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**INTERIM SOURCE
PHASE II IMPLEMENTATION
SANTA SUSANA
VENTURA COUNTY**

April 2011

Prepared For:


The Boeing Company

and

The National Aeronautics and Space Administration

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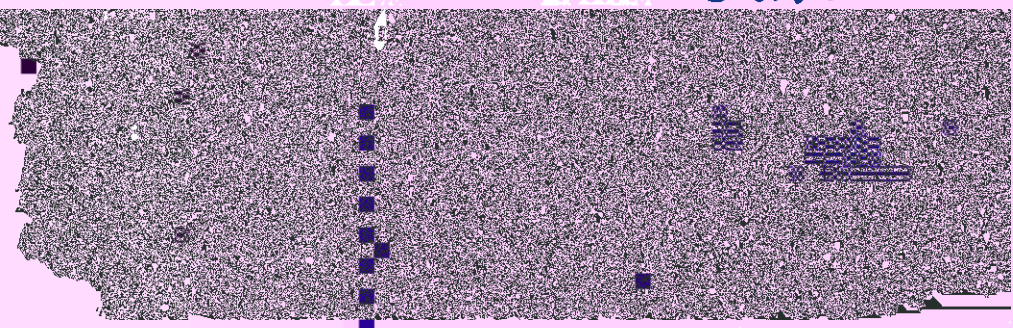
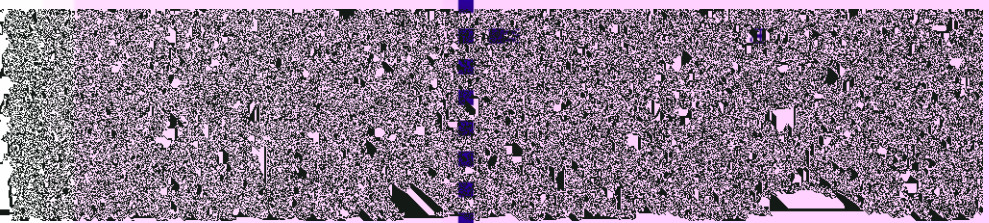


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ABBREVIATIONS AND ACRONYMS

AP/STP	Ash Pile and Building 515 Sewage Treatment Plant
Boeing	The Boeing Company
BMP	Best Management Practices
CAO	Cleanup and Abatement Order
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CM	culvert maintenance
COC	constituents of concern
CTL-I	Component Test Laboratory I
CWA	Clean Water Act
cy	cubic yards
DTSC	Department of Toxic Substances Control
ELV	Expendable Launch Vehicle
FS	Feasibility Study
HVS	Happy Valley South
IEL	Instrument and Equipment Laboratories
ISRA	Interim Source Removal Action
MRCA	Mountains Recreation Conservancy Authority
NASA	National Aeronautics and Space Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permit
PCB	polychlorinated biphenyl
PEA	Preliminary Evaluation Area
PID	photo ionization detector
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act

1.0 INTRODUCTION

This Interim Source Removal Action (ISRA) Phase II Implementation Report summarizes the ISRA activities performed during 2010 at the Santa Susana Field Laboratory (Santa Susana Site). ISRA implementation activities were conducted by MWH and CH2M HILL on behalf of The Boeing Company (Boeing) and the National Aeronautics and Space Administration (NASA) pursuant to a California Water Code Section 13304 Cleanup and Abatement Order (CAO) issued by the Los Angeles Regional Water Quality Control Board (RWQCB) dated December 3, 2008 (RWQCB, 2008). The CAO was issued by the RWQCB to achieve compliance with the Waste

Addendum (MWH, 2010c) are planned to be performed in 2011 and 2012, and will be documented in yearly implementation reports.

1.1 PROJECT BACKGROUND

The Santa Susana Site 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. Stormwater discharges at the Santa Susana Site are monitored according to the NPDES Permit. The 16 outfall locations are shown on Figure 1-2, and a detailed view of the Outfalls 008 and 009 watersheds, the subject outfalls of the CAO, is shown in Figure 1-3. The NPDES Permit established monitoring at Outfalls 008 and 009 in August 2004. NPDES permit limits were first established for Outfalls 008 and 009 in 2005-2006. Surface water discharges from the site are exclusively the result of stormwater runoff and are intermittent following rain events.

