Solar Concentrator Facility	193	2	10	10
Area Northeast of ESADA	748	2	60	80
ESADA Pistol Range - Area 1	1,316	2	100	130
ESADA Pistol Range - Area 2	130	5	20	30
ESADA Hillslope - Area 1	2,159	2	160	210
ESADA Hillslope - Area 2	1,286	2	100	130
ESADA Hillslope - Area 3	1,576	2	120	160
ESADA Hillslope - Area 4	290	5	50	70
ESADA Hillslope - Area 5	2,634	5	490	640
Building 4100 Northern Slope	225	3	30	40
Drainage West of B4100	160	5	30	40
NBZ				
Area North of OCY	1,615	3	180	230
SRE Drainage in NBZ	1,407	3	160	210
Drainage Northwest of RMHF	854	2	60	80
NBZ 1	1,256	2	90	120
NBZ 2	1,256	2	90	120
NBZ 3	1,256	2	90	120
NBZ 4	1,256	2	90	120
NBZ 5	1,256	2	90	120
NBZ 6	1,256	2	90	120
NBZ 7	1,256	2	90	120

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Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Radiological Area ¹	Area (ft ²)	Ave Depth (ft)	Volume ² (yd ³)	Disposal Volume [+30%] (yd ³)
NBZ 8	1,256	2	90	120
NBZ 9	1,256	2	90	120
		TOTAL	63,164	82,230

Total Cleanup Areas 106

Notes

1. Radiological areas were identified where radionuclide results exceeded EPA Field Action Levels (FALs) based on the following:

i. FALs represent EPAs Background Threshold Value (BTV) and Method Detection Concentrations (MDC) screening levels and do not include Method Uncertainty.

ii. Radionuclides used in this evaluation were those identified by EPA as having activities equal to or exceeding the FAL and that resulted from historical operations, and included: Americium-241, Curium-243/244, Cesium-137, Cobalt-60, Europium-152, Europium-154, Nickel-59, Plutonium-238, Plutonium-239/240, Tritium, and Strontium-90.

iii. NORM radionuclide exceedances were excluded from this evaluation.

2. Depth and volume estimates summarized in this table are based on BTVs and laboratory MDCs achieved during the EPA characterization program, and are in some cases more than the DTSC Provisional LUT value (e.g., Sr-90), and in some cases less than the Provisional LUT value (e.g., Cs-137). Thus, the ROM volume estimates provided in this TM are very preliminary and will need refinement during remedial planning.

Table 3
Summary of Area IV Chemical Preliminary Remediation Area Soil Volumes - Draft
Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Area ID	Chemical LUT Preliminary Remediation Area ¹	Chemical Volume Summary ²			
		Area (ft ²)	Average Depth (ft)	In Situ Volume (yd ³)	Disposal Volume [+30%] (yd ³)
PU-01	17th St Drainage	61,227	3.0	6,803	8,844
PU-02	17th St Pond	220,875	4.0	32,722	42,539
U5-19	5D South	70,153	2.5	6,496	8,444
U5-31	5D South 1	41,803	2.0	3,096	4,025
U5-29	5D South 10	24,206	5.0	4,483	5,827
U5-23	5D South 12	1,954	10.0	724	941
U5-32	5D South 13	1,954	3.0	217	282
U5-28	5D South 3	1,954	1.0	72	94
U5-30	5D South 4	9,877	1.0	366	476
SR-11	B4003 Area	24,415	2.0	1,809	2,351
SR-12	B4003 Path	4,492	1.0	166	216
SR-10	B4003 Xformer	18,503	1.5	1,028	1,336
PU-11	B4005 East	35,385	5.0	6,553	8,519
HS-18	B4005 LF 1	4,571	8.0	1,354	1,761
PU-07	B4005 NW	7,804	2.5	723	939
HS-09	B4006 South 1	15,647	7.0	4,057	5,274
HS-17	B4006 South 2	83	6.0	18	24
L2-05	B4007/B4008 Area 1	22,462	2.0	1,664	2,163
L2-8	B4007/B4008 Area 2	3,695	2.0	274	356
L9-03	B4009 LF	5,351	8.0	1,586	2,061
L9-18	B4009 xfm	1,954	2.0	145	188
L1-01	B4010 Southeast	4,055	2.0	300	390
L2-07	B4011 Area	27,976	1.0	1,036	1,347
L2-06	B4011 LF	45,165	5.0	8,364	10,873
SA-05	B4013 North	183	5.0	34	44
SA-06	B4013 South	124	5.0	23	30
SA-04	B4013/B4010 Area	62,236	8.0	18,440	23,972
U5-02	B4015 Drainage	12,751	2.0	944	1,228
U5-01	B4015 Field	93,067	8.0	27,575	35,848
U5-05	B4015 Ridge	25,669	2.5	2,377	3,090
U5-04	B4015 West	850	1.0	31	41
SA-01	B4019 North	5,787	1.5	322	418
SA-02	B4019 South	10,215	6.0	2,270	2,951
HL-01	B4020 Area	76,347	10.0	28,277	36,760
U5-12	B4023 Area	16,576	1.0	614	798
HS-27	B4024 East	10,502	10.0	3,890	5,057
PU-08	B4024 SE	1,954	5.0	362	470
HS-28	B4024 West	1,648	10.0	611	794
L1-03	B4025 East	6,410	2.5	594	772
L1-02	B4025 West 1	584	5.0	108	141
PU-14	B4027	18,883	2.0	1,399	1,818
U5-09	B4027 West 3	1,438	2.0	107	138
RM-05	B4028	23,891	10.0	8,849	11,503
SF-04	B4029 East	1,954	2.0	145	188
SF-01	B4029 Hillslope	22,082	4.0	3,271	4,253

