

To: John Jones and Stephanie Jennings, US Department of Energy (DOE)
From: Dixie Hambrick, Mark Sherwin, David Collins (MWH)
Cc: Dave Dassler (Boeing)
Date: September 29, 2014
Re: Rough Order of Magnitude Estimates for AOC Chemical Preliminary Remediation Volumes in Area IV and the Northern Buffer Zone, and Associated Truck Transport Estimates, based on DTSC Look-Up Table Values – DRAFT

I. Introduction

In August 2014, following completion of the Phase 3 chemical characterization sampling, the United States Department of Energy (DOE) requested that MWH Americas, Inc. (MWH) use chemical soil sampling data in Area IV and the Northern Buffer Zone (NBZ) of the Santa Susana Field Laboratory (SSFL) and the Geographic Information System (GIS) to identify Preliminary Remediation Areas (PRAs) based on the chemical Look-up Table (LUT) issued by the Department of Toxic Substances Control (DTSC) in June 2013.

This TM summarizes the evaluation performed to identify Chemical PRAs, and presents the rough-order-of-magnitude (ROM) soil volumes and associated soil transport truckloads estimated using the PRAs. Also included in this TM is a summary of the evaluation conducted using soil sampling data in non-operational areas in the southern portion of Area IV and in the NBZ to identify areas where LUT exceedances of chemicals may be caused by the natural variability of background chemical concentrations or historical laboratory analytical procedures, and not related to site operations.

Information in this TM supersedes initial Chemical PRAs and ROM soil volume estimates previously published in September 2013 (MWH, 2013), since Chemical PRAs and ROM soil volume estimates presented herein are based on the completed chemical characterization dataset from Area IV and the NBZ.

II. Chemical LUT Data Screening Process

In June 2013, DTSC issued a Chemical LUT for 125 chemicals most frequently detected within Area IV, including background constituents and additional chemicals of interest to DTSC. The LUT values are based on chemical background threshold values (BTVs) and method reporting limits (MRLs), with background chemicals adjusted for analytical and decision error uncertainty. Since not all chemicals are listed in the Chemical LUT, MRLs achievable by several analytical laboratories have been used in this evaluation for chemicals not included in the June 2013 chemical LUT (MWH/CDM/MEC^X, 2012).

The Chemical LUT values provide the Administrative Order on Consent (AOC) standard for soil remediation. To support the soil remediation evaluation, the following criteria were applied to GIS displays using the Chemical LUT values:

1. Color coded screening ‘dots’ were created in GIS to represent the chemical groups included in this evaluation. Soil matrix results from each sample location were represented by a screening ‘dot’ for each chemical group analyzed at that location. The screening ‘dot’ color coding represented the maximum ratio of any detected analyte concentration compared to its respective LUT value (‘max LUT ratio’) for each chemical group or, if no analytes in the chemical group were detected, the max LUT ratio of any non-detected analyte result compared to its respective LUT value. Chemical groups included in this evaluation were: volatile organic compounds (VOCs); polycyclic aromatic hydrocarbons (PAHs); phthalates; other semi-volatile organic compounds (SVOCs); polychlorinated biphenyls (PCBs); dioxin TEQ; metals; perchlorate; energetics; pesticides; herbicides; formaldehyde; cyanide; and TPH.
 - a. Select metals considered essential nutrients (e.g., iron, calcium, phosphorous) were not included by DTSC in the chemical LUT and were not considered in this evaluation or included in the GIS screening ‘dots’.
 - b. TPH was screened against the LUT values for individual hydrocarbon ranges (e.g., gasoline, kerosene).
2. In addition to the chemical group screening ‘dots’, a comprehensive screening ‘all dot’ was created for soil matrix data in GIS for the PRA evaluation. The ‘all dot’ represents the max LUT ratio of any detected analyte concentration compared to its respective LUT value independent of chemical group or, if no analytes were detected, the max LUT ratio of a non-detected analyte result compared to its respective LUT value. The ‘all dot’ included all chemicals with a LUT value except TPH and VOCs, and MRL values achievable by multiple laboratories for other chemicals included in the sampling investigation plans by DOE.
 - a. TPH was screened against the LUT values separately from the ‘all dot’ (as described above) since low TPH concentrations occurred throughout Area IV and those results masked other chemical exceedances, and TPH was considered separately for identification of PRAs as described below.
 - b. VOCs were screened against LUT values separately from the ‘all dot’ (as described above) since they are predominantly co-located with VOCs in soil vapor and subject to alternative remedial technologies.
3. GIS was used to display the maximum depth of LUT value exceedances at each location along with the maximum depth of analysis at that location. These depths were used to estimate average depths for each of the PRA footprints.

III. Chemical PRA Volume Estimates

Displays in GIS and analytical datasets were then used to identify PRA footprints and estimate soil remediation volumes according to the following approach:

1. Chemical PRA footprints were drawn to include all locations where detected chemical constituents exceeded the LUT values. Lateral extent was estimated based on exceedances and data below screening criteria, as well as bedrock, site operational area

- extent, known release mechanisms, and topography (as described further in items 4 and 5 below).
2. Chemical PRA footprints were generally drawn to combine locations with similar maximum LUT value exceedance depths and similar constituent exceedances. GIS and analytical datasets were used to estimate the average maximum depth of exceedance for each footprint area. Average depths were multiplied by respective footprint areas to calculate *in situ* (in place) volumes. A depth of 1 foot was used for this evaluation where shallow LUT exceedances were present in thin soils over bedrock.
 3. *In situ* soil volumes were converted to *ex situ* soil volumes using a 30% swell factor to account for soil volume expansion following excavation. *Ex situ* soil volumes are presented in the summaries below.
 4. In some cases features such as surface water drainage pathways or channels, ponds, fill soil, or bedrock extent were used to estimate lateral and vertical extent of soil exceedances.
 - a. Drainages and channels with multiple exceedances generally were considered as a single footprint rather than segregating short segments with single exceedances, assuming sediment transport within the drainage.
 - b. Channel morphology (topography), bedrock outcrop, or lateral bank data were used to define channel footprint width.
 - c. Ponds or surface water collection areas (e.g., 17th Street Pond, Sodium Reactor Experiment [SRE] Pond) and fill areas (e.g., B4056 Landfill, B4010 fill area) with multiple exceedances were drawn as footprints encompassing the entire feature based on the mixed and interspersed nature of exceedances within such features.
 - d. Rock outcrop and refusal depth data (depth to bedrock) were used to define lateral and vertical extent of PRAs.
 5. Historical site operations were also considered in defining lateral extent of exceedances. Where site operations included storage, intensive chemical use, known releases or where the preponderance of data indicates pervasive exceedances (e.g., SRE, Old Conservation Yard), PRAs were drawn to include more widely spaced, interspersed exceedances.
 6. Paved roads were not typically targeted for sampling during characterization work within Area IV, and minimal data are available to assess their potential impact on underlying soil. To be conservative, roads within former operational areas have been identified as chemical PRAs with an assigned analytical suite of PAHs, PCBs, TPH, and metals and a depth of 3 feet to address potential impacts associated with asphalt, road base, and dust control oil-spraying.
 7. Areas containing samples that have not been analyzed for TPH, but are surrounded by numerous TPH exceedances were identified as a PRA even if available sample results are less than chemical LUT values.
 8. The majority of the samples collected within Area IV and NBZ that were analyzed for TPH did not utilize sample preparation methods developed by the U.S. Environmental Protection Agency (EPA) to help eliminate non-petroleum hydrocarbon results in

reported TPH concentrations using a silica gel cleanup cartridge. A review of reported TPH results in undeveloped areas (e.g., NBZ) indicated TPH results may reflect organic-derived (i.e., plant and animal) matter, rather than site-related releases of petroleum hydrocarbons.