Pursuant to the NPDES Permit, a Best Management Practices (BMP) Plan (BMP Plan) describing the process for improving stormwater runoff quality and minimizing NPDES Permit exceedances in the Outfalls 008 and 009 watersheds at the Santa Susana Site was prepared in October 2010 (MWH *et al.*, 2010). The BMP Plan presents the refined strategy for the subject outfall drainages based on ongoing source removal actions and recently obtained data and information. The BMP Plan summarizes BMP activities that are planned, are underway, or have been completed in the Outfalls 008 and 009 watersheds, in addition to potential data gaps that need to be filled for future BMP planning and implementation. Activities pursuant to the BMP Plan are planned to be implemented in parallel with ISRA activities during 2011 and 2012.

The Santa Susana Site is also currently undergoing investigation and closure under Resource Conservation and Recovery Act (RCRA) Corrective Action and Remedial Investigation / Feasibility Study (RI/FS) Programs under oversight by the Department of Toxic Substances Control (DTSC). This action is currently in the RCRA Facility Investigation / Remedial Investigation (RFI/RI) Phase. In addition, removal of debris and contaminated soils from the Northern Drainage, within the Outfall 009 watershed, has been completed pursuant to an Imminent and Substantial Endangerment Determination and Order and Remedial Action Order

issued by DTSC (DTSC, 2007) and a Cleanup and Abatement Order issued by the RWQCB (RWQCB, 2007). A restoration plan for the Northern Drainage is being developed, with the support of the Surface Water Expert Panel, to stabilize the channel to reduce erosion. Additionally, the ongoing maintenance work related to the former Rocketdyne-Atomics International Rifle and Pistol Club shooting range on the Mountains Recreation Conservancy Authority (MRCA) property will continue under DTSC oversight.

1.1.1 ISRA Cleanup and Abatement Order (CAO)

In response to exceedances of NPDES permit limits and benchmarks at Outfalls 008 and 009, the RWQCB issued a CAO to Boeing on December 3, 2008 (RWQCB, 2008).

The ISRA approach presented in the Final ISRA Work Plan also specifies that where RCRA risk drivers are co-located with ISRA areas, the RCRA risk drivers will be considered in ISRA activities (MWH, 2009b). RCRA risk drivers are those chemicals that significantly contribute to unacceptable human risks and ecological risks within the Outfalls 008 and 009 watersheds, as presented in the RFI Group reports.

The SRGs established for the ISRA project are consistent with or near DTSC-approved soil background concentrations (MWH, 2005), as described in the ISRA Final Work Plan (MWH, 2009b). The SRG for dioxins is slightly higher than current background levels (approximately 3 times current /0 Td[0.0001(r/7v9b))-1because sh kgrghout.0005A



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confirmation that the responses were acceptable on May 26, 2010 (DTSC, 2010). Boeing subsequently submitted a memorandum response to comments that included an errata package for the 2010 ISRA Work Plan Addendum (MWH, 2010c). RWQCB indicated approval of the 2010 Work Plan Addendum in a letter to Boeing dated June 30, 2010 (RWQCB, 2010b). These communications are included in Appendix A.

Subsequent to submittal of the 2010 Work Plan Addendum (MWH, 2010c), additional delineation soil sampling was performed, resulting in the refinement and subdivision of several ISRA areas. ISRA areas A2LF-2, AP/STP-1C, AP/STP-1E, B1-1, CTLI-1, and LOX-1B were subdivided as follows: A2LF-2 was subdivided into A2LF-2A and A2LF-2B; AP/STP-1C was subdivided into AP/STP-1C-1 and AP/STP-1C-2; AP/STP-1E was subdivided into AP/STP-1E-1 through AP/STP-1E-3; B1-1 was subdivided into B1-1A through B1-1D; CTLI-1 was subdivided into CLTI-1A and CTLI-1B; and LOX-1B was subdivided into LOX-1B-1 through LOX-1B-4. Laboratory and data validation reports for data gap and source delineation soil samples associated with Phase II ISRA areas are included in Appendix G.