Table 3
Summary of Area IV Chemical Preliminary Remediation Area Soil Volumes - Draft
Santa Susana Field Laboratory
Date Prepared - September 4, 2013

Area ID	Chemical LUT Preliminary Remediation Area ¹	Chemical Volume Summary ²			
		Area (ft ²)	Average Depth (ft)	In Situ Volume (yd ³)	Disposal Volume [+30%] (yd ³)
SF-03	B4029 NW	765	2.0	57	74
SE-02	B4029 South 1	1,954	1.0	72	94
SE-03	B4029 South 2	1,909	1.0	71	92
SF-02	B4029 West 1	1,220	2.5	113	147
L3-01	B4030	9,049	3.0	1,005	1,307
PU-13	B4032	5,831	2.5	540	702
SR-15	B4033 1	19,648	3.0	2,183	2,838
SR-18	B4033 2	7,144	3.0	794	1,032
PU-12	B4036/B4037	894	6.0	199	258
L4-03	B4040 Ash Pile Area	130,411	1.5	7,245	9,419
PU-15	B4041 South	3,423	1.0	127	165
PU-17	B4042	1,954	5.0	362	470
U5-18	B4055 Area	120,432	7.0	31,223	40,590
BL-03	B4056 Landfill	100,447	10.0	37,203	48,363
BL-04	B4056 Landfill	10,342	2.0	766	996
BL-02	B4056 Pit	1,706	1.0	63	82
BL-01	B4056 Pit E Ramp	2,598	1.0	96	125
SA-12	B4057 Area	20,834	10.0	7,716	10,031
L4-01	B4064 Area	41,599	1.0	1,541	2,003
L4-02	B4064 Channel	12,669	2.0	938	1,220
MC-01	B4065 MC Area	102,082	5.0	18,904	24,575
L9-14	B4073	32,637	5.0	6,044	7,857
L9-15	B4093	808	8.5	254	331
BH-04	B4100	9,644	8.0	2,857	3,715
BH-02	B4100 Field	32,828	5.0	6,079	7,903
BH-03	B4100 Field N	1,631	5.0	302	393
HL-02	B4100 Parking	23,824	7.5	6,618	8,603
BH-01	B4100 Trench	62,259	3.0	6,918	8,993
HF-07	B4133 Hill 1	24,199	1.0	896	1,165
HF-12	B4133 Hill 3	8,815	4.0	1,306	1,698
HF-09	B4133 Hill 4	1,318	1.0	49	63
HS-11	B4334 Area	24,977	3.0	2,775	3,608
L5-03	B4353 Area	22,097	3.0	2,455	3,192
HS-01	B4356 Area	14,477	15.0	8,043	10,456
HS-15	B4358	152	2.0	11	15
L6-01	B4363 Area	53,038	4.0	7,857	10,215
L8-01	B4383 Area	118,962	5.0	22,030	28,639
L2-03	B4403	1,848	2.0	137	178
U5-07	B4453	1,901	1.0	70	92
U5-13	B4453 South	1,954	1.0	72	94
SA-11	B4626 Area	26,280	3.0	2,920	3,796
U5-08	B4641	16,299	5.0	3,018	3,924
U5-15	B4641 South	881	2.0	65	85
U5-14	B4641 SW	1,954	1.0	72	94
OC-01	B4783 Xformer	419	1.0	16	20