- a. Possible inclusion of organic-derived hydrocarbons in reported TPH results has been identified by EPA scientists as well as other researchers (RWQCB, 2012; TPH Criteria Working Group, 1998).
 - b. As part of the final Phase 3 data gap sampling activities for Subareas 5A, 5D, 8, and the NBZ, a TPH study was conducted that involved analyzing several samples for TPH with and without the silica gel cleanup sample preparation method.
 - c. The TPH study indicates when the silica gel cleanup preparation method was used analytical results were significantly lower than when the sample preparation was not used. In many cases, TPH results were below detection limits following silica gel cleanup. If these results were extrapolated across the undeveloped portion of the site, the PRA footprints and the overall number of PRAs would likely be reduced.
9. Sporadic low-level exceedances in the NBZ were considered sufficiently localized to include in unique, small PRAs.
 10. PRAs with constituent exceedances consisting of only TPH and/or PAHs are included in soil volume and truckload calculations; however, they have been uniquely identified due to their potential to be remediated using *in situ* technologies.
 11. PRAs were identified where chemical LUT values were exceeded in drainages leading from Area IV operations north of the NBZ where data currently exist.
 12. PRAs were not identified in Area III since remediation requirements for potentially contiguous and emanating chemical exceedances in this area is still under evaluation by DOE, NASA, Boeing, and DTSC.

This evaluation identified 393 individual Chemical PRAs comprising approximately 232 acres, and approximately 1,800,000 cubic yards of soil within Area IV and the NBZ (ROM volume range of 1,300,000 to 2,800,000 cubic yards). The locations of the PRAs are shown on Figure 1. Details regarding the PRAs, including surface area, depth, volume, and chemical drivers, are presented in Table 1. It should be noted that the number of PRAs identified in this process (and listed in Table 1), are dependent on the factors listed above; although some PRAs may be contiguous, they are listed separately for remedial planning due to differing estimated exceedance depths and/or chemical drivers.

III. Truckload and Transport Estimates

For truckload transport planning, it is conservatively assumed that the entire Chemical PRA remediation soil volume would require transport offsite. For this estimate, an average volume of 16 cubic yards per truckload is assumed based on previous SSFL soil removal activities. This basis is consistent with other SSFL remediation estimates since some waste will be hauled in 10- to 15-cubic yard capacity roll-off bins, and some will be hauled in 16- to 18-cubic yard end-dump trucks. Also it is worth noting for this evaluation that a ‘truckload’ is defined as a one-

way transport estimate. The duration needed for transport of these soil volumes has been estimated assuming 35 truckloads per day, 5 days per week, 50 weeks per year.

Based on these assumptions and a ROM estimate of 1,840,000 cubic yards of soil to be disposed of offsite, approximately 112,500 truckloads will be required with a hauling duration of 12.9 years. As noted above, this remediation volume is a ROM estimate, and as such, these truckload estimates may also vary accordingly.

IV. Additional Chemical PRA Evaluation for Background- or Laboratory-Related Exceedances

Following the identification of the chemical PRAs and estimation of ROM soil remediation volumes based on those PRAs, an additional evaluation of LUT exceedances in non-operational portions of Area IV and the NBZ was conducted to identify if specific exceedances may result from either the natural variability of background chemical concentrations or from chemical cross-contamination within the analytical laboratory during sample analysis (i.e., a ‘laboratory contaminant’). Multiple lines of evidence were identified to evaluate these specific exceedances, and include the following considerations:

1. The LUT exceedance is generally within the range of the maximum detected concentration within the background dataset with background outliers included.
2. The LUT exceedance is associated with mineralization or other type of geologic feature.
3. The LUT exceedance is supported by a spatial distribution consistent with natural processes and/or sources (e.g., the chemical that exceeds its LUT value is naturally occurring, is only present at depth above bedrock and not in shallower samples, and no other exceedances are present).
4. The LUT exceedance is supported by concentration gradients consistent with natural processes and/or sources (e.g., concentration gradients do not suggest a potential operational release).
5. The LUT exceedance is not co-located with known operational contaminants (e.g., PCBs).
6. The LUT exceedance occurs within an area characterized by other background chemical distributions/patterns that are naturally occurring.
7. The LUT exceedance, if identified as a common laboratory contaminant (e.g., methylene chloride, acetone, phthalates), is sporadically detected within an area and is supported by surrounding non-detected concentrations.

The evaluation of potentially naturally occurring background and laboratory contaminant sources of LUT exceedances was conducted in the non-operational portions of Area IV (Subarea 5D South and Subarea 8 South) and the NBZ since historical chemical use locations in these areas was sparse and when present, very localized (e.g., a water tank). In addition, the frequency of the LUT exceedances in these areas was sporadic and the magnitude generally low. The evaluation approach focused on:

1. Locations where LUT exceedances were only slightly elevated; generally between 1 and 2 times the LUT value for only a few chemicals.

2. Locations where LUT exceedances were sporadic in nature with no discernable distribution pattern. The chemical results in the area were reviewed for overall consistency relative to LUT values, and to assess the potential for higher concentrations in adjacent unsampled areas.
3. Locations where LUT exceedances were generally less than two times the maximum background concentrations, and/or within the range of the full background dataset (including outliers). Exceedance results were reviewed for consistency with surrounding sampling results, depth of occurrence, depth of bedrock, mineralization, potential down-slope migration from a natural source, and spatial relationship to former operational areas. Overall data distributions were evaluated to ensure that there were no spatial trends in detected concentrations that suggest a source or the potential for higher concentrations in adjacent unsampled areas.

Using the lines of evidence and general approach described above, if sufficient reasons were identified to consider that LUT exceedances were not related to onsite operations in Area IV or the NBZ, then the chemical PRA (or portion of the chemical PRA) was identified for further evaluation regarding the need (if any) for remediation planning.