In total, there were 32 ISRA areas remaining prior to Phase II implementation, including the two Area I Landfill ISRA areas for which a remedial approach has not been finalized and the ELV ISRA areas identified in the Final ISRA Work Plan (MWH, 2009b). All ISRA areas, including those completed during Phase I implementation, are shown on Figures 1-4, 1-5, and 1-6. These figures also present concentrations of ISRA COCs in surface soils (0 to 2 feet) within the Outfall 009 watershed prior to Phase II ISRA implementation. The samples with results above SRGs for ISRA COCs shown on the figures meet one of the following criteria:

- 1) Are located within ISRA areas planned for remediation;
- 2) Are located within an ISRA PEA that, following evaluation in the 2010 ISRA Work Plan Addendum (MWH, 2010), was not recommended for remedial action;
- 3) Are located upgradient of a culvert where stormwater maintenance activities are ongoing, and remedial action will be evaluated as part of the performance monitoring program;
- 4) Are located under an impermeable layer (e.g., asphalt or building); or
- 5) Are slightly above the SRG, not located near a drainage, and/or surrounded by small amount of soil.

submitted to the RWQCB documenting the use of a subcontract laboratory to conduct the split procedures (Boeing, 2011a).

2010-2011 BMP and ISRA Performance Monitoring Sampling and Analysis Plan for the 008/009 Watersheds, which describes the sampling and analysis plan for performance monitoring at ISRA areas and BMP sub-watershed sampling recommended in the BMP Plan described in Section 1.1 (MWH, 2010m).

2.3 PERMITTING

Permitting activities were conducted prior to commencing Phase II implementation activities, as required by Item 7 of the CAO. All necessary permits were obtained prior to beginning remediation activities and included the following:

Clean Water Act (CWA) Section 404, Nationwide Permit (NWP) 38 (Cleanup of Hazardous and Toxic Waste), from the U.S. Army Corps of Engineers (USACE), for activities performed at ISRA areas AP/STP-1E and LOX-1A (other remaining ISRA areas were evaluated and determined to be outside USACE geographic jurisdiction) (Boeing, 2010h; USACE, 2010);

CWA Section 401 Notification to RWQCB for Phase II ISRA areas was submitted prior to commencing field work. CWA Section 404 NWP 38 is a CWA Section 401 Certified permit (Boeing, 2010g);

Determination that Phase II activities were covered under an existing Amendment to Streambed Alteration Agreement (SAA) No. 1600-2003-5052-R5 with the California Department of Fish and Game (CDFG) (Boeing, 2009b; CDFG, 2009);

Grading Permit from Ventura County for Phase II ISRA areas located on non-Federal property (MWH, 2010f; Ve

Phase II ISRA areas met the requirements of disposal facility permits and complied with the California Health and Safety Code, as described in the radiological waste certifications included in Appendix G.

2.5 OUTFALL 009 SOIL BORROW AREA SAMPLING

A local soil borrow source was used for fill during re-contouring of excavations in Outfall 009 on Boeing property. The soil borrow area was located within the Outfall 009 watershed on Boeing property, in a small valley east of Well RD-47 near the Outfall 009 watershed divide, approximately 1,400 feet south of the former LOX Plant and approximately 1,250 feet northeast of the Alfa RFI Site. The area is not believed to have been impacted by operational activities. The location of the soil borrow area is shown on Figure 1-6.

Prior to use, 17 soil samples were collected from 10 locations within the soil borrow area and analyzed for the following ISRA COCs and other site-related chemicals of potential concern:

- Metals by USEPA Methods SW6010B, SW6020, SW6020A, and SW7471A;
- Dioxins by USEPA Method 1613B;
- Fluoride by USEPA Method 300.0;
- pH by USEPA Method 9045C;
- Polychlorinated biphenyls (PCBs) by USEPA Method 8082;
- Total petroleum hydrocarbons (TPH) by USEPA Method SW8015B, modified;
- Volatile organic compounds (VOCs) by USEPA Method SW8260B; and
- Semi-volatile organic compounds (SVOCs) by USEPA Method 8270C SIM.

Soil borrow area sample results did not exceed the SRGs, background concentrations, or risk-based screening levels (RBSLs). Soil borrow area sampling results were provided to the RWQCB and DTSC for review in a memorandum dated July 23, 2010 (MWH, 2010l), and RWQCB indicated their approval of the soil borrow area in a letter dated September 23, 2010 (RWQCB, 2010c), attached to which is an email from DTSC recommending RWQCB approve the soil borrow area. Boring logs for soil borrow area samples are included in Appendix D. Laboratory and data validation reports are included in Appendix G.



