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Via Federal Express
In reply, refer to SHEA-110932

February 28, 2011

Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Attention: Information Technology Unit

Gentlemen:

Subject: 2010 Annual NPDES Discharge Monitoring Report - The Boeing Company, Santa Susana Site, Ventura County, California
Compliance File CI-6027 and NPDES No. CA0001309

The Boeing Company (Boeing) hereby submits this annual discharge monitoring report (DMR) for the Santa Susana Field Laboratory (Santa Susana or SSFL) for the period of January 1, 2010 through December 31, 2010. This DMR is provided for all outfalls authorized by National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001309. The Los Angeles Regional Water Quality Control Board (RWQCB) issued a revised permit on May 20, 2010, with an effective date of July 19, 2010.

The following is a tabulated list of the two permits in effect during 2010.

NPDES Permit Revisions	Order Number	Issue Date	Effective Dates
2009 Permit	R4-2009-0058	May 19, 2009	June 29, 2009 to July 18, 2010
2010 Permit	R4-2010-0090	May 20, 2010	July 19, 2010 to present

This annual DMR provides information and data, including summary tables of surface water sample analytical results, rainfall summaries, liquid waste shipment summaries, and analytical laboratory Quality Assurance/Quality Control (QA/QC) procedures and certifications. A compact disc with the report tables, figures and attachments is being submitted along with this DMR. This document will also be made available electronically at:

www.boeing.com/aboutus/environment/santa_susana/ents/monitoring_reports.html

Additionally, hard copies of this report are available at the following: California State University at Northridge Library; Simi Valley Library; and the Platt Branch, Los Angeles Library.

REPORT CONTENTS

This annual DMR summarizes analytical data collected from the permitted outfalls during 2010. Data for this report have been summarized in tabular form. Therefore, in addition to the report text, this DMR includes the following:

- Santa Susana facility map showing the outfall locations (Figure 1)
- Summary of Annual Rainfall (Table 1)
- Summary of Liquid Waste Shipments (Table 2)
- Summary of Permit Limit Exceedances (Table 3)
- Outfall-specific Summary Tables and Charts of Analytical Results (Sections 1 through 9)
- Arroyo Simi (Receiving Water) Summary Tables and Charts of Analytical Results (Section 10)
- Summary of Reasonable Potential Analysis (RPA) (Section 11)
- Stormwater Pollution Prevention Plan Annual Evaluation (Section 12)
- Analytical Laboratory QA/QC Procedures and Certifications (Section 13)

OVERVIEW OF THE 2010 REPORTING PERIOD AT SANTA SUSANA

This section presents an overview of the efforts Boeing has made and continues to make to achieve compliance with the site NPDES permit. It provides an overview of best management practices (BMPs) that have been implemented to minimize impacts to surface water and the potential for surface water permit limit exceedances.

Site-wide planting of Native Vegetation

In accordance with the Stormwater Expert Panel recommendations, Boeing planted new vegetation across the Santa Susana Site. Plantings included over 4,900 plants within Outfall 001, 002, 008, and 009 watersheds. The native plants installed consisted of Mule fat, Elderberry, Creeping Wild Rye, Mugwort and Coyote Brush. Irrigation lines were also installed to ensure these native species become established.

Outfall 008/009 Interim Source Removal Action (ISRA) and BMP Plan Related Activities

Pursuant to the December 3, 2008 Section 13304 Order issued by the RWQCB, Boeing and National Aeronautics Space Administration (NASA) have been proceeding with ISRA activities in the Outfall 008 and 009 watersheds to address constituents that have exceeded NPDES Permit limits/benchmarks. During 2010, Boeing, on behalf of Boeing and NASA, performed the following activities related to the referenced Order:

- Submitted a report to the RWQCB summarizing the ISRA activities undertaken in 2009;