As described further in Note 7 below, there is uncertainty regarding reported TPH concentrations, especially those analyses not performed using the silica gel cleanup process (EPA Method 3630) to remove naturally occurring organic material. Thus, the presence of TPH LUT exceedances did not necessarily invalidate the conclusion that other LUT exceedances are likely related to naturally occurring background and/or laboratory sources using the lines of evidence described above. However, due to the uncertainty and consistent PRA identification described above, the resulting ‘TPH-only’ locations were identified separately.

In summary, a total of 62 PRAs were included in this evaluation. Multiple lines of evidence were identified in 31 PRAs sufficient to indicate that LUT exceedances are likely related to naturally occurring background variability and/or laboratory sources, rather than former operations within Area IV and the NBZ. These areas are shown on Figure 2. The areas where LUT exceedances are likely related to naturally occurring background variability and/or laboratory sources cover approximately 8 acres of the chemical PRAs (60,000 cubic yards of soil). This evaluation also identified approximately 25 acres of chemical PRAs (150,000 cubic yards of soil) that would be identified as a PRA due to TPH exceedances only.

V. Additional Notes / Assumptions

1. The estimated soil volumes presented in this TM represent ROM engineering estimates within a tolerance factor of +50/-30% and are based on the information available to MWH in September 2014. These estimates should only be used for project planning purposes.
2. This evaluation of Chemical PRAs and associated ROM soil volume estimate was limited to data within Area IV, the NBZ, and adjacent areas described above (north of the NBZ).
3. Areas identified by NASA in their Environmental Impact Statement (EIS) for AOC cleanup in Area IV and the NBZ, and areas sampled by DOE in Area III, were excluded from this evaluation.

4. The swell factor is a function of various soil properties and can vary considerably depending on soil type. Many sources report swell factors for common materials, including state transportation agencies (Caltrans, Washington Department of Transportation (DOT), etc.), the Federal Highway Administration (FHWA) Geotechnical Technical Guidance Manual, and the Caterpillar Performance Handbook. According to the FHWA manual, dry earth has a swell factor of 50% and dry sand has a swell factor of 11% (with a 33% uncertainty). Based on silty sands, which are the most common soil type onsite, a swell factor range of 20% to 30% is appropriate for SSFL. The upper end of this range was used in this evaluation to be conservative.
5. Consideration of exclusion criteria as allowed by the 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 estimates provided above.
6. Radionuclides were not included in this evaluation. Radiological LUT PRAs are presented in a separate TM.
7. Use of silica gel cleanup sample preparation procedures (EPA Method 3630) significantly reduced TPH concentrations in areas where re-sampling was performed, especially in non-operational areas. This finding indicates significant uncertainty related to PRAs with TPH as the only LUT exceedance and their associated soil volumes in the ROM estimate.

Table 1
 Summary of Area IV Chemical
 Preliminary Remediation Area Soil Volumes - Draft
 Santa Susana Field Laboratory
 Date Prepared - September 29, 2014

Chemical PRA ID ¹	Subarea	Area ² (ft ²)	Area ² (acres)	Average Depth ³ (ft)	In Situ Volume ⁴ (cy)	Ex Situ Volume ⁴ (cy)	Chemical Group Exceedance ⁵													
							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide	TPH Assumed
3-1	3	2,813	0.06	1.0	104	135	X				X			X						
3-2	3	829	0.02	1.0	31	40	X					X								
3-3	3	1,515	0.03	1.0	56	73		X												
5A-1	5A	4,675	0.11	12.0	2,078	2,701	X				X	X		X						
5A-2	5A	1,598	0.04	10.0	592	769	X	X												
5A-3	5A	17,817	0.41	3.0	1,980	2,574	X			X	X	X		X				X		
5A-4	5A	42,439	0.97	5.0	7,859	10,217	X	X		X	X	X		X	X		X	X		
5A-5	5A	802	0.02	8.5	253	328						X		X						
5A-6	5A	3,355	0.08	3.5	435	565	X				X	X		X						
5A-7	5A	21,240	0.49	3.0	2,360	3,068	X			X	X	X		X				X		
5A-8	5A	1,644	0.04	5.0	304	396	X				X			X						
5A-9	5A	1,341	0.03	4.0	199	258	X							X						
5A-10	5A	64,708	1.49	2.0	4,793	6,231	X	X			X	X	X	X			X	X		
5A-11	5A	14,849	0.34	3.0	1,650	2,145	X	X		X	X	X		X	X		X	X		
5A-12	5A	1,689	0.04	1.0	63	81	X	X		X	X	X		X			X	X		
5A-13	5A	1,954	0.04	6.0	434	564								X						
5A-14	5A	15,400	0.35	2.0	1,141	1,483	X	X		X	X	X		X	X		X	X		
5A-15	5A	36,488	0.84	5.0	6,757	8,784	X	X		X	X	X		X	X	X	X			
5A-16	5A	1,161	0.03	6.0	258	335						X								
5A-17	5A	13,816	0.32	2.0	1,023	1,330	X			X	X	X		X						
5A-18	5A	16,061	0.37	2.5	1,487	1,933	X	X				X		X	X					
5A-19	5A	4,952	0.11	2.0	367	477				X		X								
5A-20	5A	1,937	0.04	2.0	143	186	X							X						
5A-21	5A	1,680	0.04	2.0	124	162														X
5A-22	5A	6,119	0.14	2.0	453	589														X
5A-23	5A	8,368	0.19	2.0	620	806														X
5A-24	5A	11,751	0.27	2.0	870	1,132	X	X		X	X	X		X			X	X		
5A-25	5A	23,916	0.55	3.0	2,657	3,454	X			X		X		X						
5A-26	5A	17,511	0.40	3.0	1,946	2,529	X			X		X		X						
5A-27	5A	643	0.01	2.0	48	62						X		X						
5A-28	5A	44,130	1.01	2.5	4,086	5,312	X							X						
5A-29	5A	14,799	0.34	3.0	1,644	2,138	X	X				X	X	X			X	X		
5A-30	5A	1,954	0.04	1.0	72	94						X		X						
5A-31	5A	8,801	0.20	1.0	326	424						X	X	X						
5A-32	5A	29,946	0.69	2.0	2,218	2,884	X			X	X	X		X						
5A-33	5A	42,746	0.98	2.0	3,166	4,116	X	X			X	X	X	X			X	X		
5A-34	5A	145,101	3.33	1.5	8,061	10,479	X	X		X	X	X		X			X			
5A-35	5A	33,190	0.76	5.0	6,146	7,990								X						
5A-36	5A	50,219	1.15	1.0	1,860	2,418								X						
5A-37	5A	146,866	3.37	1.5	8,159	10,607	X	X				X		X						
5A-38	5A	26,461	0.61	1.0	980	1,274								X						
5A-39	5A	10,173	0.23	2.0	754	980		X			X	X		X			X	X		
5A-40	5A	4,743	0.11	2.0	351	457	X	X				X	X	X			X	X		
5A-41	5A	16,707	0.38	4.0	2,475	3,218								X						
5A-42	5A	3,698	0.08	30.0	4,108	5,341	X					X		X						
5A-43	5A	13,374	0.31	10.0	4,953	6,439	X	X			X			X	X					
5A-44	5A	5,888	0.14	2.0	436	567	X	X		X	X	X		X			X	X		
5A-45	5A	10,020	0.23	2.0	742	965								X						
5A-46	5A	31,220	0.72	4.0	4,625	6,013	X	X			X	X		X						
5A-47	5A	14,977	0.34	1.0	555	721	X	X			X	X		X				X		
5A-48	5A	1,315	0.03	10.0	487	633								X						