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3.0 PHASE II REMEDIAL ACTION IMPLEMENTATION SUMMARY

During Phase II implementation, remedial actions were conducted at 11 ISRA areas within the Outfall 009 watershed, including AP/STP-1A, AP/STP-1D, AP/STP-1F, B1-1A, B1-1B, B1-1C, B1-1D, B1-2, CTLI-1A, CTLI-1B, and IEL-1. The locations and planned boundaries of these ISRA areas are shown on Figures 1-5 and 1-6. The recommended remedial alternative identified for each of these ISRA areas was excavation and offsite disposal, as described above in Section 1.1.4. Remedial actions consisted of installing and inspecting erosion control BMPs per the ISRA SWPPP, excavating soil, transporting soil to an offsite disposal facility, collecting confirmation soil samples, backfilling excavations, completing site restoration, performing post-excavation and post-restoration topographic surveys, and conducting performance monitoring stormwater inspections and sampling. These activities are described in more detail below.

3.1 EXCAVATION SUMMARY

Excavations were conducted at Outfall 009 Phase II ISRA areas, with work practices in accordance with the ISRA supporting plans (MWH, 2010d, 2010e, 2010h, and 2010j). The total volume of soil excavated from Phase II ISRA areas was approximately 7,500 cy (*ex situ* estimate). Excavation activities began on July 20, 2010 and were completed on December 4, 2010. Contractors conducting the remedial activities were MPe (heavy equipment operation), EnviroSolve (geologic logging and sample collection), and MWH (field oversight). Equipment used during excavations included an excavator, a water truck, haul trucks, and a vacuum truck. A summary of the excavation details for each ISRA area, including the ISRA COCs and co-located RCRA risk drivers, planned and actual excavation surface areas and volumes, backfill volumes, excavation depths, numbers of waste characterization and confirmation samples collected, numbers of RWQCB split samples collected, and soil waste classifications, is provided in Table 3-1. Trench logs for the excavations are included in Appendix D. Photographs of ISRA Phase II excavation activities are included in Appendix I.

Pipelines/conduits and concrete containing conduits were encountered during excavation activities at ISRA areas AP/STP-1A, B1-2, and CTLI-1A. These features were documented, and the portions of the features within the excavation boundary were subsequently removed under

RWQCB and DTSC oversight, except where located under *Deinandra minthornii* (Santa Susana tar plants), a California-listed rare plant species. If pipelines contained black mastic wrapping on the exteriors, a sample of the wrapping was collected and analyzed for PCBs and/or asbestos for waste disposal purposes. Appendix H includes tables of pipeline segment characteristics and the results of pipeline sampling, building feature documentation logs, and building feature removal logs. Laboratory reports of pipe wrapping samples are included in Appendix G. Management and disposal of the pipelines/conduits, including materials contained within and adjacent to these

After the excavations were completed, confirmation soil samples were collected from the sidewalls and floors of the excavations, at the frequencies specified in the Final ISRA Work Plan (MWH, 2009b), to confirm that SRGs were met. Data gap samples that remained in place along the sidewalls of excavations were also used for confirmation sample purposes, with the approval of the RWQCB. The number of confirmation samples collected at each ISRA area is provided in Table 3-1. Confirmation sample locations are shown in Appendix E figures, and confirmation sample results are listed in Appendix E tables. Laboratory and data validation reports are included in Appendix G. In general, soil associated with confirmation samples with results exceeding SRGs was subsequently removed, and, if the additional excavation did not contact bedrock, additional confirmation samples were collected. The remediation status of these confirmation samples are, therefore, listed as “Excavated” in Appendix E tables. There are ten confirmation samples with results slightly exceeding SRGs that were left in place with RWQCB agreement, including:

Four floor confirmation samples at ISRA area B1-2 (B1ET0671, B1ET0680, B1ET0682, and B1ET0683) located among Coast Live Oak trees, a Ventura County protected tree species, where additional excavation would expose roots and potentially cause instability of the tree. The recommendation of the project biologist and/or arborist to not excavate additional soil at these locations is documented in communications, which are included in Appendix A (Pacific Horticulture 2010, Padre, 2010d);

One sidewall confirmation sample at ISRA area B1-2 (B1ET0590) located along the entrance road, where additional excavation would compromise the road;

Three confirmation samples (1 floor and 2 sidewall) at ISRA area B1-2 (B1ET0640, B1ET0654, and B1ET0687) with mercury results slightly above, but essentially equivalent to the SRG when the precision of the analyses is considered;

