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In reply refer to SHEA-109895

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MWH

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Appendix

ABBREVIATIONS AND ACRONYMS

AL1F	Area 1 Landfill
ASTM	American Society for Test and Materials
bgs	below ground surface
Boeing	The Boeing Company
CAO	Cleanup and Abatement Order
CDFG	California Department of Fish and Game
CM	culvert maintenance
COC	constituents of concern
CWA	Clean Water Act
cy	cubic yards
DTSC	Department of Toxic Substances Control
ELV	Expendable Launch Vehicle
EPA	United States Environmental Protection Agency
Geosyntec	Geosyntec Consultants, Inc.
HSP	health and safety plan
ISRA	Interim Source Removal Action
LOX	liquid oxygen
mg/kg	milligrams per kilogram
NASA	National Aeronautics and Space Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permit
MRCA	Mountains Recreation Conservancy Authority
PCBs	polychlorinated biphenyls
PEA	preliminary evaluation area
pg/g	picograms per gram
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RUSLE	Revised Universal Soil Loss Equation, Version 2
RWQCB	Los Angeles Regional Water Quality Control Board

ABBREVIATIONS AND ACRONYMS (continued)

SAA	Streambed Alteration Agreement
SAP	Sampling and Analysis Plan
SIM	selective ion monitoring
SMP	Soil Management Plan
SRGs	Soil Remediation Goals
SSFL	Santa Susana Field Laboratory
SVOCs	semi-volatile organic compounds
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TCDD TEQ	tetrachlorobenzo-p-dioxin toxic equivalent (normalized to 2,3,7,8-TCDD)
TPH	total petroleum hydrocarbons
USDA	United States Department of Agriculture
USACE	United States Army Corp of Engineers
VOCs	volatile organic compounds
WDR	Waste Discharge Requirement

1.0 INTRODUCTION

This 2010 Interim Source Removal Action (ISRA) Work Plan Addendum summarizes the results of the ISRA evaluation process and presents recommended remedial actions to control releases of constituents of concern (COCs) to surface water for the remaining areas within the Outfall 009 watershed at the Santa Susana Field Laboratory (SSFL). This work plan supplements the Preliminary ISRA Work Plan (MWH, 2009a), the Final ISRA Work Plan (MWH, 2009b) along with other work plan addenda (MWH 2009c, MWH 2009d, MWH 2009e, and NASA, 2009). The Preliminary ISRA Work Plan and the Final ISRA Work Plan present the approach used to identify and control the release of COCs to surface water within the Outfall 008 and 009 watersheds. The Final ISRA Work Plan, along with other work plan addenda, summarizes the results of ISRA evaluations performed prior to this work plan.

As described in the Final ISRA Work Plan, the ISRA project is being conducted in annual phases to allow completion of ongoing work within the Outfall 009 watershed (Northern Drainage cleanup and storm water maintenance activities), and to accommodate federal funding schedules for work to be performed on property owned by the federal government and administered by the National Aeronautics and Space Administration (NASA). ISRA activities performed in 2009 are summarized in the ISRA Phase I Implemen property (Item 6 of the CAO). This communication and coordination is ongoing and represented in this work plan, as well as in previous ISRA work plans and progress reports.

1.1 PROJECT BACKGROUND

The SSFL is located approximately 29 miles northwest of downtown Los Angeles, California, in the southeast corner of Ventura County. Figure 1-1 shows the geographic location and property boundaries of the site, as well as surrounding communities. Storm water discharges at the SSFL are monitored according to the NPDES Permit. A figure showing the 16 outfall locations is included in the Final ISRA Work Plan (MWH, 2009b), and a detailed view of the Outfall 008 and 009 watersheds is shown in Figure 1-2. Currently, surface water discharges at the site are exclusively the result of intermittent storm water runoff after rain events.

The SSFL is also currently undergoing a Resource Conservation and Recovery Act (RCRA) Corrective Action Program under oversight by the Department of Toxic Substances Control (DTSC). This action is currently in the RCRA Facility Investigation (RFI) Phase.