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HS-13	B4826	1,967	9.0	656	852
RM-02	Catch Basin	82,338	1.0	3,050	3,964
PU-10	Coal Storage	8,075	2.0	598	778
RM-07	Culvert	1,220	1.5	68	88
HL-04	Ditch S of G St	22,477	3.5	2,914	3,788
U5-27	Ditch S of L St	9,117	2.0	675	878
HF-11	Downslope of ISF	13,378	1.0	495	644
FS-15	Drainage E of FSDF	15,571	2.0	1,153	1,499
L5-02	Drainage N of B4353	7,409	5.0	1,372	1,784
FS-10	Drainage N of FSDF	13,235	2.0	980	1,274
FS-11	Drainage of FSDF	12,233	2.0	906	1,178
BZ-14	Drainage N of OCY 1	33,494	2.0	2,481	3,225
RM-14	Drainage N of SNAP2	1,954	1.0	72	94
SE-01	Drainage S of B4029	20,220	2.0	1,498	1,947
PU-05	E of B4005 LF 1	42,121	2.0	3,120	4,056
HS-20	E of B4009 LF 2	667	10.0	247	321
FS-08	E of FSDF	7,045	1.5	391	509
OC-06	E of Tank 4731	6,814	1.0	252	328
PU-06	East of B4042	17,888	2.0	1,325	1,723
MC-03	East of B4056 LF	1,954	1.0	72	94
HF-03	East of B4133	8,302	2.0	615	799
HS-21	East of B4616	12	1.5	1	1
HS-07	East of HMSA 2	3,045	4.0	451	586
OC-14	Edison Sub	4,458	2.0	330	429
ES-01	ESADA Pistol Range	13,860	3.0	1,540	2,002
ES-7	ESADA South	15,350	1.5	853	1,109
ES-02	ESADA Storage Yard	20,548	1.5	1,142	1,484
FS-01	FSDF Clean Pad	36,419	8.0	10,791	14,028
FSDF_C	FSDF Drainage C (NBZ)	9,090	2.0	673	875
FSDF_D1	FSDF Drainage D1 (NBZ)	7,249	2.0	537	698
FSDF_D2	FSDF Drainage D2 (NBZ)	7,469	2.0	553	719
FSDF_D3	FSDF Drainage D3 (NBZ)	7,833	2.0	580	754
FSDF_D4	FSDF Drainage D4 (Offsite)	28,268	2.0	2,094	2,722
FSDF_East_Down	FSDF Drainage East (NBZ)	5,812	2.0	431	560
FSDF_NE	FSDF Drainage NE	6,343	2.0	470	611
FSDF_SE	FSDF Drainage SE	1,749	2.0	130	168
FS-12	FSDF Range	1,774	2.0	131	171
FS-14	FSDF Range	27	4.0	4	5
FS-06	FSDF Upper Pond	1,679	7.5	467	606
HS-04	HMSA Area	10,892	10.0	4,034	5,244
SE-07	Hummock Area N 1	11,158	2.0	827	1,074
SE-08	Hummock Area N 2	1,027	1.0	38	49
SE-04	Hummock Area	36,945	2.0	2,737	3,558
HF-10	ISF	3,005	5.0	556	723
U5-24	J St Drainage	12,293	2.0	911	1,184

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		Area (ft ²)	Average Depth (ft)	In Situ Volume (yd ³)	Disposal Volume [+30%] (yd ³)
HS-10	Kalina North	5,148	1.0	191	248
L9-02	N of B4009 LF	2,119	5.0	392	510
U5-03	N of B4015 Field	54,568	5.0	10,105	13,137
L9-16	N of B4093	466	3.5	60	79
OC-15	N of Edison	813	1.0	30	39
RM-11	N of SNAP Drain1	12,707	2.0	941	1,224
RM-10	N of SNAP Ops 1	72,133	4.0	10,686	13,892
RM-13	N of SNAP Ops 2	481	1.0	18	23
L9-10	N of Solar Panel	2,982	2.0	221	287
SR-09	Sodium Cleaning Pad	22,905	2.0	1,697	2,206
BZ-01	NBZ 1	1,954	2.0	145	188
BZ-10	NBZ 10	1,828	2.0	135	176
BZ-11	NBZ 11	2,059	2.0	153	198
BZ-12	NBZ 12	1,954	2.0	145	188
BZ-17	NBZ 13	1,954	2.0	145	188
BZ-18	NBZ 14	15,019	1.0	556	723
BZ-19	NBZ 15	2,813	2.0	208	271
BZ-20	NBZ 16	20,694	0.5	383	498
BZ-21	NBZ 17	2,813	2.0	208	271
BZ-02	NBZ 2	8,161	2.0	605	786
BZ-24	NBZ 20	1,954	2.0	145	188
BZ-25	NBZ 25	4,676	0.5	87	113
BZ-26	NBZ 26	5,364	0.5	99	129
BZ-27	NBZ 27	4,456	0.5	83	107
BZ-28	NBZ 28	36,331	2.0	2,691	3,498
BZ-03	NBZ 3	1,790	2.0	133	172
BZ-04	NBZ 4	1,954	2.0	145	188
BZ-05	NBZ 5	1,910	2.0	142	184
BZ-06	NBZ 6	1,512	2.0	112	146
BZ-07	NBZ 7	8,066	0.5	149	194
BZ-08	NBZ 8	3,631	2.0	269	350
BZ-09	NBZ 9	2,813	2.0	208	271
NC-03	NC Drainage S	19,017	2.0	1,409	1,831
U6-01	NCY Dirt Rd 1	114,217	2.0	8,461	10,999
U6-02	NCY Dirt Rd 2	24,145	2.0	1,789	2,325
EL-01	NE of B3271	1,009	2.0	75	97
FS-09	NE of FSDF	5,356	4.0	793	1,032
FS-13	NE of FSDF	1,723	2.5	160	207
FS-16	NE of FSDF	1,954	2.0	145	188
NEBZ-06	NEBZ 3	1,954	2.0	145	188
NEBZ-07	NEBZ 4	1,954	2.0	145	188
NEBZ-08	NEBZ 5	1,626	2.0	120	157
NEBZ-09	NEBZ 6	1,954	2.0	145	188
NEBZ-10	NEBZ 7	1,954	2.0	145	188
NEBZ-11	NEBZ 8	1,942	2.0	144	187