- Performed data gap and source delineation soil sampling to complete delineation of ISRA areas within the Outfall 009 watershed;
- Conducted waste characterization soil sampling for ISRA areas within the Outfall 009 watershed;
- Submitted a Work Plan Addendum for ISRA implementation activities to be undertaken in 2010;
- Conducted performance monitoring inspections and sampling at 2009 ISRA areas and select culverts per the ISRA Performance Monitoring Plan, during the 2009-2010 rainy season;
- Installed containerized plants Stormwater Expert Panel recommendations as noted above;
- Prepared supplemental plan addenda for 2010 implementation, including addenda to the Soil Management Plan, Transportation Plan, and Health and Safety Plan, and submitted to the RWQCB;
- Prepared a Stormwater Pollution Prevention Plan (SWPPP) for 2010 implementation and submitted to the RWQCB and State Water Resources Control Board (SWRCB);
- Obtained necessary permits for excavation at the planned 2010 ISRA areas, including a Ventura County grading permit, a Ventura County oak tree permit exemption, and a Section 404 Nationwide Permits (NWP) 38 permit authorization; and submitted a Section 401 pre-certification notification to the RWQCB;
- Conducted a biological survey of the planned ISRA areas within the Outfall 009 watershed and submitted it to the RWQCB;
- Conducted excavation and confirmation sampling at 11 ISRA areas within the Outfall 009 watershed;
- Presented confirmation sampling results and data for the 2010 excavations to the RWQCB, and received RWQCB concurrence that excavations are complete;
- Completed offsite disposal of excavated soil from ISRA areas on Boeing property in the Outfall 009 watershed;
- Began post-excavation activities at ISRA areas, including post-excavation topographic surveys, backfill and re-contouring of excavations, post-restoration topographic surveys, BMPs installation, hydroseed mulch application, and native plants installation;
- Conducted road abandonment of unused fire roads in the Outfall 008 watershed and unused access roads in the Outfall 009 watershed per Stormwater Expert Panel Recommendations[1];
- Submitted the 2010-2011 BMP and ISRA Performance Monitoring Sampling and Analysis Plan to the RWQCB;
- Collected performance monitoring and BMP subarea monitoring surface water samples during rain events in the Fourth Quarter 2010;
- Conducted weekly SWPPP inspections during the rainy season.

Boeing submitted the 2010 ISRA Work Plan Addendum to the RWQCB on April 30, 2010 for review and approval. The work plan provided a summary of the 2009 and 2010 ISRA data gap investigation results,

[1] Technical Memorandum: Recommended procedures for Road Closures in the Outfall 008 and Outfall 009 Watersheds, prepared by: Surface Water Expert Panel Attn: Michael Josselyn, PhD, November 2, 2010

and identified the remaining ISRA Preliminary Evaluation Areas (PEAs) that Boeing will implement in 2010 and 2011.

ISRA activities were performed in accordance with the provisions of the site-wide SWPPP and ISRA SWPPP. BMPs were implemented during the ISRA excavation activities to minimize the transportation of sediment into the Outfall 009 watershed. Prior to the start of removal activities, hay bales and silt fencing were installed in the drainages below the disturbed areas of the Outfall 009 watershed. Shaker/ rumble plates were installed at the entrance and exit of the work area to reduce sediment tracking from the construction site onto private or public roads. Stockpiles were covered during nights and weekends, and on windy days to control dust from the stock pile areas. Water was sprayed to suppress dust during the excavation of soil from the removal areas. Runoff was not generated during these operations.

Boeing continues to submit monthly and quarterly progress reports to RWQCB Staff on the progress of the ISRA activities, including permit status. ISRA related documents can be found electronically at:

http://www.boeing.com/aboutus/environment/santa_susana/isra.html

Northern Drainage

The Northern Drainage clay target debris removal associated with the former shooting range continued in 2010. Boeing has actively worked to protect the Northern Drainage following the clean-up activities performed under the Department of Toxic Substances Control (DTSC) oversight. Mitigation and restoration activities will begin once DTSC terminates its Imminent and Substantial Danger Order and Remedial Action (ISE/RA) Order. Specifically, Boeing:

- Installed plants along the banks to stabilize sediment, per the recommendations from the Stormwater Expert Panel and as noted above;
- Maintained, replaced, and/or implemented sediment and erosion control BMPs (consisting of fiber rolls, straw bales, silt fencing and plastic sheeting placed over exposed soils areas) to minimize the potential for sediment transport and soil erosion along the drainage during the First Quarter 2010;
- Installed containerized native plants and associated irrigation systems in the Northern Drainage on Sage Ranch property per the Stormwater Expert Panel Recommendations. Installation of native plants was completed in May 2010. Approximately twelve hundred native plants were planted in several topographic lows within and adjacent to the Outfall 009 drainage under the direction of the Stormwater Expert Panel. A biologist has inspected plant development on a weekly basis and will continue to monitor until the plants are successfully rooted;
- Conducted removal of approximately 10 tons of soil/clay targets in the former shooting range area. Completed manual removal of approximately one gallon of visible grey foam insulation and clay target fragments. Boeing completed this removal primarily with hand tools and without major heavy equipment, so as to limit impacts to vegetation and to limit further sediment erosion;
- Applied hydroseed to promote the establishment of native plant species within sparsely vegetated areas, and as an additional erosion control and soil stabilization measure within the entire drainage;

- Installed rip-rap in an area east of the former Liquid Oxygen (LOX) plant to provide bank protection and stabilization;
- Continued to identify areas with poor vegetation and bare soil for the as-needed installation of BMPs;
- Maintained and inspected current BMPs throughout the drainage; and
- Collected surface water samples from the Northern Drainage as required by the RWQCB Cleanup and Abatement Order (CA) No. R4-2007-.