One floor confirmation sample at ISRA area CTLI-1B (LFET0202) with a lead result slightly above SRG (LF 2010d);

X

Soil management was conducted as specified in the 2010 Addendum to the ISRA Transportation Plan (MWH, 2010d) and the 2010 Addendum to the ISRA SMP (MWH, 2010e). Excavated soil classified as non-hazardous was loaded directly into haul trucks and transported to a temporary stockpile location at the Lower Parking Lot near the Santa Susana Site facilities entrance. Excavated soil from an area in the southwestern portion of ISRA area B1-2 was segregated from other soils excavated from ISRA area B1-2 because it was from an area outside of the boundary used for *in situ* waste characterization sampling, and *ex situ* stockpile samples were collected for waste characterization purposes. Results of chemical evaluations for this soil are addressed in the ISRA area B1-2 waste certification, and a separate radiological waste certification for this soil was prepared. Both waste certifications are included in Appendix B, and laboratory reports are included in Appendix G. Portions of waste soils from ISRA areas B1-1D, B1-2, and CTLI-1A were classified as hazardous. These soils were loaded directly into lined and covered roll-off bins and transported to the Lower Parking Lot for subsequent shipment to appropriately permitted disposal facilities. Within ISRA area B1-2, soils impacted by hydrocarbons were identified using a photo ionization detector (PID). The majority of these soils did not have hydrocarbon staining, and were loaded directly into roll-off bins and classified as non-hazardous based on existing data. Management of the small amount of soil with visible hydrocarbon staining is described earlier in this Section.

Soils classified as non-hazardous were transported to either Lancaster Recycle and Disposal Facility in Lancaster, California or McKittrick Waste Treatment Site in McKittrick, California for disposal. Soils classified as hazardous were transported to U.S. Ecology in Beatty, Nevada for disposal. Offsite disposal of waste soils was completed on February 28, 2011. Offsite disposal records, including a summary table and waste manifests, are provided in Appendix F.

Confirmation sample location maps and results tables for each ISRA area were provided to RWQCB for review and approval prior to backfill and site restoration. Following review of the confirmation sampling data, RWQCB concurred that excavation was complete at each ISRA area and restoration activities could proceed. Correspondences from RWQCB related to confirmation sample results and completion of excavations is included in Appendix A. Confirmation sample result tables and figures are included in Appendix E. All ISRA areas, including those completed

Biological monitoring was conducted throughout Phase II restoration activities by Padre Inc. A summary of the monitoring is presented in the Santa Susana Site Outfall 009 ISRA Biological Survey and Construction Monitoring Report – June 2010 to February 2011 (Padre, 2011), which is provided in Appendix J.

3.4 PERFORMANCE MONITORING

The 2010-2011 BMP and ISRA Performance M

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4.0 SUMMARY AND ONGOING WORK

Phase II ISRA remedial activities during 2010 consisted of excavation and site restoration at 11 ISRA areas in the Outfall 009 watershed. A total of approximately 7,500 cy (*ex situ*) of soil was removed from Phase II ISRA area excavations. Confirmation sampling and analysis results demonstrate that the soil remaining in place at the Phase II ISRA areas contain ISRA COCs at concentrations that are below or consistent with the ISRA SRGs, or additional excavation is limited by the presence of a plant species (Coastal Live Oak), active utilities, or infrastructure (road). The RWQCB and DTSC reviewed the confirmation sampling data and agreed that the soil removal actions at the 11 ISRA areas were complete prior to the implementation of restoration activities.

Restoration activities at Phase II ISRA areas included backfilling excavations using a local soil borrow source approved by RWQCB and DTSC, re-contouring the areas to approximately pre-existing topographic grades, and installing erosion control BMPs. Site restoration at ISRA area B1-2 included construction of a temporary treatment control BMP consisting of a lined retention basin, earthen berms, and a discharge pipeline. Closure and rehabilitation of unpaved roads was conducted within the Outfall 009 watershed at the road between B1-1 ISRA areas and Woolsey Canyon Road, the road between the CTLI-1 ISRA areas and the Area II Service Road, and within the Outfall 008 watershed at fire roads in the Happy Valley South area. Also, containerized native plants were installed in the Outfall 009 watershed, and BMP inspections have continued in both outfalls throughout the rainy season per the ISRA SWPPP.