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NEBZ-12	NEBZ 9	818	2.0	61	79
NC-2	New Con Drainage (Area III)	5,946	2.0	440	573
NC-04	New Con Yard	53,609	3.0	5,957	7,744
EL-03	North of B3271 2	77	1.0	3	4
L9-04	North of B4009	728	2.0	54	70
BH-05	North of B4100	5,570	4.0	825	1,073
HF-02	North of B4133	6,367	3.0	707	920
L5-01	North of B4353	1,954	3.5	253	329
SR-16	North of SRE	34,828	1.0	1,290	1,677
U5-06	NW of B4011	37,472	4.0	5,551	7,217
HS-24	NW of B4356	313	2.0	23	30
ES-03	NW of ESADA SY	1,954	8.0	579	752
ES-04	NW of ESADA SY	1,954	5.0	362	470
PD-03	NW of PD Area	1,954	2.5	181	235
L9-13	NW of Solar F	9,111	2.0	675	877
OC-16	OCY 16	8,614	3.0	957	1,244
OC-17	OCY 17	7,997	3.0	889	1,155
OC-18	OCY 18	7,146	3.0	794	1,032
OC-19	OCY 19	30,047	1.5	1,669	2,170
OC-20	OCY 20	1,764	1.0	65	85
OC-21	OCY 21	3,503	1.0	130	169
OC-04	OCY Debris Area	53,917	5.0	9,985	12,980
OC-03	OCY East	39,447	4.0	5,844	7,597
OC-02	OCY West	175,080	3.0	19,453	25,289
NC-01	OCY/NCY Drainage	47,483	2.0	3,517	4,572
OCY_DOWN	Old Con Drainage (NBZ)	15,103	2.0	1,119	1,454
PD-01	PD Hummock Area	48,658	5.0	9,011	11,714
PD-04	PD Southwest	5,177	10.0	1,917	2,493
PU-18	PDU 18	1,100	2.0	81	106
PU-19	PDU 19	7,258	2.0	538	699
PU-20	PDU 20	6,108	2.0	452	588
PU-21	PDU 21	5,581	2.0	413	537
PU-22	PDU 22	7,985	2.0	591	769
PU-23	PDU 23	2,278	5.0	422	548
PU-24	PDU 24	6,998	2.0	518	674
PD-02	Pond Dredge Area	103,881	5.0	19,237	25,008
RM-01	RMHF and Slope	152,516	2.0	11,298	14,687
RMHF_DOWN	RMHF Drainage (NBZ)	13,601	2.0	1,007	1,310
RM-03	RMHF Drainage 1	20,806	2.0	1,541	2,004
SR-02	Road N of SRE	16,515	5.0	3,058	3,976
SR-17	Road to B4724	3,364	2.0	249	324
U5-17	S 5D North 1	12,430	1.0	460	598
L4-04	S of B4040	3,053	1.5	170	220
SE-05	S of G St 1	43,852	2.0	3,248	4,223
SE-06	S of G St 1	1,799	1.0	67	87

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L9-12	S of Solar F	17,693	5.0	3,277	4,259
OC-13	SA 3 Debris Area	58,037	4.0	8,598	11,177
SE-11	SA 5A South 11	33,828	2.0	2,506	3,258
SE-6	SA 5A South 6	67,280	2.0	4,984	6,479
SE-9	SA 5B South 9	9,579	2.0	710	922
SA7_W4	SNAP Drainage 1 (Offsite)	2,113	2.0	157	203
HS-29	SCTI 1	3,560	2.0	264	343
HS-30	SCTI 2	1,716	2.0	127	165
HS-31	SCTI 3	2,757	2.0	204	265
HS-32	SCTI 4	1,222	2.0	91	118
HS-33	SCTI 5	2,798	2.0	207	269
HS-34	SCTI 6	12,643	2.0	937	1,218
HS-35	SCTI 7	8,932	2.0	662	860
HS-26	SCTL Area	21,977	3.0	2,442	3,174
HS-02	SCTL North	38,957	4.0	5,771	7,503
SA_5A_S2	SE Drum Yard to ECL	4,743	2.0	351	457
SA_5A_S3	SE Drum Yard to ECL	10,173	2.0	754	980
L9-09	SE of B4009	2,907	10.0	1,077	1,400
L1-04	SE of B4025	1,954	5.0	362	470
MC-02	SE of B4056 LF	1,954	1.0	72	94
L9-17	SE of B4093	1,954	2.0	145	188
SETF-1	SETF 1	8,490	2.0	629	818
SETF-2	SETF 2	10,060	2.0	745	969
SETF-3	SETF 3	7,103	2.0	526	684
SETF-4	SETF 4	16,798	2.0	1,244	1,618
SETF-5	SETF 5	35,939	2.0	2,662	3,461
SETF-6	SETF 6	4,623	2.0	342	445
SN-2	Silvernale Drainage NE	48,790	2.0	3,614	4,698
SN-1	Silvernale Pond	79,333	3.0	8,815	11,459
ES-05	Slope S of ESADA	354,785	5.0	65,701	85,411
SA7_W1	SNAP Drainage 1 (NBZ)	8,922	2.0	661	859
SA7_W2	SNAP Drainage 2 (NBZ)	2,784	2.0	206	268
SA7_W3	SNAP Drainage 3 (NBZ)	2,790	2.0	207	269
SA-10	SNAP Excavation	41,436	10.0	15,347	19,951
HS-14	Sout of B4026	187	5.0	35	45
PU-09	South of B4005	1,954	6.0	434	564
HL-03	South of B4020	30,572	2.0	2,265	2,944
HF-04	South of B4133	3,068	3.0	341	443
U5-26	South of B4353	26,187	2.5	2,425	3,152
U5-25	South of G St	1,954	3.5	253	329
U5-20	Southern 5D N 1	1,954	5.0	362	470
U5-21	Southern 5D N 2	1,954	5.0	362	470
U5-22	Southern 5D N 3	1,954	5.0	362	470