Boeing continues to perform BMP maintenance activities throughout the year as part of ongoing Northern Drainage responsibilities.

Outfalls 011 and 018 Treatment Systems

Two temporary stormwater treatment systems (TSTSs) were installed and operational at Santa Susana in early 2010 to treat stormwater from Outfalls 011 and 018, with capacities of 690 and 1,035 gallons per minute (gpm), respectively. The TSTSs are expected to reduce the concentration of the constituents of concern (COCs) listed in the NPDES Permit limits present in stormwater discharged to these outfalls.

The Outfall 011 TSTS, located adjacent to R-1 Pond, consists of screen filters, an equalization tank, two banks of sand filters (containing sand of increasingly smaller particle size), bag filters, and granular activated carbon (GAC) media filters. Stormwater is pumped from the Perimeter Pond to the R-1 Pond for treatment. Potassium permanganate ($KMnO_4$) solution is injected into the influent water to oxidize dissolved iron and manganese, which turns them into particles that can be later removed by the downstream processes within the TSTS. Treated effluent water from the GAC skid is discharged directly to Outfall 011. Construction began for the Outfall 011 TSTS in November 2009 and was completed in the First Quarter 2010.

The Outfall 018 TSTS is a more complex system consisting of both a clean water treatment system and a solids handling and disposal system. During 2009, the TSTS was re-located from R-2 pond to next to Silvernale Pond. Silvernale has a larger storage volume and provided: (i) enhanced storage capacity and reduces the possibility of overflows; and (ii) allows some degree of suspended solids settling to reduce turbidity peaks during rain events, as observed in R-2 pond last year. Consequently, water from R-2 Pond is pumped uphill to Silvernale Pond for treatment at the Outfall 018 TSTS. Chemicals utilized in this TSTS include $KMnO_4$, aluminum sulfate (alum) and polymer, caustic which are injected into the water at different stages to enhance treatment. $KMnO_4$ oxidizes iron and manganese and will promote precipitation out of solution, while alum and polymer stimulate coagulation and flocculation of organics and fine sediments with co-precipitation of other metals and constituents. The clean water treatment system is comprised of screen filters, equalization tanks, contact tanks with weir and lamella plates, two banks of sand filters, bag filters, and GAC media filters. The solids present in the influent water, together with those resulting from the addition of alum and polymer produce sludge that is removed by settling in the contact tanks with lamellae plates. The fraction of solids that remain in suspension is removed by filtration through two stages of sand filters followed by bag filters with 0.5 µm bags. The finished effluent is finally polished through a bank of GAC media filters and clean water is discharged at Outfall 018 at approximately 1,000 gpm.

The solids handling and disposal system is designed to remove all the solids produced by the clean water treatment system. These solids are collected in a solids holding tank, which receives sludge from the contact tanks and backwash water from the sand filters, which contains particulates retained by the sand filtration stages. Settled solids from the solids holding tank are pumped to a centrifuge, while the supernatant is routed back to the front end of the clean water treatment system being treated. Finally, the dewatered solids from the centrifuge are collected in roll-off bins and transported offsite for disposal, while the centrate (liquid fraction) is routed back to the front end of the clean water treatment system. Boeing began construction of the Outfall 018 TSTS in November 2009 and completed it in the First Quarter of 2010.

Boeing operated the Outfall 018 TSTS during all discharges that occurred at Outfall 018 during the First Quarter 2010. Boeing tested the TSTS and adjusted it early in the quarter by recirculating water between the TSTS and Silvernale Pond. The first discharge from the TSTS to Outfall 018 was on January 18, 2010. However, only limited chemicals were being added to the system at that point, which explains the exceedances in iron and manganese. Adjusted chemical addition processes greatly improved iron removal.