1.1.1 Outfall 008 and 009 NPDES Monitoring and Exceedance History

Outfall 008 was established in August 2004 as the NPDES Permit monitoring location for Happy Valley (Figure 1-2). Between 2004 and December 2009, a total of 21 samples were collected from Outfall 008 and the results from these samples were compared to the 2009 NPDES benchmark limits. The constituents that were detected at concentrations that exceeded these limits are considered the surface water COCs in the Outfall 008 watershed, and include: copper, lead, and dioxins[1]. Details of these sampling results are presented in Table 1-1.

Outfall 009 was established in August 2004 as the NPDES Permit monitoring location in the Northern Drainage (Figure 1-2). Between 2004 and December 2009, a total of 38 samples were collected from Outfall 009 and the results from these samples were compared to the

[1] The term ‘dioxins’ as used in this work plan represents the sum of 17 dioxin/furan congener results adjusted for toxicity by normalizing to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD TEQ). See *Notes* to Table 1-1.

2009 NPDES benchmark limits. The constituents that were detected at concentrations that exceeded these limits are considered the surface water COCs in the Outfall 009 watershed, and include cadmium, copper, lead, mercury, dioxins, oil and grease, and pH. Details of these sampling results are presented in Table 1-1. Since the exceedances of oil and grease and pH each occurred only once and are attributable to natural causes (Boeing, 2005 and 2006), they are not considered ISRA COCs, as described in the ISRA work plans (MWH, 2009a and 2009b).

1.1.2 ISRA CAO

In response to exceedances of 2009 NPDES benchmark limits at Outfall 008 and Outfall 009, the RWQCB issued a CAO to Boeing on December 3, 2008 (RWQCB, 2008). The CAO requires that the sources which are discharging constituents that exceeded NPDES benchmark limits within the Outfall 008 and 009 watersheds be addressed. Constituents for which there have been NPDES benchmark limit exceedances at Outfall 008 and Outfall 009 between 2004 and March 2008 include lead at Outf

The SRGs established for the ISRA project are consistent with or near background concentrations (MWH, 2005), as described in the ISRA Final Work Plan (MWH, 2009b). However, since the 2005 soil background data are being re-evaluated by DTSC and a final background dataset is not defined at this time, ISRA SRGs will be adjusted, as necessary, once a final background dataset is approved by DTSC. The SRG for dioxins is slightly higher than current background levels (approximately 3 times the background concentration) since there is more uncertainty in the 2005 data set for dioxins than for other ISRA COCs, and because the Outfall 008 and 009 watersheds were extensively burned during the 2005 Topanga Fire, resulting in dioxin-containing ash and burned debris being deposited throughout the area.

1.1.4 Phase I Implementation

ISRA remedial activities performed in 2009 are considered to be Phase I implementation activities, and included all ISRA activities recommended in the Final ISRA Work Plan (MWH, 2009b), as well as subsequent Work Plan Addenda (MWH, 2009c; MWH, 2009d; MWH, 2009e; NASA, 2009), with the exception of the two ISRA areas, ELV-1C and ELV-1D, identified within the Expendable Launch Vehicle (ELV) ISRA PEA, which are planned to be completed this year. ISRA remedial activities during 2009 consisted of excavation and site restoration at ten ISRA areas in the Outfall 008 watershed on Boeing property and two ISRA areas in the Outfall 009 watershed on NASA property. A total of approximately 5,200 cubic yards (cy) (*ex situ*) of soil was removed from Outfall 008 ISRA area excavations, and approximately 180 cy (*ex situ*) of soil was removed from Outfall 009 ISRA area excavations.

the Phase I ISRA areas and selected Outfall

ISRA Work Plan (MWH, 2009b). A report summarizing those activities will be submitted to DTSC. Cleanup activities to address residual lead shot present near the former shooting range and within the Northern Drainage will be conducted following completion of the 2009/2010 rainy season.

1.2.2 Stormwater Maintenance Activities

As part of the SSFL surface water maintenance program, culvert upgrades were performed in early 2009 at 13 culverts within the Outfall 009 watershed and in January 2010 at the culvert located within ISRA area A2LF-3 after ISRA remedial and site restoration activities. These culvert maintenance actions included installation of culvert headwalls and filtration media to reduce sediment loads and COCs that may be within or associated with suspended solids in storm water discharging into the primary Outfall 009 drainage. The design of the culvert upgrades was completed by Geosyntec Consultant identifies this PEA as PEA-CTLI-1 due to its proximity to the Component Test Laboratory I (CTLI-I).