Performance monitoring of stormwater runoff upgradient and downgradient of the Phase I and II ISRA areas and selected culverts was conducted during the 2010-2011 rainy season, and results will be presented in a summary report scheduled to be submitted to the RWQCB in July 2011. The report will also include a summary of the 2009-2010 rainy season results and recommendations for monitoring at Phase I ISRA areas and culverts. Performance monitoring at Phase II ISRA areas is planned to continue through the end of the 2011-2012 rainy season.

Phase III ISRA implementation will be performed in 2011 and is planned to consist of seven ISRA areas in the Outfall 009 watershed, including IEL-2 and the six remaining AP/STP ISRA areas. The locations of these ISRA areas are shown on Figures 1-5 and 1-6. At this time, the field preparation at ISRA area IEL-2 is complete and excavation is anticipated to begin in the near future. Phase IV ISRA implementation will be performed in 2012 and is planned to consist of 11 ISRA areas in the Outfall 009 watershed, including the two A2LF ISRA areas, the two ELV ISRA areas, and the seven LOX ISRA areas. Remedial action at the two A1LF ISRA areas will be scheduled following completion of the remedial alternatives evaluation, and remedial action at the ISRA area IEL-3 will be scheduled following asphalt removal.

5.0 REFERENCES

- Boeing, 2005a. 2004 Annual NPDES Discharge Monitoring Report, The Boeing Company, Santa Susana Field Laboratory, Ventura County, California. Compliance File CI 6027, NPDES No. CA0001309. March 1.
- Boeing, 2005b. First Quarter 2005 NPDES Discharge Monitoring Report Submittal-Santa Susana Field Laboratory. Compliance File CI 6027, NPDES No. CA0001309. May 13.
- Boeing, 2006. 2005 Annual NPDES Discharge Monitoring Report, The Boeing Company, Santa Susana Field Laboratory, Ventura County, California. Compliance File CI-6027, NPDES No. CA0001309. March 1.
- Boeing, 2007. 2006 Annual NPDES Discharge Monitoring Report, The Boeing Company, Santa Susana Field Laboratory, Ventura County, California. Compliance File CI-6027, NPDES No. CA0001309. March 1.
- Boeing, 2008. 2007 Annual NPDES Discharge Monitoring Report, The Boeing Company, Santa Susana Field Laboratory, Ventura County, California. Compliance File CI-6027, NPDES No. CA0001309. March 1.
- Boeing, 2009a. 2008 Annual NPDES Discharge Monitoring Report, The Boeing Company, Santa Susana Field Laboratory, Ventura County, California. Compliance File CI-6027, NPDES No. CA0001309. March 1.
- Boeing, 2009b. Letter from Boeing to CDFG, Work Scope Information and Summary, The Boeing Company, Santa Susana Field Laboratory, Interim Source Removal Action - Outfalls 008 and 009 Watersheds, SAA 1600-2003-5052-R5 and Amendments, Ventura County, California,. May 28.
- Boeing, 2009c. January 2010 Monthly Progress Report for November 17 - December 18, 2009 Activity, California Water Code Section 13304 Interim Source Removal Action Order (ISRA) (NPDES No. CA0001309, CI No. 6027, SCP NO. 1111, Site ID No. 2040109). December 22.
- Boeing, 2010a. February 2010 Monthly Progress Report for December 19, 2009 - January 15, 2010 Activity, California Water Code Section 13304 Interim Source Removal Action Order (ISRA) (NPDES No. CA0001309, CI No. 6027, SCP NO. 1111, Site ID No. 2040109). January 18.
- Boeing, 2010b. March 2010 Monthly Progress Report for January 15, 2010 - February 12, 2010 Activity, California Water Code Section 13304 Interim Source Removal Action Order (ISRA) (NPDES No. CA0001309, CI No. 6027, SCP NO. 1111, Site ID No. 2040109). February 15.
- Boeing, 2010c. March 2010 Monthly Progress Report for February 8, 2010 - March 12, 2010 Activity, California Water Code Section 13304 Interim Source Removal Action Order (ISRA) (NPDES No. CA0001309, CI No. 6027, SCP NO. 1111, Site ID No. 2040109). March 15.



TABLES

TABLE 3-1
Phase II ISRA Area Excavation Summary
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