Manganese removal below the permit limit of 50 micrograms per liter (µg/L) remained the most challenging part of the TSTS operation. This process consisted of (i) the addition of sufficient $KMnO_4$ to oxidize dissolved manganese and bring it out of solution, (ii) the pH must be above 8.0 to increase the kinetics of the oxidation of manganese, and (iii) additional manganese removal by a coating of manganese oxides formed on the sand beds (which acts in the same way of an ion exchange system for manganese). Additionally, meeting this manganese permit limit required all processes to occur concurrently. At the time of the second reported exceedance on February 6–7, 2010 (manganese only), $KMnO_4$ addition was calibrated to produce the desired manganese oxidation, but the formation of the manganese oxides in the sand media was not complete. Further measurements of total manganese in the TSTS effluent demonstrate that the limit was met when the latter process was complete.

Based on the results of the First Quarter 2010 storm events, Boeing has upgraded the treatment system to a permanent chemical treatment systems with an ACTIFLO™ process. The ACTIFLO™ unit will control high turbidity peaks and protect the rest of the system from solids overload. During the Fourth Quarter 2010, Boeing completed the following activities related to the installation of permanent chemical treatment systems:

- Prepared and placed steel plate foundations for treatment system equipment and secured equipment on their corresponding foundation. This consisted of drilling anchor holes, placing and pouring concrete for anchor rods, securing rods to steel plates, and placing and welding equipment to steel plate foundations.
- Installed main piping and valves between equipment.
- Installed piping and valves to connect R-2A Pond, Silvernale Pond, and their Outfall 018 discharge location.
- Poured concrete foundations for pumps, tanks, and electrical panels.
- Installed the intake structures for both treatment systems.

- Installed intake cages for uphill conveyance from R-2A Pond to Silvernale Pond, and from Perimeter Pond to R-1 Pond.

The treatment systems for the 2010-2011 storm season will be completed in the First Quarter 2011 with additional modification or optimization to be completed throughout the Second Quarter 2011. While this treatment system is currently under construction, stormwater control measures are in place, including existing flow through media beds, to help meet the stormwater quality objectives.

Site-wide Stormwater Conveyance System

As part of ongoing efforts to improve retention and manage stormwater runoff, upgrades were made at Outfalls 003, 004, 006 and 010 as part of a broader effort to provide conveyance for stormwater at multiple outfall locations. Specifically, a new conveyance pump and containment were added to Outfall 003 downstream of the existing main retention. The berm upstream of Outfall 004 was extended to provide additional retention capacity, and new transfer pumps were added to convey stormwater to a storage tank located at the outfall. The sides of Outfall 010 filtration basin were modified to provide additional retention capacity and even the distribution of surface water run-off across the outfall BMP. New transfer pumps were added to Outfall 006, 010, 012, and 013; new retention tanks were added to Outfalls 005, 007, 012, 013, and 014 to increase the stormwater storage capacity at each outfall.

Retained stormwater will be pumped through a conveyance system for treatment at the system located next to Silvernale Pond prior to discharge at Outfall 018 once the construction is complete. The existing Outfall 014 BMP will be equipped with a pump that will be used to pump stormwater from storage tanks at the outfall to the treatment system located near Perimeter Pond prior to discharge at Outfall 011.

BMP Maintenance Activities

During the Third and Fourth Quarter 2010 the flow BMP media beds at Outfalls 003, 004, 006 and 010 were replaced based on the Stormwater Expert Panel recommendations. Their recommendation consisted of replacing the existing layered media with a blended mixture of rhyolite sand, surface modified zeolite, and GAC. This media mixture combination has demonstrated slightly better maintenance characteristics, and performed more consistently under a broader range of conditions than individual components used separately. All media was flushed/rinsed prior to purchase, delivery and installation into the media beds. The blended mixture of media was installed to a depth of 26-28 inches in the structural BMP based on the recommendations of the Stormwater Expert Panel. After installation was completed the media mixture was rinsed again in the Fourth Quarter 2010 to stabilize field parameters.

In addition to those activities described above and as noted in the Summary of Non-compliance and Corrective Actions section of this report, specific upgrade details are also provided by outfall location in Table C and detailed later in this report.

Site Closure Activities

As part of closure activities at the Santa Susana Site, Boeing is actively removing impermeable surfaces. The removal of these surfaces provides the following water quality benefits:

1. Runoff volumes are reduced, thereby also reducing mass loadings during rainfall events.
2. Runoff velocities, particularly peak velocities are reduced, thereby also reducing downstream scour and erosion, which in turn reduces sediment loadings and improves water quality.
3. The site approaches its pre-development hydrologic condition, which improves overall watershed health and well-being.