This Work Plan addendum follows the ISRA approach presented in the Final ISRA Work Plan and summarized in Section 1.1.3 for the remaining ISRA PEAs, resulting in the identification of ISRA areas and recommended remedial actions. As described in the Final ISRA Work Plan and further in Section 2, finalization of ISRA areas and remedial planning in Outfall 009 are pending completion of ongoing Northern Drainage cleanup actions, culvert maintenance activities, SSFL building demolition plans, and federal funding schedules.

This work plan includes four sections and two appendices:

- Section 1 summarizes the project background information and describes the scope and objectives of this ISRA Work Plan Addendum.
- Section 2 presents the results of the ISRA area identification and remedial alternatives evaluation for the remaining ISRA PEAs.
- Section 3 summarizes the remedial action planning process, including activities associated with supporting plans, permits, and site surveys, and the remedial action implementation.
- Section 4 presents the ISRA implementation schedule and ISRA reporting requirements.
- Appendix A presents the results of data gap and source delineation soil samples within the remaining ISRA PEAs.
- Appendix B presents modeling results considered in the ISRA area identification process.

2.0 OUTFALL 009 ISRA AREA IDENTIFICATION AND REMEDIAL PLANNING

There are eight ISRA PEAs that were identified in the Preliminary ISRA Work Plan (MWH, 2009a) based on available soil data, but have not been evaluated in previous work plans and work plan addenda. Four of the ISRA PEAs are located in the eastern portion of the Outfall 009 watershed and four are located in the western portion of the Outfall 009 watershed, shown in Figures 1-3 and 1-4. Although these figures display only surface soil data, subsurface soil data were also considered in the identification of ISRA PEAs in the Preliminary ISRA Work Plan; all subsurface soil COC detections above SRGs were collocated with surficial COC impacts.

As described in previous work plans, the ISRA PEAs identified in the Preliminary ISRA Work Plan were highly generalized and approximate due to data limitations. Additional soil samples have been collected at and near these ISRA PEAs to further delineate areas exceeding SRGs for the ISRA COCs, and assess concentrations of ISRA COCs near and/or down-gradient of former operational areas previously not investigated (see Section 2.1). This section summarizes the sampling activities and results, the ISRA area identification results, the remedial alternatives

- Total petroleum hydrocarbons (TPH) by EPA 8015B, modified;
- Volatile organic compounds (VOCs) by EPA 8260B;
- Polychlorinated biphenyls (PCBs) by EPA 8082;
- Semi-volatile organic compounds (SVOCs) by EPA 8270C with selective ion monitoring (SIM);
- Dioxins by EPA 1613B;
- pH by EPA 9045C;
- Percent moisture by American Society for Test and Materials (ASTM) Method D2216.

samples collected to further refine these two PEAs are shown on Figure 2-1. A summary of the sample results within each PEA is provided below.

PEA-B1-1

Fifty-three borings were advanced during source delineation sampling at PEA-B1-1. A total of 49 soil samples (45 surface samples, 2 subsurface samples, and 2 duplicate samples) were collected from 45 sampling locations and analyzed for ISRA COCs. Eight of the sampling locations (B1BS0083, B1BS0094, B1BS0096, B1BS0107, B1BS0116, B1BS0120, B1BS0128, and B1BS0130) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. On average, bedrock was encountered at a depth of approximately 1.5 feet below ground surface (bgs) on the B1-1 hillside and former dirt road. Soils are thicker, up to 13 feet bgs, located near the former B-1 test stand area.

Seventeen soil samples collected from 16 locations were analyzed for cadmium and 39 soil samples from 36 locations were analyzed for dioxins. Results of chemical testing for metals (cadmium) and dioxins are presented in Appendix A, and shown on Figure 2-7. Below is a summary of the results:

- **Metals.** Of the 17 soil samples (16 surface samples and 1 subsurface sample) analyzed for cadmium, 2 samples contained cadmium above the SRG of 1.0 milligrams per kilogram (mg/kg). Cadmium was detected at concentrations up to 3.74 mg/kg at B1BS0110.
- **Dioxins.** Of the 39 soil samples (38 surface samples and 1 subsurface sample) analyzed for dioxins, 14 soil samples contained dioxins above the SRG of 3.0 picograms per gram (pg/g). Dioxins were detected at concentrations up to 820 pg/g at B1BS0175.