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							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide	TPH Assumed
5A-49	5A	16,385	0.38	2.0	1,214	1,578	X	X			X	X		X			X			
5A-50	5A	17,484	0.40	3.0	1,943	2,526								X						
5A-51	5A	14,582	0.33	1.0	540	702								X						
5A-52	5A	3,042	0.07	2.0	225	293	X	X			X	X					X	X		
5A-53	5A	29,698	0.68	5.0	5,500	7,150	X	X			X	X		X	X					
5A-54	5A	9,590	0.22	2.0	710	923	X				X			X				X		
5A-55	5A	20,477	0.47	1.5	1,138	1,479	X	X		X	X	X		X			X	X		
5A-56	5A	1,954	0.04	2.0	145	188	X										X			
5A-57	5A	5,516	0.13	2.0	409	531	X	X			X	X					X			
5A-58	5A	738	0.02	2.0	55	71								X						
5A-59	5A	3,934	0.09	1.0	146	189														X
5A-60	5A	52,076	1.20	3.0	5,786	7,522	X			X		X		X						
5A-61	5A	24,298	0.56	3.0	2,700	3,510	X			X		X		X						
5B-1	5B	12,731	0.29	2.0	943	1,226	X				X			X						
5B-2	5B	17,653	0.41	15.0	9,807	12,750	X	X		X	X	X		X	X	X				
5B-3	5B	41,140	0.94	4.5	6,857	8,914	X	X		X	X	X	X	X	X		X	X		
5B-4	5B	24,197	0.56	8.0	7,169	9,320	X	X		X	X	X	X	X	X	X		X		
5B-5	5B	21,769	0.50	7.0	5,644	7,337	X	X				X		X	X	X				
5B-6	5B	47,717	1.10	3.0	5,302	6,893	X			X	X	X		X		X	X			
5B-7	5B	313	0.01	2.0	23	30	X							X						
5B-8	5B	24,337	0.56	4.0	3,606	4,687	X			X	X	X		X		X				
5B-9	5B	12,478	0.29	2.0	924	1,202								X						
5B-10	5B	7,071	0.16	7.0	1,833	2,383								X						
5B-11	5B	15,405	0.35	3.0	1,712	2,225	X			X	X	X		X			X	X		
5B-12	5B	28,460	0.65	5.0	5,270	6,851	X			X	X	X		X	X		X	X		
5B-13	5B	19,588	0.45	3.0	2,176	2,829	X	X		X	X	X		X						
5B-14	5B	12,303	0.28	3.0	1,367	1,777	X			X		X		X						
5B-15	5B	15,394	0.35	3.0	1,710	2,224	X			X		X		X						
5B-16	5B	42,922	0.99	2.0	3,179	4,133	X	X		X	X	X		X	X					
5B-17	5B	49,973	1.15	5.0	9,254	12,031	X	X		X	X	X		X	X		X			
5B-18	5B	3,162	0.07	2.0	234	304														X
5B-19	5B	11,818	0.27	3.0	1,313	1,707	X							X						
5B-20	5B	49,964	1.15	3.0	5,552	7,217	X	X		X	X	X		X	X		X	X		
5B-21	5B	222,029	5.10	4.0	32,893	42,761	X	X	X	X	X	X	X	X			X	X		
5B-22	5B	45,668	1.05	2.0	3,383	4,398	X	X		X	X	X		X			X	X		
5B-23	5B	4,330	0.10	8.0	1,283	1,668	X	X			X	X		X			X			
5B-24	5B	9,883	0.23	3.5	1,281	1,665	X							X						
5B-25	5B	14,863	0.34	2.0	1,101	1,431														X
5B-26	5B	6,890	0.16	1.5	383	498						X		X						
5B-27	5B	6,108	0.14	1.5	339	441	X							X						
5B-28	5B	8,363	0.19	6.0	1,859	2,416	X				X	X		X	X	X				
5B-29	5B	63,228	1.45	15.0	35,127	45,665	X	X	X	X	X	X	X	X	X	X	X	X		
5B-30	5B	18,438	0.42	3.0	2,049	2,663	X			X		X		X						
5B-31	5B	36,403	0.84	4.0	5,393	7,011	X				X	X								
5C-1	5C	6,764	0.16	3.0	752	977						X								
5C-2	5C	38,861	0.89	5.0	7,196	9,355	X	X		X	X	X	X	X			X		X	
5C-3	5C	18,582	0.43	3.0	2,065	2,684	X	X			X	X	X	X			X			
5C-4	5C	26,331	0.60	7.0	6,826	8,874	X	X		X	X	X		X	X	X	X	X		
5C-5	5C	7,915	0.18	3.0	879	1,143	X			X		X		X						
5C-6	5C	34,656	0.80	3.0	3,851	5,006	X			X		X		X						
5C-7	5C	19,588	0.45	2.0	1,451	1,886	X							X						

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 Date Prepared - September 29, 2014