Because of the relationships between impermeable surfaces and water quality Boeing continues to identify opportunities to remove impermeable surfaces as quickly as is possible.

Bioassessment

A bioassessment review was conducted on May 17, 2010 for Second Quarter 2010 as required by the permit. However, because all drainages associated with NPDES Permit-regulated outfalls at the Santa Susana Site were dry at the time of sampling, the biologist determined that there was no suitable habitat from which to complete the bioassessment sampling due to the lack of naturally occurring continuous flow of water in these drainages.

DISCHARGE STATUS

Precipitation during 2010 at Santa Susana is provided for each month of the year in Table 1. Surface water samples were collected when flow was observed at the designated outfall locations during storm events of greater than 0.1 inches. For all qualifying events between January 1 to December 31, 2010, surface water samples were collected from Outfalls 001, 002, 003, 006, 008, 009, 010, 011, 018, and the Arroyo Simi Receiving Water location in accordance with the NPDES permit.

Figure 1 illustrates the Santa Susana facility and the locations of the outfalls. The following table provides a summary of the 2010 sampling record (Table A), by outfall/location where flow was observed and samples collected per the requirements of the NPDES Permit

Table A. Summary of Stormwater Sampling Events

Date	Outfall/Location	Samples Collected (i.e. grab, composite)
1/18/2010	Outfall 001 (South Slope below Perimeter Pond)	Grab
	Outfall 002 (South Slope below R-2 Pond)	Grab
	Outfall 006 (FSDF-2)	Grab
	Outfall 008 (Happy Valley)	Grab & Composite
	Outfall 009 (WS-13 Drainage)	Grab
	Outfall 010 (Building 203)	Grab & Composite
	Outfall 018 (R-2 Pond)	Grab
1/19/2010	Outfall 002 (South Slope below R-2 Pond)	Composite
	Outfall 006 (FSDF-2)	Composite

Date	Outfall/Location	Samples Collected (i.e. grab, composite)
	Outfall 009 (WS-13 Drainage)	Composite
	Outfall 018 (R-2 Pond)	Composite
1/20/2010	Outfall 011 (Perimeter Pond)	Grab
1/21/2010	Outfall 003 (RMHF)	Grab
	Outfall 011 (Perimeter Pond)	Composite
1/22/2010	Outfall 003 (RMHF)	Composite
2/5/2010	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
	Outfall 008 (Happy Valley)	Composite
	Outfall 009 (WS-13 Drainage)	Grab & Composite
	Outfall 010 (Building 203)	Grab
2/6/2010	Outfall 001 (South Slope below Perimeter Pond)	Grab & Composite
	Outfall 003 (RMHF)	Grab
	Outfall 008 (Happy Valley)	Grab
	Outfall 010 (Building 203)	Composite
	Outfall 011 (Perimeter Pond)	Grab
	Outfall 018 (R-2 Pond)	Grab
2/7/2010	Outfall 003 (RMHF)	Composite
	Outfall 011 (Perimeter Pond)	Composite
	Outfall 018 (R-2 Pond)	Grab
2/11/2010	Arroyo Simi Receiving Water/Sediment	Grab
2/20/2010	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
	Outfall 009 (WS-13 Drainage)	Grab & Composite
2/27/2010	Outfall 002 (South Slope below R-2 Pond)	Grab
	Outfall 008 (Happy Valley)	Grab
	Outfall 009 (WS-13 Drainage)	Grab
	Outfall 010 (Building 203)	Grab
2/28/2010	Outfall 002 (South Slope below R-2 Pond)	Composite
	Outfall 008 (Happy Valley)	Composite
	Outfall 009 (WS-13 Drainage)	Composite
	Outfall 010 (South Slope below R-2 Pond)	Composite
3/2/2010	Outfall 018 (R-2 Pond)	Grab
3/3/2010	Outfall 018 (R-2 Pond)	Composite
3/6/2010	Outfall 002 (South Slope below R-2 Pond)	Grab
	Outfall 009 (WS-13 Drainage)	Grab
	Outfall 018 (R-2 Pond)	Grab
3/7/2010	Outfall 002 (South Slope below R-2 Pond)	Composite
	Outfall 008 (Happy Valley)	Grab & Composite
	Outfall 009 (WS-13 Drainage)	Composite
	Outfall 018 (R-2 Pond)	Composite