Concurrently to the collection of the ISRA soil samples described above, soil samples were collected within PEA-B1-1 for the SSFL demolition program to assess a localized mercury leak near the former water tank area located at the top of the B1-1 hillside. Sixteen surface soil samples were collected and analyzed for mercury. Of the 16 samples collected, 8 contained mercury above the SRG of 0.09 mg/kg. Mercury was detected at concentrations up to 75 mg/kg in B1BS0136. These samples delineated the exceedances of mercury to relatively small, isolated

PEA-IEL-1 and PEA-IEL-3

Twenty-four borings were advanced during source delineation sampling at PEA-IEL-1 and PEA-IEL-3. A total of 18 soil samples (13 surface samples, 2 subsurface, 1 duplicate sample, and 2 split samples) were collected from 14 sampling locations and analyzed for ISRA COCs. Ten of the sampling locations (ILBS0118A, ILBS0139A, ILBS0310, ILBS0311, ILBS0312, ILBS0314, ILBS0315, ILBS0317, ILBS0322, and ILBS0325) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. On average, bedrock was encountered at approximately 2 feet bgs east of the former Building 1324 and near the west corner of Building 1300, and up to 5.5 feet bgs east of the former Building 1324.

Eighteen soil samples collected from 14 locations were analyzed for metals. Results of chemical testing for metals (cadmium, copper, lead, and mercury) are presented in Appendix A, and shown on Figure 2-9. The following is a summary of the results:

- **Metals.** Of the 18 soil samples (16 surface samples and 2 subsurface samples) analyzed for one or more of the metals listed above, no samples contained metals above the SRGs.

PEA-IEL-2, PEA-IEL-4, and PEA-IEL-5

Sixteen borings were advanced during source delineation sampling at PEA-IEL-2, PEA-IEL-4, and PEA-IEL-5. A total of 15 soil samples (12 surface samples, 2 subsurface samples, and 1 duplicate sample) were collected from 12 sampling locations and analyzed for ISRA COCs. Four of the sampling locations (ILBS0291, ILBS0293, ILBS0299, and ILBS0305) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. Bedrock was not encountered in these sampling locations, but is known to be present in the vicinity at depths up to 25 feet bgs based on previous sampling.

Fifteen soil samples collected from 12 locations were analyzed for metals. Results of chemical testing for metals (cadmium, copper, and lead) and dioxins are presented in Appendix A, and shown on Figure 2-10. The following is a summary of the results:

Five soil samples collected from 5 locations were analyzed for metals, and 1 soil sample collected from 1 location was analyzed for dioxins. Results of chemical testing for metals (cadmium, copper, lead, and mercury) and dioxins are presented in Appendix A, and shown on Figure 2-11. The following is a summary of the results:

- **Metals.** Of the 5 soil samples (5 surface samples) analyzed for one or more of the metals listed above, 2 samples contained cadmium above the SRG of 1.0 mg/kg, and 3 samples contained mercury above the SRG of 0.09 mg/kg. Cadmium was detected up to 2.95 mg/kg, and mercury was detected up to 0.519 mg/kg, both at A1BS0061.
- **Dioxins.** In the one soil samples (1 surface sample) analyzed for dioxins, dioxins were not detected above the SRG.

PEA-A1LF-2

Fifty-two borings were advanced during source delineation sampling at PEA-A1LF-2. A total of 45 soil samples (43 surface samples, 1 subsurface sample and 1 duplicate sample) were collected from 44 sampling locations and analyzed for ISRA COCs. Eight of the sampling locations (A1BS0056, A1BS0057, A1BS0081, A1BS0084, A1BS0105, A1BS0107, A1BS0110, and A1BS0112) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. On average, bedrock was encountered at approximately 2 feet bgs, and at depths up to 5 feet bgs.