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L8-02	SPTF Northeast	13,641	1.5	758	985
L8-03	SPTF Southeast	35,711	7.0	9,258	12,036
SR-04	SRE B4143	30,592	15.0	16,995	22,094
SR-08	SRE Channel	40,939	2.0	3,033	3,942
BZ-16	SRE Drainage in NBZ	2,095	2.0	155	202
SRE_DOWN	SRE Drainage (NBZ)	19,121	2.0	1,416	1,841
SR-05	SRE East	82,922	8.0	24,569	31,940
SR-13	SRE Entrance	3,765	1.0	139	181
SR-03	SRE Hillslope	17,954	3.0	1,995	2,593
SR-14	SRE Laundry	26,893	1.0	996	1,295
SR-06	SRE Pond	19,511	6.0	4,336	5,637
SR-01	SRE West	51,311	2.0	3,801	4,941
HF-13	SW Flow fm SRE	33,245	1.0	1,231	1,601
B8-01	SW of B4006	1,348	2.0	100	130
L9-08	SW of B4009	1,954	2.0	145	188
SA-13	SW of B4059	809	1.0	30	39
HS-25	SW of B4356	1,447	10.0	536	697
OC-05	SW of OCY 1	39,723	2.0	2,942	3,825
OC-07	SW of OCY 2	15,311	5.0	2,835	3,686
OC-08	SW of OCY 3	1,954	2.0	145	188
OC-12	SW of OCY 4	1,196	1.0	44	58
FS-02	W Debris Area 1	1,954	7.9	572	743
FS-03	W Debris Area 2	1,487	5.0	275	358
L9-01	W of B4100	1,011	2.0	75	97
HF-06	W of B4133 Ops	9,503	2.0	704	915
ES-06	W of ESADA	1,954	2.0	145	188
FS-04	W of FSDF	28,927	1.5	1,607	2,089
L9-11	W of Solar Concentrator Facility	26,275	3.0	2,919	3,795
PU-16	West of B4005	1,954	2.0	145	188
L2-01	West of B4011	21,494	5.0	3,980	5,175
U5-11	West of B4073	3,011	2.0	223	290
HF-05	West of B4133	9,297	10.0	3,443	4,476
HS-23	West of B4356	4,795	2.0	355	462
HF-01	West of B4686	15,190	1.0	563	731
HS-05	West of HMSA	48	4.0	7	9

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		Area (ft ²)	Average Depth (ft)	In Situ Volume (yd ³)	Disposal Volume [+30%] (yd ³)
OC-09	West of OCY 1	8,089	3.0	899	1,168
OC-10	West of OCY 2	2,649	3.5	343	446
OC-11	West of OCY 3	1,954	1.0	72	94
Total				823,246	1,070,220
Total Acres				132.8	
Total Areas				306	

Notes

1. Chemical Preliminary Remediation Areas were identified where chemical results exceeded screening levels using the following criteria:
 - i. Screening levels were based on the Look-Up Table values issued by DTSC in June 2013 for 125 chemicals most frequently detected in Area IV, including all background constituents and additional chemicals of interest to DTSC. These values were based on chemical background threshold values (BTVs) and method reporting limits (MRLs), with background chemicals adjusted for analytical and decision error uncertainty.
 - ii. TPH was screened against the LUT values using a 'light' (gasoline) and combined 'heavy' (kerosene, diesel, and oil) and 'light' (gasoline) fraction approach. Areas where TPH had not been previously analyzed in samples, but that were surrounded by numerous TPH exceedances were included in the PRA footprints even if the primary chemical class results were less than the Chemical LUT values.
2. Depth and volume estimates are based on data available as of August 2013 and are not based on final Chemical Look-Up Table values. Thus, they are considered preliminary, working draft ROM estimates that will need refinement during remedial planning.
3. Radionuclide areas were identified where radiological results exceeded EPA Field Action Levels (FALs) based on the following:
 - i. FALs represent EPAs Background Threshold Value (BTV) and Method Detection Concentrations (MDC) screening levels and do not include Method Uncertainty.
 - ii. Radionuclides used in this evaluation were those identified by EPA as having activities equal to or exceeding the FAL and that resulted from historical operations, and included: Americium-241, Curium-243/244, Cesium-137, Cobalt-60, Europium-152, Europium-154, Nickel-59, Plutonium-238, Plutonium-239/240, Tritium, and Strontium-90.
 - iii. NORM radionuclide exceedances were excluded from this evaluation.