Date	Outfall/Location	Samples Collected (i.e. grab, composite)
3/8/2010	Outfall 006 (FSDF-2)	Grab & Composite
3/25/2010	Outfall 008 (Happy Valley)	Grab[2]
4/5/2010	Outfall 009 (WS-13 Drainage)	Composite
	Outfall 010 (Building 203)	Grab[3]
4/12/2010	Outfall 009 (WS-13 Drainage)	Composite
5/12/2010	Arroyo Simi Receiving Water	Grab
8/5/2010	Arroyo Simi Receiving Water	Grab
10/6/2010	Outfall 009 (WS-13 Drainage)	Grab & Composite
10/20/2010	Outfall 009 (WS-13 Drainage)	Grab & Composite
11/10/2010	Arroyo Simi Receiving Water	Grab
11/20/2010	Outfall 009 (WS-13 Drainage)	Grab
12/6/2010	Outfall 009 (WS-13 Drainage)	Grab & Composite
12/18/2010	Outfall 009 (WS-13 Drainage)	Grab & Composite
12/19/2010	Outfall 001 (South Slope below Perimeter Pond)	Grab
	Outfall 002 (South Slope below R-2 Pond)	Grab
	Outfall 008 (Happy Valley)	Grab & Composite
12/20/2010	Outfall 001 (South Slope below Perimeter Pond)	Composite
	Outfall 002 (South Slope below R-2 Pond)	Composite
	Outfall 006 (FSDF-2)	Grab & Composite
	Outfall 018 (R-2 Pond)	Grab
12/21/2010	Outfall 018 (R-2 Pond)	Composite
12/22/2010	Outfall 011 (Perimeter Pond)	Grab
12/23/2010	Outfall 011 (Perimeter Pond)	Composite
12/26/2010	Outfall 001 (South Slope below Perimeter Pond)	Grab & Composite
	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
	Outfall 006 (FSDF-2)	Grab & Composite
	Outfall 008 (Happy Valley)	Grab & Composite
	Outfall 009 (WS-13 Drainage)	Grab & Composite
12/29/2010	Outfall 002 (South Slope below R-2 Pond)	Grab
	Outfall 008 (Happy Valley)	Grab
	Outfall 009 (WS-13 Drainage)	Grab
12/30/2010	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite[4]
	Outfall 008 (Happy Valley)	Composite
	Outfall 009 (WS-13 Drainage)	Composite

Samples collected were submitted to and analyzed by a California-certified analytical laboratory per the NPDES Permit requirements. All sanitary wastes from the domestic sewage treatment plants (STPs I, II,

[2] Mitigation purposes is purchased water from the Calleguas Municipal Water District.
[3] The low flow conditions did not allow for composite samples to be taken; thus, grab sampling was performed.
[4] The low flow conditions did not allow for composite samples to be completed; thus, grab sampling was performed to supplement the partial composite sample.

and III) were shipped offsite to a permitted treatment and disposal facility. Details of the STP waste shipments are summarized in Table 2.

SURFACE WATER DISCHARGE ANALYTICAL RESULTS REPORTING

All analyses of surface water discharge samples were conducted at laboratories certified for such analyses by the California Department of Public Health or approved by the RWQCB's Executive Officer and in accordance with current United States Environmental Protection Agency (EPA) guidelines, procedures, or as specified in the monitoring program. As indicated on Page T-3 in the NPDES permit, analytical results were designated "Detected but not Quantified (DNQ)" (similar to organic analyses being J-flagged by the laboratory or data validator) if the analytical result was greater than or equal to the laboratory's method detection limit (MDL), and less than the State Board's Minimum Level (ML) or laboratory reporting limit (RL). For the purposes of determining compliance with permit limits, data that were designated DNQ or that were J-flagged (estimated values), were reported as such, but were not used to establish compliance because the estimated value was less than the laboratories' RL.

Attachment T-A of the NPDES permit presents the State Board's MLs for use in reporting and determining compliance with NPDES permit limits. The analytical laboratory achieved these MLs for 2010. However, some constituents' daily maximum and/or monthly average discharge limits in the NPDES permit are less than their respective MLs and less than the laboratory RL. In cases where the permit limit is less than the RL and ML, the RL was used to determine compliance. As required in the NPDES permit, Section 11 of this report provides a summary table of constituents listed in the permit, their analytical laboratory methods, MDLs, and RLs, and copies of laboratory quality assurance and quality control procedures. California Department of Public Health Environmental Laboratory Accreditation Program (ELAP) certifications are also included in Section 11, as required in the NPDES permit.