Twenty six soil samples collected from 24 locations were analyzed for metals, and 30 soil samples collected from 29 locations were analyzed for dioxins. Results of chemisnBDC 0.00gfor dior to reac

- **Dioxins.** Of the 30 soil samples (surface samples) analyzed for dioxins, 4 samples contained dioxins above the SRG of 3.0 pg/g. Dioxins were detected up to 11 pg/g at A1BS0085.

PEA-A1LF-3

Thirteen borings were advanced during source delineation sampling at PEA-A1LF-3. A total of six soil samples (surface samples) were collected from six sampling locations and analyzed for ISRA COCs. Seven of the sampling

COCs. Twenty-eight (28) of the sampling locations (ENBS0145, ENBS0147, ENBS0149, ENBS0151, ENBS0152, ENBS0154, LFBS0245, LFBS0257 to LFBS0262, LFBS0265, LFBS0269, LFBS0271, LFBS0289, LFBS0291, LFBS0297 to LFBS0304, LFBS0314 to LFBS0315) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. On average, bedrock was encountered at approximately 2.0 feet bgs, and up to 6 feet bgs with in the drainage north of PEA-CTLI-1.

Eighty soil samples collected from 65 locations were analyzed for metals, and 48 soil samples collected from 38 locations were analyzed for dioxins. Results of chemical testing for metals (cadmium, copper, lead, and mercury) and dioxins are presented in Appendix A, and shown on Figure 2-13. The following is a summary of the results:

- **Metals.** Of the 80 soil samples (67 surface samples, 11 subsurface samples, 1 duplicate sample, and 1 split sample) analyzed for one or more of the metals listed above, 16 soil samples contained lead above the SRG of 34 mg/kg and 3 soil samples contained copper above the SRG of 29 mg/kg. Lead was detected up to 450 mg/kg at LFBS0276, and copper was detected up to 1,900 mg/kg at LFBS0276.
- **Dioxins.** Of the 48 soil samples (41 surface samples, 7 subsurface samples) analyzed for dioxins, 3 soil samples contained dioxins above the SRG of 3.0 pg/g. Dioxins were detected up to 94 pg/g at LFBS0316.

PEA-CTLI-3 and PEA-CTLI-4

Thirty borings were advanced during source delineation sampling at PEA-CTLI-3 and PEA-CTLI-4. A total of 20 soil samples (19 surface samples and 1 duplicate sample) were collected from nineteen sampling locations and analyzed for ISRA COCs. Eleven of the sampling locations (ENBS0086, ENBS0088, ENBS0136 to ENBS0142, ENBS0145 and ENBS0147) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. On average, bedrock was encountered at approximately 1.0 feet bgs, and up to 3 feet bgs within the drainage south of the CM-7.

Ten soil samples collected from 9 locations were analyzed for metals, and 17 soil samples collected from 16 locations were analyzed for dioxins. Results of chemical testing for metals (cadmium, copper, lead, and mercury) and dioxins are presented in Appendix A. The following is a summary of the results:

- **Metals.** Of the 10 soil samples (19 surface samples and 1 duplicate sample) analyzed for one or more of the metals listed above, 4 samples contained lead above the SRG of 34 mg/kg. Lead was detected up to 79.9 mg/kg at ENBS0133.
- **Dioxins.** Of the 17 soil samples (16 surface samples and 1 duplicate sample) analyzed for dioxins, 3 samples contained dioxins above the SRG of 3.0 pg/g. Dioxins were detected up to 7.2 pg/g at ENBS0121.

PEA-LOX-1

Forty-two borings were advanced during source delineation sampling at PEA-LOX-1. A total of 44 soil samples (41 surface samples, 2 subsurface samples, and 1 split sample) were collected from 42 sampling locations and analyzed for ISRA COCs. The source delineation sampling locations are shown on Figure 2-6. On average, bedrock was encountered at approximately 0.5 feet bgs.

Thirty four soil samples collected from 41 locations were analyzed for metals and 36 soil samples collected from 34 locations were analyzed for dioxins. Results of chemical testing for metals (cadmium, copper, and lead) and dioxins are presented in Appendix A, and shown on Figure 2-14. The following is a summary of the results:

- **Metals.** Of the 34 soil samples (32 surface samples, 2 subsurface samples) analyzed for one or more of the metals listed above, 8 soil samples contained lead above the SRG of 34 mg/kg and 8 soil samples contained copper above the SRG of 29 mg/kg. Lead was detected up to 203 mg/kg at LXBS1051 and copper was detected up to 121 mg/kg at LXBS1066.
- **Dioxins.** Of the 36 soil samples (34 surface samples, 2 subsurface) analyzed for dioxins, 29 soil samples contained dioxins above the SRG of 3.0 pg/g. Dioxins were detected up to 340 pg/g at LXBS1046.