Table 4
Summary of Transportation for Area IV Soil Volumes - Draft
Santa Susana Field Laboratory
Date Prepared - September 5, 2013

Soil Cleanup Scenario ¹	Chemical (only)	Co-Located Chemical + Radiological	Radiological (only)	Total
1) Chemical Clearly Contaminated Area Soil Volumes				
Volume of Soil Requiring Remediation	220,000	18,000	64,400	302,400
Number of Truckloads	13,750	1,125	4,025	18,900
Disposal Duration (years)	1.6	0.1	0.5	2.2
2) Chemical Look-Up Table Preliminary Remediation Area Soil Volumes				
Volume of Soil Requiring Remediation	997,000	74,000	8,400	1,079,400
Number of Truckloads	62,313	4,625	525	67,463
Disposal Duration (years)	7.1	0.5	0.1	7.7
3) Upper Range Soil Volumes				
Volume of Soil Requiring Remediation	1,585,000	82,000	400	1,667,400
Number of Truckloads	99,063	5,125	25	104,213
Disposal Duration (years)	11.3	0.6	<0.1	11.9

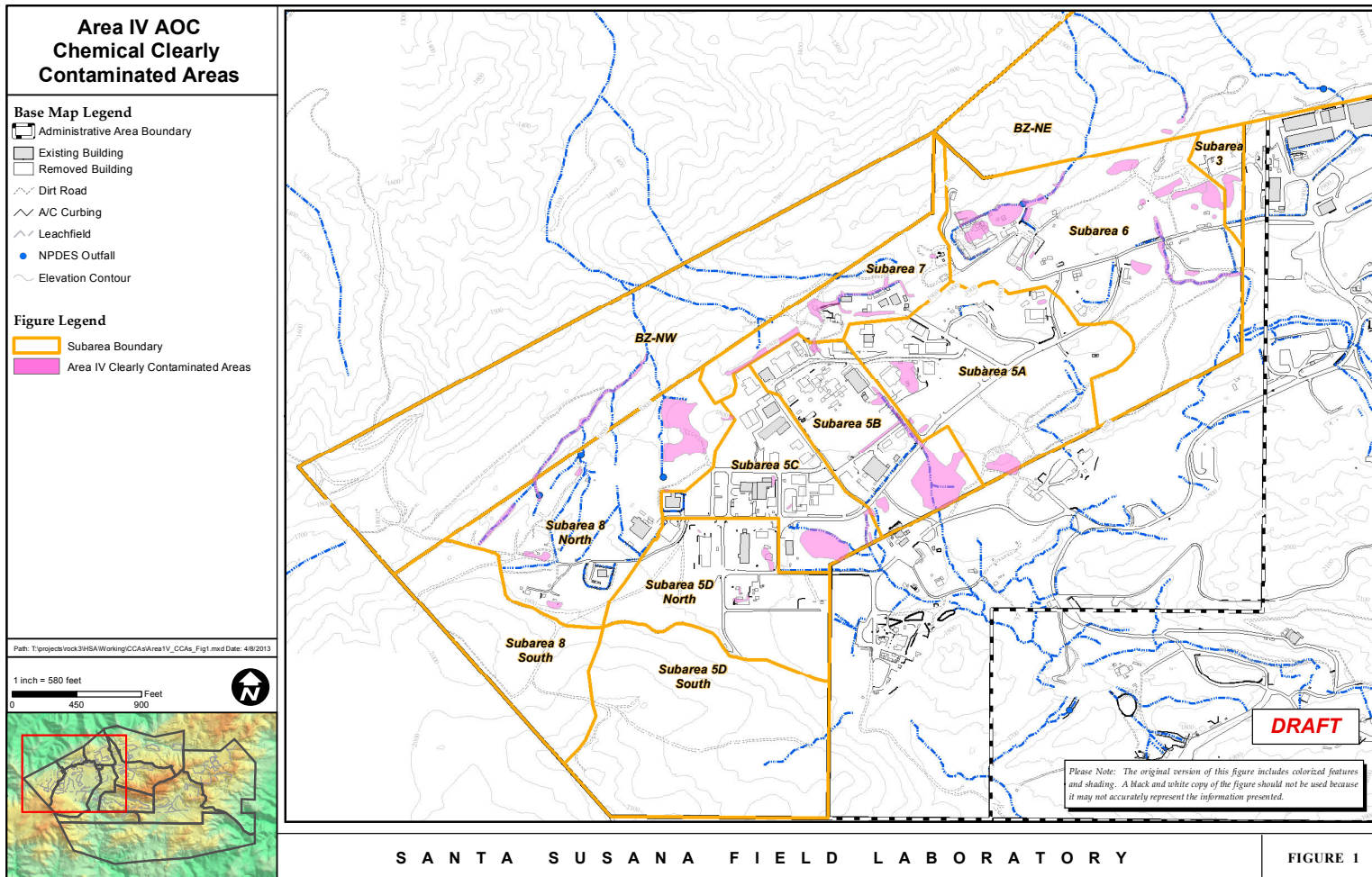
Notes

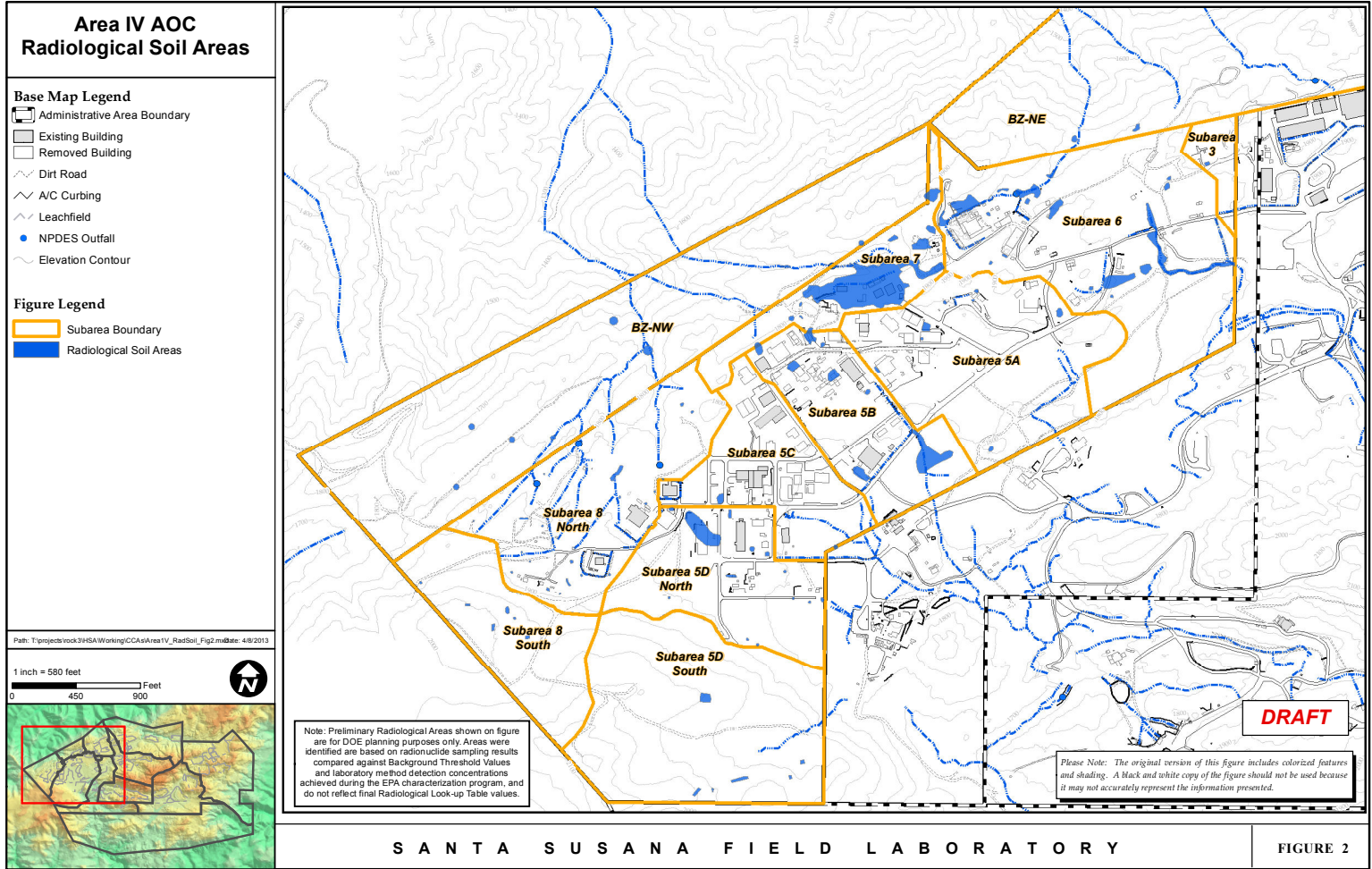
1. Criteria for identifying Chemical Clearly Contaminated Area, Chemical Look-Up Table PRAs, Upper Range, and Radiological soil volumes is provided in the text of this document.

2. Volume estimates are based on validated data available as of August 2013 and are considered preliminary, working draft ROM estimates that will need refinement once validated data is available for all subareas and/or during remedial planning.

3. For truckload transport planning, an average volume of 16 cubic yards per truckload has been assumed based on previous soil removal actions at SSFL.

4. Truckloads estimated assuming 35 truckloads allowed per day, 5 days per week, 50 weeks per year. Does not include allowance for NASA or Boeing trucks leaving property.