During 2010, specific constituents that had permit limits that were less than the RLs and MLs were mercury, bis(2-ethylhexyl)phthalate (DEHP), cyanide, polychlorinated biphenyls (PCBs), (Aroclors), chlordane, 4,4'-dichlorodiphenyldichloroethane (4,4'-DDD), 4,4'-dichlorodiphenyldichloroethane (4,4'-DDE), 4,4'-dichlorodiphenyltrichloroethane (4,4'-DDT), dieldrin, toxaphene, and chlorpyrifos. None of these compounds were detected at concentrations equal to or greater than their RL during 2010.

SUMMARY OF NON-COMPLIANCE AND CORRECTIVE ACTIONS

Analytical results for all surface water samples are summarized in Table 3 and in the Attachment -- Sections 1 through 10. Consistent with prior annual report submittals and in accordance with the NPDES permit, a graphical presentation of the data collected has also been included for specific analytes and parameters that could be effectively graphed. Analytes that had a permit limit were graphed. Analytes that do not have permit limits were not graphed. Graphing consisted of charting an analyte's analytical result(s) with the sample date(s). The graphs are included in each section of the attachment as described below.

The tabular and graphic data for all outfall locations, including the Arroyo Simi receiving water location, where data were collected (i.e., where outfalls flowed) are provided in the attachment as follows:

Attachment:

Section 1 Outfall 001	South Slope below Perimeter Pond
Section 2 Outfall 002	South Slope below R-2 Pond
Section 3 Outfall 003	RMHF
Section 4 Outfall 006	FSDF-2
Section 5 Outfall 008	Happy Valley
Section 6 Outfall 009	WS-13 Drainage
Section 7 Outfall 010	Building 203
Section 8 Outfall 011	Perimeter Pond
Section 9 Outfall 018	R-2A Pond

Section 10 Receiving Water and Sediment Sampling Location – Arroyo Simi (Frontier Park)

Included after Table 3 and at the beginning of the sections in the Attachment are the Annual Reporting Summary Notes. The Annual Reporting Summary Notes are a compilation of notes, abbreviations, and data validation codes that are found in the analytical data summary tables contained in the attachments.

As indicated in the Attachments, and as summarized in Table 3, a 2010 Summary of Daily Max, Monthly Average, and Daily Mass Permit Limit or Benchmark Limit Exceedances includes:

- Chromium at Outfall 001
- Copper at Outfall 001
- Gross Alpha at Outfall 008
- Iron at Outfalls 001, 002, 011 and 018
- Lead at Outfalls 001, 008, 009, and 011
- Manganese at Outfalls 001, 002, 011 and 018
- TCDD toxic equivalent (TEQ) at Outfalls 001, 002, 006, 008, 009, 010, 011, and 018
- Zinc at Outfall 001

Discussion of Permit Limit or Benchmark Exceedances

The following paragraphs present a summary of permit limit or benchmark exceedances by outfall. Following these summaries, a discussion of corrective measures is included.

Stormwater Outfall 001

General Approach for Achieving Compliance at Outfall 001

A detailed discussion of the benchmark exceedances by constituent type and potential sources of these exceedances at Outfall 001 is set forth in the paragraphs below. However, whatever the source of the exceedances, Boeing continues to take proactive steps to meet the requirements of its NPDES permit. These steps have been summarized in Table C of this report and are primarily focused on stabilization of streambed channel banks to reduce sediment erosion through the planting of native vegetation and hydroseeding. Boeing believes that implementing these stabilization and erosion control measures is the most effective way to meet effluent standards while not severely impacting the adjacent undisturbed

habitats. These activities will continue to be re-evaluated and upgraded as needed to minimize the occurrence of any future benchmark exceedances.

Exceedance Summary

During the 2010 monitoring period, samples collected at Outfall 001 showed that there were nineteen exceedances for seven constituents with benchmark limits, as summarized in Table 3.