PEA-LOX-2

Thirty-seven borings were advanced during source delineation sampling at PEA-LOX-2. A total of 12 soil samples (11 surface samples and 1 duplicate sample) were collected from 11 sampling locations and analyzed for ISRA COCs. Twenty-five of the sampling locations (ENBS0081, ENBS0162 to ENBS0165, ENBS0167 to ENBS0170, ENBS0172 to ENBS0174, ENBS0176 to ENBS0179, ENBS0181 and ENBS0184, ENBS0186 to ENBS0189, and ENBS0194) did not have a sample analyzed either because samples were not collected due to refusal prior to reaching the desired sample depth, or analysis of collected samples was not needed for source delineation. The source delineation sampling locations are shown on Figure 2-4. On average, bedrock was encountered at approximately 2 feet bgs.

Two soil samples collected from 2 locations were analyzed for lead and 11 soil samples collected from 10 locations were analyzed for dioxins. Results of chemical testing for lead and dioxins are presented in Appendix A. The following is a summary of the results:

- **Metals.** Of the 2 soil samples (surface samples) analyzed for lead, 1 soil sample contained lead above the SRG of 34 mg/kg. Lead was detected up to 124 mg/kg at ENBS0195.
- **Dioxins.** Of the 11 soil samples (10 surface samples and 1 duplicate sample) analyzed for dioxins, no samples contained dioxins above the SRG.

PEA-A2LF-2

Eleven borings were advanced during source delineation sampling at PEA-A2LF-2. A total of 11 soil samples (10 surface samples, and 1 subsurface samples) were collected from 11 sampling locations and analyzed for ISRA COCs. The source delineation sampling locations are shown on Figure 2-6. On average, bedrock was encountered at approximately 1 foot bgs.

Eleven soil samples collected from 11 locations were analyzed for metals. Results of chemical testing for metals (lead and mercury) are presented in Appendix A, and shown on Figure 2-15. The following is a summary of the results:

- **Metals.** Of the 11 soil samples (10 surface samples, 1 subsurface sample) analyzed for one or more of the metals listed above, 4 soil samples contained mercury above the SRG of 0.09 mg/kg. Mercury was detected up to 0.174 mg/kg in A2BS1081.

PEA-AP/STP-1

Sixty-nine borings were advanced during source delineation sampling at PEA-AP/STP-1. A total of 87 soil samples (66 surface samples, and 21 subsurface samples) were collected from

69 sampling locations and analyzed for ISRA COCs. The source delineation sampling locations

Of the 23 ISRA PEAs listed above, additional source delineation sampling is ongoing at six, including PEA-B1-2, PEA-CTLI-1, PEA-A1LF-2, PEA-LOX-1, PEA-A2LF-2, and PEA-AP/STP-1. Although the final excavation boundaries of these six PEAs are still pending, an expected boundary for each PEA is shown on the figures. Following completion of the ongoing delineation sampling, appropriate tables and figures in this report will be revised and submitted to the RWQCB for review and approval.

The six ISRA PEAs that are not in the list above include PEA-A1LF-3, PEA-CTLI-3, PEA-CTLI-4, PEA-IEL-7, PEA-IEL-8, and PEA-LOX-2. Four of these ISRA PEAs is located upgradient of a culvert: PEA-A2LF-3 is upgradient of CM-8, PEA-CTLI-3 is upgradient of CM-7, PEA-CTLI-4 is upgradient of CM-11, and PEA-LOX-2 is upgradient of CM-3. The location of CM-3 is shown on Figure 2-5, the locations of CM-7 and CM-11 are shown on Figure 2-4, and the location of CM-8 is shown Figure 2-3. This summer, accumulated sediment upgradient of each of these culverts is planned to be removed as part of the surface water maintenance program. Because of this planned removal action, these ISRA PEAs will not undergo further evaluation in this work plan addendum. Following completion of the culvert maintenance (CM) activities, the effectiveness ofd to nnede