Chemical PRA ID ¹	Subarea	Area ² (ft ²)	Area ² (acres)	Average Depth ³ (ft)	In Situ Volume ⁴ (cy)	Ex Situ Volume ⁴ (cy)	Chemical Group Exceedance ⁵													
							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide	TPH Assumed
5C-8	5C	2,404	0.06	2.0	178	232	X					X	X		X					
5C-9	5C	1,907	0.04	2.0	141	184						X			X					
5C-10	5C	6,136	0.14	1.0	227	295														X
5C-11	5C	86,506	1.99	5.0	16,020	20,826	X	X		X	X	X	X	X	X		X			
5C-12	5C	8,251	0.19	2.0	611	795	X			X		X	X	X						
5C-13	5C	21,624	0.50	7.0	5,606	7,288	X	X		X	X	X	X	X				X		
5C-14	5C	19,015	0.44	1.0	704	916														X
5C-15	5C	17,323	0.40	1.0	642	834								X						
5C-16	5C	7,818	0.18	3.0	869	1,129	X			X		X		X						
5C-17	5C	7,043	0.16	5.0	1,304	1,696	X						X							
5C-18	5C	29,831	0.68	2.0	2,210	2,873	X													
5C-19	5C	1,773	0.04	7.0	460	598						X								
5C-20	5C	5,575	0.13	3.0	619	805	X							X						
5C-21	5C	778	0.02	2.0	58	75	X	X			X	X					X	X		
5C-22	5C	3,921	0.09	2.0	290	378														X
5C-23	5C	89,005	2.04	5.0	16,482	21,427	X	X	X	X	X	X	X	X	X		X	X		
5C-24	5C	42,113	0.97	10.0	15,598	20,277	X	X			X	X		X			X	X		
5C-25	5C	21,358	0.49	3.0	2,373	3,085	X			X	X			X						
5C-26	5C	4,196	0.10	2.0	311	404				X										
5C-27	5C	14,342	0.33	8.0	4,249	5,524								X						
5C-28	5C	30,901	0.71	3.0	3,433	4,463	X			X		X		X						
5C-29	5C	3,378	0.08	12.0	1,501	1,952	X						X	X	X	X				
5C-30	5C	42,860	0.98	10.0	15,874	20,636	X	X			X	X	X	X	X	X				
5C-31	5C	31,522	0.72	3.0	3,502	4,553	X			X	X	X		X	X		X			
5C-32	5C	17,434	0.40	5.0	3,229	4,197	X							X						
5C-33	5C	4,277	0.10	60.0	9,504	12,355	X	X		X		X	X	X		X				
5C-34	5C	95,940	2.20	8.0	28,427	36,955	X	X	X	X	X	X	X	X	X		X	X		
5C-35	5C	16,565	0.38	2.0	1,227	1,595	X	X	X	X	X	X	X	X			X			
5C-36	5C	51,948	1.19	5.0	9,620	12,506	X			X	X	X	X	X			X	X		
5C-37	5C	15,605	0.36	1.0	578	751						X		X						
5C-38	5C	28,244	0.65	2.5	2,615	3,400	X	X	X	X	X	X	X	X			X	X		
5C-39	5C	16,990	0.39	3.0	1,888	2,454	X			X		X		X						
5DN-1	5DN	76,292	1.75	10.0	28,256	36,733	X	X		X	X	X	X	X	X		X	X		
5DN-2	5DN	25,994	0.60	10.0	9,627	12,515	X	X		X	X	X		X	X	X	X	X		
5DN-3	5DN	30,483	0.70	2.0	2,258	2,935	X	X		X	X	X					X	X		
5DN-4	5DN	23,832	0.55	5.0	4,413	5,737	X	X		X	X	X		X			X			
5DN-5	5DN	32,071	0.74	2.0	2,376	3,088								X						
5DN-6	5DN	17,606	0.40	2.0	1,304	1,695	X				X			X					X	
5DN-7	5DN	3,759	0.09	7.0	975	1,267	X				X			X						
5DN-8	5DN	28,257	0.65	3.0	3,140	4,082	X	X		X	X	X		X	X	X			X	
5DN-9	5DN	7,368	0.17	4.0	1,092	1,419	X	X			X	X		X	X		X	X		
5DN-10	5DN	137,163	3.15	5.0	25,401	33,021	X	X	X	X	X	X	X	X	X			X		
5DN-11	5DN	21,972	0.50	5.0	4,069	5,289														X
5DN-12	5DN	248,961	5.72	6.0	55,325	71,922	X	X	X	X	X	X	X	X	X		X	X		
5DN-13	5DN	14,984	0.34	10.0	5,550	7,215						X		X						
5DN-14	5DN	31,066	0.71	1.0	1,151	1,496	X				X	X		X	X					
5DN-15	5DN	26,120	0.60	2.5	2,418	3,144	X	X			X	X		X					X	
5DN-16	5DN	76,716	1.76	7.0	19,889	25,856	X	X			X	X	X	X	X		X	X		
5DN-17	5DN	15,192	0.35	4.0	2,251	2,926	X	X		X	X	X		X	X				X	
5DN-18	5DN	9,232	0.21	3.0	1,026	1,334	X	X			X	X	X	X					X	
5DN-19	5DN	114,749	2.63	7.0	29,750	38,675	X				X	X		X	X					

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							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide	TPH Assumed			
5DN-20	5DN	68,407	1.57	1.0	2,534	3,294								X	X								
5DN-21	5DN	29,425	0.68	2.0	2,180	2,833																	X
5DN-22	5DN	2,431	0.06	6.0	540	702						X		X									
5DN-23	5DN	7,457	0.17	10.0	2,762	3,590	X							X									
5DS-1	5DS	227,991	5.23	2.0	16,888	21,955								X	X								
5DS-2	5DS	16,542	0.38	2.0	1,225	1,593	X			X				X									
5DS-3	5DS	249,978	5.74	2.0	18,517	24,072						X		X									
5DS-4	5DS	225,411	5.17	2.0	16,697	21,706	X	X			X	X		X				X	X				
5DS-5	5DS	32,239	0.74	3.0	3,582	4,657		X	X			X	X	X					X	X			
5DS-6	5DS	174,055	4.00	2.0	12,893	16,761	X	X		X	X	X	X	X				X	X				
5DS-7	5DS	128,782	2.96	5.0	23,849	31,003	X				X	X		X									
5DS-8	5DS	13,836	0.32	10.0	5,124	6,662						X	X					X					
5DS-9	5DS	57,517	1.32	3.0	6,391	8,308								X									
5DS-10	5DS	35,198	0.81	3.0	3,911	5,084																	X
5DS-11	5DS	32,333	0.74	2.0	2,395	3,114																	X
5DS-12	5DS	109,829	2.52	5.0	20,339	26,440	X							X									
5DS-13	5DS	84,892	1.95	2.0	6,288	8,175								X									
6-1	6	35,710	0.82	1.0	1,323	1,719	X	X			X	X		X				X	X				
6-2	6	14,997	0.34	2.0	1,111	1,444	X	X		X	X	X		X				X	X				
6-3	6	9,504	0.22	3.0	1,056	1,373	X				X			X	X								
6-4	6	3,611	0.08	1.0	134	174																	X
6-5	6	12,026	0.28	2.5	1,113	1,448								X									
6-6	6	11,143	0.26	3.0	1,238	1,610	X			X		X		X									
6-7	6	8,608	0.20	3.0	956	1,243	X			X		X		X									
6-8	6	1,297	0.03	1.5	72	94	X				X			X				X	X				
6-9	6	6,427	0.15	1.0	238	309					X												
6-10	6	5,915	0.14	3.0	657	854	X			X	X	X		X						X			
6-11	6	3,744	0.09	1.0	139	180	X				X			X									
6-12	6	2,707	0.06	4.0	401	521								X									
6-13	6	59,688	1.37	2.0	4,421	5,748	X	X		X	X	X		X	X			X	X				
6-15	6	11,198	0.26	2.0	829	1,078	X	X		X	X	X		X				X	X				
6-16	6	36,047	0.83	1.5	2,003	2,603	X	X		X	X	X	X	X				X	X				
6-17	6	120,822	2.77	1.5	6,712	8,726	X	X		X	X	X		X	X			X	X				
6-18	6	6,303	0.14	5.0	1,167	1,517	X	X		X		X		X									
6-19	6	5,500	0.13	6.0	1,222	1,589	X			X	X	X		X									
6-20	6	1,824	0.04	1.0	68	88								X									
6-21	6	23,217	0.53	3.0	2,580	3,354	X			X		X		X									
6-22	6	9,888	0.23	3.0	1,099	1,428	X			X		X		X									
6-23	6	36,926	0.85	1.0	1,368	1,778	X	X		X	X	X		X						X			
6-24	6	35,986	0.83	5.0	6,664	8,663	X	X		X	X	X	X	X		X	X	X	X	X	X		
6-25	6	108,926	2.50	4.0	16,137	20,978	X	X		X	X	X		X	X			X	X				
6-26	6	29,217	0.67	2.0	2,164	2,813	X			X	X	X		X			X						
6-27	6	39,595	0.91	2.5	3,666	4,766	X			X	X	X		X	X								
6-28	6	16,822	0.39	2.0	1,246	1,620		X				X		X				X					
6-29	6	68,416	1.57	2.0	5,068	6,588	X				X	X		X									
6-30	6	10,747	0.25	2.0	796	1,035								X									
6-31	6	12,801	0.29	2.5	1,185	1,541								X									
6-32	6	6,980	0.16	6.5	1,680	2,185	X			X	X	X		X									
6-33	6	4,923	0.11	1.0	182	237	X				X	X		X									
6-34	6	7,089	0.16	2.0	525	683																	X
6-35	6	1,976	0.05	4.0	293	381	X																