Area IV Chemical Look-Up Table Preliminary Remediation Areas

Base Map Legend

- Administrative Area Boundary
- Existing Building
- Removed Building
- Rock Outcrop
- Dirt Road
- Drainage
- A/C Curbing
- Leachfield
- NPDES Outfall
- Elevation Contour

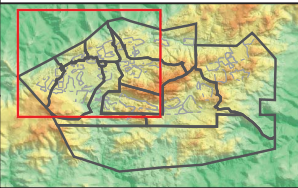
Figure Legend

- Subarea Boundary
- DOE AOC Preliminary Remediation Areas
- NASA Estimated Soil Cleanup Boundaries for Proposed Action

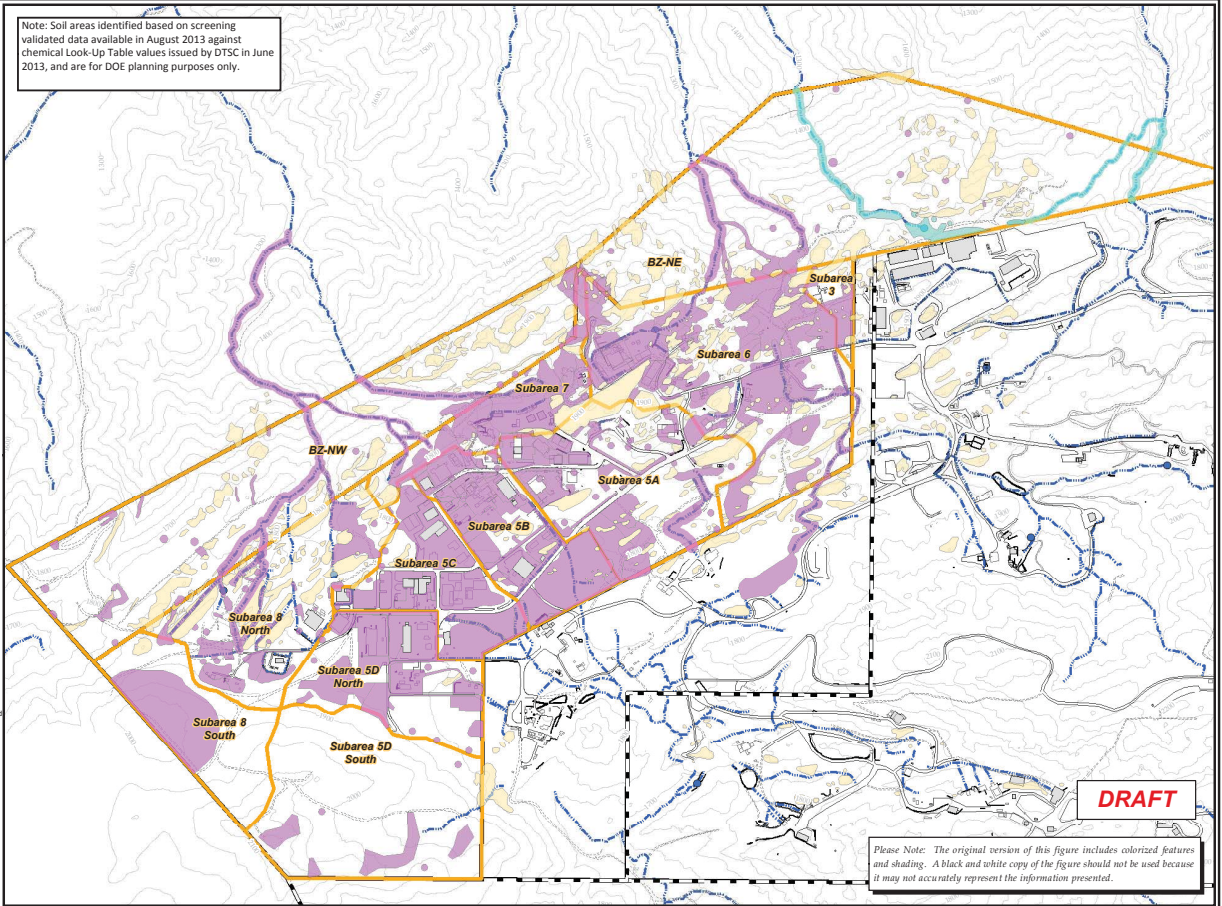
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1 inch = 720 feet

0 720 1,440 Feet



Note: Soil areas identified based on screening validated data available in August 2013 against chemical Look-Up Table values issued by DTSC in June 2013, and are for DOE planning purposes only.



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

SANTA SUSANA FIELD LABORATORY

FIGURE 3

Area IV **Chemical Look-Up Table** **Upper Range Preliminary** **Remediation Areas**

- Base Map Legend**

 - Administrative Area Boundary
 - Existing Building
 - Removed Building
 - Rock Outcrop
 - Dirt Road
 - Drainage
 - A/C Curbing
 - Leachfield
 - NPDES Outfall
 - Elevation Contour
- Figure Legend**

 - Subarea Boundary
 - DOE AOC Preliminary Remediation Areas Upper Range
 - DOE AOC Preliminary Remediation Areas
 - NASA Estimated Soil Cleanup Boundaries for Proposed Action

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