2.2

9. A2LF-2	25.5
10. B1-1	24.9
11. LOX-1C	23.9
12. AP/STP-1D	23.7
13. AP/STP-1F	22.3
14. LOX-1A	22.1
15. IEL-2	21.8
16. IEL-1	21.1
17. AP/STP-1A & LOX-1D	20.1
19. IEL-3	18.9
20. CTLI-2	18.7
21. IEL-4	14.8
22. IEL-5	14.4
23. IEL-6	13.7

Three PEAs have a total rank above a value of 30, 15 PEAs have a total rank between a value of 20 and 30, and 5 PEAs have a total rank below a value of 20. The distinguishing factors of the four PEAs ranked above a value of 30 include ISRA COCs at least 10 times greater than SRGs, non-ISRA COCs at least 2 times greater than RCRA risk based screening levels, estimated clean up volumes greater than 1,000 cubic yards, and drainages located less than 200 feet from the PEA. The distinguishing factors of the five PEAs ranked below a value of 20 include ISRA COCs less than 2 times SRGs and no collocated RCRA risk drivers, in addition, two of the PEAs are covered completely by an impermeable surface.

2.2.2 RUSLE Results

As described in the Final ISRA Work Plan (MWH, 2009b), results of the RUSLE were also considered to prioritize recommendations for ISRA areas based on the average annual ISRA COC yield from the 23 refined ISRA PEAs compared to the average annual ISRA COC yield for the entire watershed. Appendix B presents the results of the average annual sediment yield from these refined PEAs, the average annual ISRA COC yield from the 23 refined ISRA PEAs, and a comparison of the average annual ISRA COC yield of 23 refined ISRA PEAs to that of the entire watershed (Geosyntec, 2010). To be conservative, the sediments within each refined ISRA PEA were assumed to have concentrations of ISRA COCs equal to the greatest concentration detected within that particular PEA. The analysis also assumed background concentrations for sediments within the watershed.

Based on the analysis, all but 5 of the 23 ISRA PEAs are believed to contribute less than 6% of the annual pollutant yield within the watershed for the ISRA COCs (Geosyntec, 2010). The model indicates PEA-A1LF-1 and PEA-B1-1 contribute the most to the annual COC yield of the watershed, including 1.5% for cadmium and 46% for lead from PEA-A1LF-1, and more than 100% for mercury and dioxins from PEA-B1-1. Other PEAs that contribute more than 6% of the annual pollutant yield with the watershed for the ISRA COCs include PEA-AP/STP-1C (14% for dioxins), PEA-AP/STP-1E (32% for dioxins), and PEA-LOX-1B (24% for dioxins). These results are conservative and likely biased high because, as mentioned above, the sediments within each PEA were assumed to have concentrations of ISRA COCs equal to the greatest concentration detected within that particular PEA.

2.2.3 ISRA Area Identification Summary

The contaminant migration criteria evaluation resulted in 18 of the 23 refined ISRA PEAs with a total rank above a value of 20. Based on the contaminant migration ranking and RUSLE model results, these 18 refined ISRA PEAs are the highest priority areas for ISRA implementation. The five refined ISRA PEAs with a total rank below a value of 20 are the lowest priority areas for ISRA implementation and, at this time, remedial action is not recommended. Two of these five refined ISRA PEAs are covered completely with an impermeable layer, including IEL-3 and IEL-6. If the impermeable layer was removed from each of these PEAs, the total rank of IEL-6 would remain below a value of 20, but IEL-3 would increase to above a value of 20. To remove the potential COCs sources that may be affecting the water quality at the Outfall 009 NPDES monitoring point, the 18 refined ISRA PEAs with a total rank above a value of 20 are considered ISRA areas and are carried forward for the remedial alternatives evaluation. In addition, since PEA-IEL-3 would have a total rank above a value of 20 if the impermeable surface were removed, it is also considered an ISRA area and is carried forward for the remedial alternatives evaluation. The remaining four ISRA PEAs that had a total rank below a value of 20, including

PEA-CTLI-2, PEA-IEL-4, PEA-IEL-5, and PEA-IEL-6, are not considered ISRA areas and will not be carried forward for the remedial alternatives evaluation.