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							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide	TPH Assumed
6-36	6	9,303	0.21	1.5	517	672	X				X	X	X		X					
6-37	6	14,896	0.34	2.0	1,103	1,434									X					
6-38	6	8,065	0.19	1.0	299	388	X								X					
6-39	6	7,413	0.17	2.0	549	714	X					X	X							
6-40	6	54,695	1.26	2.0	4,051	5,267	X	X			X	X	X		X		X	X		
6-41	6	12,703	0.29	4.0	1,882	2,446	X				X	X			X					
6-42	6	18,425	0.42	3.0	2,047	2,661	X	X	X		X	X	X		X		X	X		
6-43	6	32,290	0.74	15.0	17,939	23,321	X	X			X	X	X	X	X	X		X		
6-44	6	41,884	0.96	10.0	15,512	20,166	X	X	X		X	X	X		X					
6-45	6	18,996	0.44	6.0	4,221	5,488	X	X	X		X	X	X		X	X		X	X	
6-46	6	20,418	0.47	1.5	1,134	1,475	X		X		X	X	X		X	X			X	
6-47	6	27,021	0.62	3.0	3,002	3,903	X	X	X		X	X	X		X	X		X	X	
6-48	6	8,619	0.20	2.0	638	830									X					
6-49	6	67,491	1.55	1.5	3,750	4,874	X	X			X	X	X		X	X		X	X	
6-50	6	10,956	0.25	3.0	1,217	1,583	X				X	X	X		X					
6-51	6	2,826	0.06	1.0	105	136	X				X	X	X		X					
6-52	6	8,165	0.19	1.0	302	393	X					X								
6-53	6	14,934	0.34	1.0	553	719	X					X			X					
6-54	6	11,263	0.26	1.0	417	542									X					
6-55	6	1,223	0.03	3.5	159	206									X					
6-56	6	4,772	0.11	1.0	177	230	X								X					
6-57	6	54,798	1.26	2.5	5,074	6,596									X					
6-58	6	9,221	0.21	2.5	854	1,110									X					
6-59	6	8,796	0.20	1.0	326	424									X					
6-60	6	1,425	0.03	3.5	185	240		X												
6-61	6	13,033	0.30	2.0	965	1,255														X
6-62	6	23,660	0.54	2.0	1,753	2,278									X					
6-63	6	420	0.01	1.0	16	20	X					X				X				
6-64	6	5,195	0.12	1.5	289	375	X	X				X			X					
6-65	6	436	0.01	3.0	48	63							X							
6-66	6	7,471	0.17	3.0	830	1,079	X	X			X	X	X		X		X			
6-67	6	8,802	0.20	3.0	978	1,271	X	X				X	X		X	X				
6-68	6	58,900	1.35	2.0	4,363	5,672	X	X				X	X		X		X			
6-69	6	17,543	0.40	1.0	650	845						X			X		X			
6-70	6	27,288	0.63	1.0	1,011	1,314									X					
6-71	6	21,667	0.50	1.0	802	1,043									X					
6-72	6	10,547	0.24	2.0	781	1,016						X			X					
6-73	6	4,767	0.11	1.0	177	230									X					
7-1	7	12,766	0.29	2.0	946	1,229	X	X			X	X	X		X				X	
7-2	7	10,614	0.24	3.0	1,179	1,533	X		X		X	X	X		X	X		X	X	
7-3	7	9,596	0.22	3.0	1,066	1,386	X	X			X	X	X		X	X				
7-4	7	4,245	0.10	3.0	472	613		X			X				X					
7-5	7	6,663	0.15	10.0	2,468	3,208	X	X			X	X	X	X	X	X		X	X	
7-6	7	3,436	0.08	7.0	891	1,158	X					X			X					
7-7	7	47,035	1.08	1.0	1,742	2,265	X	X			X	X	X	X	X	X		X	X	
7-8	7	5,522	0.13	4.0	818	1,063	X	X			X	X	X		X		X	X		
7-9	7	23,130	0.53	1.0	857	1,114	X				X	X	X		X					
7-10	7	9,830	0.23	4.0	1,456	1,893									X					
7-11	7	88,771	2.04	2.5	8,219	10,685	X	X	X		X	X	X	X	X	X		X	X	X
7-12	7	134,167	3.08	2.5	12,423	16,150	X	X	X		X	X	X	X	X	X		X	X	X
7-13	7	8,714	0.20	3.0	968	1,259	X				X	X			X		X			