2.3 REMEDIAL ALTERNATIVES EVALUATION AND PLAN

In the Final ISRA Work Plan, a remedial action alternatives analysis was performed for the ISRA project to identify potential source removal alternatives that achieve the remedial objectives and requirements of the CAO. The potential alternatives identified by the analysis were excavation with offsite disposal, capping with a clay cap, and construction of diversion and collections structures. Excavation was ranked highest in meeting the CAO objectives and is considered the default approach to source removal unless circumstances at specific ISRA areas render another alternative more feasible or cost-effective. With the exception of the ISRA areas associated with the Area I Landfill (A2LF-1 and A1LF-2), the ISRA areas identified in Section 2.2 for remedial action are similar in physical, chemical, and geochemical characteristics. In addition, there are relatively small volumes of material to be removed from each area, and there are no known site constraints that render excavation less feasible. Therefore, excavation and offsite disposal is the recommended remedial alternative for these ISRA areas. Although excavation and offsite disposal is the recommended remedial alternative for ISRA Area IEL-3, it is currently covered by asphalt and implementation of the remedial action at this location will be postponed until the asphalt is removed. A summary of the ISRA area remedial plans, including COCs and SRGs, is presented in Table 2-4. Remedial action planning and implementation activities are summarized in Section 3.

The remedial alternatives analysis for the Area I Landfill (A1LF-1) and Area I Landfill drainage (A1LF-2) is more complex than the other ISRA areas due to the relatively large volume of material (~40,000 cy), the permitting requirements, and the involvement of multiple regulatory agencies. Therefore, a separate work plan addendum will be prepared that summarizes the remedial alternatives analysis and identifies the recommended remedial action for the Area I Landfill and the Area I Landfill drainage.

3.0 REMEDIAL ACTION PLANNING AND IMPLEMENTATION

This section summarizes the activities that will be conducted prior to and during ISRA remedial action implementation. Prior to implementation, the planning documents prepared for the Phase I ISRA Implementation will be revised to support the proposed ISRA activities, including the site-specific Health and Safety Plan (HSP), the Storm Water Pollution Prevention Plan (SWPPP), the Soil Management Plan (SMP), and the Transportation Plan. In addition, permitting packages and site surveys will be prepared and submitted to appropriate agencies. Remedial action implementation activities consist of site preparation, excavation, confirmation sampling, site restoration, and performance monitoring sampling. Brief descriptions of these planning and implementation activities are provided below. Additional information can be found in the Final ISRA Work Plan (MWH, 2009b).

3.1 SUPPLEMENTAL PLANS

Several planning documents were prepared for the Phase I ISRA Implementation, including a site-specific HSP, a SWPPP, a SMP, and a Transportation Plan. These supplemental plans will be revised to supplement the proposed ISRA activities and submitted to the RWQCB prior to implementation. A summary of each plan is provided below.

- An addendum to the existing site-specific HSP shall be prepared by the contractor selected to perform the ISRA work that describes overall health and safety requirements for the proposed ISRA activities.
- A modification to the existing ISRA SWPPP shall be prepared that describes erosion control and storm water pollution prevention measures for the proposed ISRA activities.
- An addendum to the existing ISRA SMP shall be prepared that describes procedures for waste soils characterization, soil handling, and stockpile and container management for the proposed ISRA activities;
- An addendum to the existing ISRA Transportation Plan shall be prepared that identifies

the 19 ISRA areas identified in Section 2.2. A general description of th

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October 2010	Submit Area 1 Landfill Work Plan Addendum to RWQCB
Summer/Fall 2010	Implement Phase II field work and restoration activities following approval by RWQCB, issuance of necessary permits, and completion of required studies/surveys
Spring 2011	Submit Phase II ISRA Implementation Report

Phase III Implementation:

Summer/Fall 2011	Implement Phase III field work and restoration activities following approval by RWQCB, issuance of necessary permits, and completion of required studies/surveys
TBD	Submit Final ISRA Summary Report

As described in Final ISRA Work Plan, following ISRA implementation, effectiveness of the soil source removal in meeting NPDES benchmark limits will be evaluated by the results of

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