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							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide	TPH Assumed
7-14	7	36,268	0.83	1.0	1,343	1,746								X						
7-15	7	30,711	0.71	10.0	11,374	14,787	X							X						
7-16	7	2,491	0.06	1.0	92	120					X			X						
7-17	7	13,215	0.30	10.0	4,894	6,363	X	X		X	X			X	X					
7-18	7	33,426	0.77	3.0	3,714	4,828								X						
7-19	7	21,399	0.49	2.0	1,585	2,061								X						
7-20	7	55,160	1.27	5.0	10,215	13,279	X	X	X	X	X	X		X	X	X	X	X		
7-21	7	19,530	0.45	2.0	1,447	1,881	X	X			X	X		X			X			
7-22	7	13,949	0.32	3.0	1,550	2,015	X							X						
7-23	7	455	0.01	1.0	17	22					X									
7-24	7	1,954	0.04	1.0	72	94								X			X			
7-25	7	256	0.01	1.0	9	12					X			X						
7-26	7	1,640	0.04	1.5	91	118		X						X						
7-27	7	5,497	0.13	2.0	407	529								X						
7-28	7	43,243	0.99	1.5	2,402	3,123								X						
7-29	7	7,874	0.18	3.0	875	1,137								X						
7-30	7	6,532	0.15	2.0	484	629	X							X						
7-31	7	6,345	0.15	1.0	235	305														X
8N-1	8N	1,485	0.03	3.0	165	215					X									
8N-2	8N	30,013	0.69	1.0	1,112	1,445		X		X	X	X		X						
8N-3	8N	8,226	0.19	1.0	305	396	X				X	X		X			X			
8N-4	8N	115,877	2.66	10.0	42,917	55,793	X	X		X	X	X		X	X		X			
8N-5	8N	10,462	0.24	2.0	775	1,007	X			X	X			X	X					
8N-6	8N	8,312	0.19	1.0	308	400								X						
8N-7	8N	12,344	0.28	1.0	457	594								X						
8N-8	8N	2,253	0.05	1.0	83	108														X
8N-9	8N	15,999	0.37	3.0	1,778	2,311	X	X			X	X		X						
8N-10	8N	28,906	0.66	5.0	5,353	6,959								X						
8N-11	8N	56,549	1.30	4.0	8,378	10,891	X	X		X	X	X	X	X						
8N-12	8N	35,630	0.82	2.0	2,639	3,431								X	X					
8N-13	8N	1,287	0.03	9.0	429	558	X			X	X	X		X						
8N-14	8N	1,954	0.04	8.0	579	752									X					
8N-15	8N	2,752	0.06	5.0	510	663								X						
8N-16	8N	26,876	0.62	2.0	1,991	2,588	X	X		X	X	X		X				X		
8N-17	8N	2,285	0.05	8.0	677	880									X					
8N-18	8N	56,114	1.29	8.0	16,626	21,614	X	X		X	X	X	X	X	X			X		
8N-19	8N	9,868	0.23	2.0	731	950	X			X	X	X		X						
8N-20	8N	9,827	0.23	2.0	728	946	X			X	X		X	X						
8N-21	8N	52,325	1.20	2.0	3,876	5,039				X	X	X		X	X					
8N-22	8N	25,392	0.58	2.0	1,881	2,445	X	X		X	X	X		X			X			
8N-23	8N	14,073	0.32	3.0	1,564	2,033	X			X	X		X	X						
8N-24	8N	10,355	0.24	2.0	767	997				X	X	X		X						
8N-25	8N	12,451	0.29	2.0	922	1,199								X						
8N-26	8N	12,052	0.28	1.0	446	580								X	X					
8N-27	8N	17,294	0.40	2.0	1,281	1,665	X	X		X	X	X		X						
8N-28	8N	35,699	0.82	1.0	1,322	1,719								X						
8N-29	8N	3,783	0.09	1.0	140	182														X
8N-30	8N	26,318	0.60	2.0	1,949	2,534								X						
8N-31	8N	6,132	0.14	2.0	454	591					X			X	X					
8N-32	8N	7,616	0.17	2.0	564	733	X	X		X	X	X		X						

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Chemical PRA ID ¹	Subarea	Area ² (ft ²)	Area ² (acres)	Average Depth ³ (ft)	In Situ Volume ⁴ (cy)	Ex Situ Volume ⁴ (cy)	Chemical Group Exceedance ⁵												
							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide
8N-33	8N	67,158	1.54	10.0	24,873	32,335	X	X		X	X	X		X			X		
8N-34	8N	30,164	0.69	2.0	2,234	2,905	X				X	X		X	X		X		
8N-35	8N	8,370	0.19	2.0	620	806	X			X	X	X		X			X		
8N-36	8N	14,510	0.33	3.0	1,612	2,096								X					
8N-37	8N	107,347	2.46	2.0	7,952	10,337								X	X				
8N-38	8N	18,022	0.41	3.0	2,002	2,603								X					
8N-39	8N	33,419	0.77	3.0	3,713	4,827								X					
8N-40	8N	8,572	0.20	3.0	952	1,238					X			X					
8N-41	8N	51,860	1.19	10.0	19,207	24,970	X	X	X	X	X	X		X	X				
8N-42	8N	16,287	0.37	2.0	1,206	1,568								X					
8N-43	8N	14,319	0.33	2.0	1,061	1,379		X					X						
8N-44	8N	10,169	0.23	1.5	565	734								X					
8S-1	8S	375,359	8.62	6.0	83,413	108,437	X				X			X					
8S-2	8S	430,170	9.88	5.0	79,661	103,559	X	X		X	X			X		X	X		
8S-3	8S	91,021	2.09	5.0	16,856	21,913								X					
8S-4	8S	59,239	1.36	3.0	6,582	8,557	X							X					
NBZ-1	NBZ	2,704	0.06	2.0	200	260		X											
NBZ-2	NBZ	2,918	0.07	2.0	216	281	X												
NBZ-3	NBZ	2,784	0.06	1.0	103	134								X					
NBZ-4	NBZ	2,816	0.06	2.0	209	271								X					
NBZ-5	NBZ	2,813	0.06	3.5	365	474								X					
NBZ-6	NBZ	2,813	0.06	3.0	313	406					X			X					
NBZ-7	NBZ	2,813	0.06	2.0	208	271								X					
NBZ-8	NBZ	11,161	0.26	2.0	827	1,075								X					
NBZ-9	NBZ	1,784	0.04	2.0	132	172								X					
NBZ-10	NBZ	2,670	0.06	2.0	198	257								X					
NBZ-11	NBZ	2,813	0.06	2.0	208	271					X								
NBZ-12	NBZ	2,813	0.06	2.0	208	271	X				X								
NBZ-13	NBZ	2,813	0.06	2.0	208	271										X	X		
NBZ-14	NBZ	29,597	0.68	2.0	2,192	2,850	X	X		X	X	X		X			X	X	
NBZ-15	NBZ	2,813	0.06	2.0	208	271											X		
NBZ-16	NBZ	2,736	0.06	2.0	203	264								X			X		
NBZ-17	NBZ	2,526	0.06	2.0	187	243		X						X					
NBZ-18	NBZ	2,813	0.06	2.0	208	271	X				X			X					
NBZ-19	NBZ	2,813	0.06	2.0	208	271								X			X		
NBZ-20	NBZ	2,689	0.06	1.0	100	129					X			X			X		
NBZ-21	NBZ	2,748	0.06	2.0	204	265											X		
NBZ-22	NBZ	3,775	0.09	2.0	280	364											X		
NBZ-23	NBZ	1,954	0.04	1.0	72	94					X								
NBZ-24	NBZ	1,954	0.04	1.0	72	94					X								
NBZ-25	NBZ	1,612	0.04	1.0	60	78	X				X			X					
NBZ-26	NBZ	1,954	0.04	1.0	72	94								X			X		
NBZ-27	NBZ	10,044	0.23	2.0	744	967	X							X					
NBZ-28	NBZ	5,990	0.14	2.0	444	577								X					
NBZ-29	NBZ	2,519	0.06	2.0	187	243								X					
NBZ-30	NBZ	2,813	0.06	1.0	104	135					X			X					
NBZ-31	NBZ	2,813	0.06	1.0	104	135					X			X					
NBZ-32	NBZ	28,594	0.66	2.0	2,118	2,754				X	X			X					
NBZ-33	NBZ	7,892	0.18	2.0	585	760	X							X		X			
NBZ-34	NBZ	9,077	0.21	2.0	672	874	X	X			X			X				X	
NBZ-35	NBZ	1,925	0.04	2.0	143	185					X			X					

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							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide	TPH Assumed
NBZ-36	NBZ	2,194	0.05	2.0	163	211					X			X						
NBZ-37	NBZ	7,744	0.18	2.0	574	746	X	X		X	X	X	X							
NBZ-38	NBZ	7,743	0.18	2.0	574	746				X	X	X	X	X			X			
NBZ-39	NBZ	2,743	0.06	2.0	203	264				X	X	X	X	X			X			
NBZ-40	NBZ	9,186	0.21	2.0	680	885				X	X	X		X			X			
NBZ-41	NBZ	19,652	0.45	2.0	1,456	1,892					X			X						
NBZ-42	NBZ	17,956	0.41	2.0	1,330	1,729	X							X						
NBZ-43	NBZ	1,350	0.03	2.0	100	130	X							X						
NBZ-44	NBZ	2,113	0.05	2.0	157	203		X												
NBZ-45	NBZ	7,963	0.18	2.0	590	767	X							X				X		
NBZ-46	NBZ	13,844	0.32	2.0	1,025	1,333	X	X									X			
NBZ-47	NBZ	16,009	0.37	2.0	1,186	1,542		X			X			X			X			
NBZ-48	NBZ	68,871	1.58	2.0	5,102	6,632								X						
NBZ-49	NBZ	7,270	0.17	1.0	269	350	X							X						
NBZ-50	NBZ	8,853	0.20	1.0	328	426	X	X												
NBZ-51	NBZ	6,299	0.14	2.0	467	607	X							X				X		
NBZ-52	NBZ	1,708	0.04	1.0	63	82								X				X		
NBZ-53	NBZ	1,954	0.04	2.0	145	188	X					X								
NBZ-54	NBZ	1,626	0.04	2.0	120	157					X							X		
NBZ-55	NBZ	1,954	0.04	2.0	145	188												X		
NBZ-56	NBZ	2,237	0.05	1.0	83	108	X							X						
NBZ-57	NBZ	1,942	0.04	2.0	144	187	X													
NBZ-58	NBZ	4,229	0.10	1.0	157	204								X						
NBZ-59	NBZ	1,954	0.04	1.0	72	94		X										X		
NBZ-60	NBZ	1,954	0.04	1.0	72	94	X	X			X									
NBZ-61	NBZ	2,813	0.06	2.0	208	271								X						
NBZ-62	NBZ	25,857	0.59	1.0	958	1,245		X						X						
NBZ-63	NBZ	13,328	0.31	1.0	494	642	X			X		X		X						
NBZ-64	NBZ	2,813	0.06	2.0	208	271								X						
NBZ-65	NBZ	598	0.01	2.0	44	58								X						
NBZ-66	NBZ	3,830	0.09	1.0	142	184								X						
NBZ-67	NBZ	9,810	0.23	2.0	727	945								X						
NBZ-68	NBZ	4,422	0.10	1.0	164	213	X				X	X					X	X		
NBZ-69	NBZ	522	0.01	5.0	97	126								X						
NBZ-70	NBZ	32,925	0.76	2.0	2,439	3,171	X				X	X		X			X	X		
NBZ-71	NBZ	23,630	0.54	2.0	1,750	2,275	X	X			X			X	X		X			
NBZ-72	NBZ	15,631	0.36	2.0	1,158	1,505	X							X			X	X		
Totals			231		1,410,000	1,840,000														

Notes

1. Chemical soil data were compare to Look-Up Table values published by DTSC in June 2013. These values are based on background threshold values (BTVs) and method reporting limits (MRLs), with background chemicals adjusted for analytical and decision error uncertainty.
2. The estimated soil volumes presented in this TM represent ROM engineering estimates within a tolerance factor of +50/-30% and are based on the information available to MWH in September 2014. The total volumes have been rounded to 3 significant digits above (and 2 significant digits in text) since a ROM estimate. These estimates should only be used for project planning purposes.
3. The minimum remediation depth was assumed to be 1 foot.
4. *In situ* soil volumes were converted to *ex situ* soil volumes using a 30% swell factor to account for soil volume expansion following excavation.

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 Summary of Area IV Chemical
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Chemical PRA ID ¹	Subarea	Area ² (ft ²)	Area ² (acres)	Average Depth ³ (ft)	In Situ Volume ⁴ (cy)	Ex Situ Volume ⁴ (cy)	Chemical Group Exceedance ⁵												
							PAHs	Phthalates	SVOCs	PCBs	Dioxins	Metals	Perchlorate	TPH	VOCs	Formaldehyde	Pesticides	Herbicides	Cyanide

5. Chemical groups indicated were exceeded in at least one sample collected within the identified preliminary remediation footprint boundary.

Area IV AOC Chemical Preliminary Remediation Areas

Base Map Legend

-  Administrative Area Boundary
-  Area IV Subareas
-  Existing or Removed Structure
-  Rock Outcrop
-  Drainage
-  Paved Road

Figure Legend

-  Preliminary Remediation Areas for AOC Cleanup based on Chemical Look-Up Table Values
-  Remediation by Others

- Notes:
1. PRA boundaries denote individual areas identified in Table 1.
 2. Remediation by others shown only for Area IV and NBZ.

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0 275 550 1,100 Feet