- On January 18, manganese was detected at a concentration of 400 µg/L, which is above the daily maximum benchmark limit of 50 µg/L.
- On January 18, iron was detected at concentrations of 23 milligrams per liter (mg/L), which is above the daily max benchmark limit of 0.3 mg/L.
- On January 18, lead was detected at a concentration of 13 µg/L, which is above the daily max benchmark limit of 5.2 µg/L.
- On January 18, TCDD-TEQ was detected at a concentration of $1.3x10^{-6}$ µg/L, which is above the daily max benchmark limit of $2.8x10^{-8}$ µg/L.
- On February 6, manganese was detected at a concentration of 150 µg/L, which is above the daily maximum benchmark limit of 50 µg/L.
- On February 6, iron was detected at concentrations of 9.7 mg/L, which is above the daily max benchmark limit of 0.3 mg/L.
- On February 6, lead was detected at a concentration of 6.4 µg/L, which is above the daily max benchmark limit of 5.2 µg/L.
- On February 6, copper was detected at a concentration of 14.3 µg/L, which is above the daily max benchmark limit of 14 µg/L.
- The January monthly average for lead was 13 µg/L, which is above the monthly average benchmark limit of 2.6 µg/L.
- The January monthly average for TCDD-TEQ was $1.3x10^{-6}$ µg/L, which is above the monthly average benchmark limit of $1.40x10^{-8}$ µg/L.
- The January monthly average for copper was 12 µg/L, which is above the monthly average benchmark limit of 7.1 µg/L.
- The January monthly average for zinc was 76 µg/L, which is above the monthly average benchmark limit of 54 µg/L

- The February monthly average for lead was 6.4 µg/L, which is above the monthly average benchmark limit of 2.6 µg/L.

- The February monthly average for TCDD-TEQ was $2.8x10^{-8}$ µg/L, which is above the monthly average benchmark limit of $1.40x10^{-8}$ µg/L.

- The February monthly average for chromium was 11 µg/L, which is above the monthly average benchmark limit of 8.1 µg/L.

- The February monthly average for copper was 14.3 µg/L, which is above the monthly average benchmark limit of 7.1 µg/L.

- On December 19, manganese was detected at a concentration of 96 µg/L, which is above the daily maximum benchmark limit of 50 µg/L.

- On December 19, iron was detected at concentrations of 6.4 mg/L, which is above the daily max benchmark limit of 0.3 mg/L.

- On December 26, iron was detected at concentrations of 1.8 mg/L, which is above the daily max benchmark limit of 0.3 mg/L.

Exceedance Discussion

Metals

Benchmark limit exceedances for chromium, copper, iron, lead, manganese, and zinc occurred at Outfall 001 in 2010. Outfall 001 is located in the undeveloped portion of the property where no industrial activities have occurred.

As reported in previous DMRs, the Stormwater Expert Panel study, *SSFL Metals Background Report: Sources of Metals in SSFL Watersheds*[5], noted that heavy metals in stormwater discharges from Outfalls 001, 002, 008, and 009 originate from various sources, including natural soil components, rainfall, and dry atmospheric deposition from local and regional sources. This report also explained that data show wet weather metals concentrations in creeks in regional natural watersheds are generally one order of magnitude lower than concentrations in regional developed watersheds, and that Santa Susana "outfall metal concentrations were comparable to the concentrations at these undeveloped watersheds."

Boeing believes that the metals concentrations in stormwater runoff from the Santa Susana site are associated with total suspended solids (TSS) consisting of native sediments and soils, and TSS and metals loading will vary based on rainfall intensity, duration, and erosion characteristics. The elevated metal concentrations observed are thus likely predominately due to the erosion of native soils and ash, and their subsequent migration into stormwater.

[5] Available at http://www.boeing.com/aboutus/environment/santa_susana/tech_reports.html

TCDD TEQ

The daily benchmark limit and monthly average benchmark limit for TCDD TEQ was exceeded at Outfall 001 in January 2010, and the monthly average benchmark limit was exceeded in February 2010. However, in July 2010 monthly average permit limits were removed as permit limits and are not appropriate for inconsistent, sporadic, and infrequent storm water-dominated discharges such as those at Santa Susana. Based on the data collected from Santa Susana, monthly average permit limit exceedances are typically the result of a single sample where there are no additional rainfall events or monitoring data during the month[6].

TCDD congeners have been frequently detected in DTSC-approved, non-impacted background soils at the SSFL (MWH, 2005). In some areas, onsite operations have utilized combustion processes, however when these potentially impacted areas were investigated, the TCDD TEQ values in soils were found either to be equivalent to background levels or, if elevated, they were shown to decrease over relatively short distances to near background levels down slope or down drainage from the suspected source area.

The presence of TCDD in both background soils and fire-related materials is well documented in the scientific literature (USEPA, 2000), substantiated by previously-completed on- and offsite studies (MWH, 2005), and presented in the Flow Science Background Report (Flow Science, 2006). These reports suggest that the levels of TCDD TEQ measured in surface water at the SSFL could originate primarily from wildfire combustion processes, regional and atmospheric deposition, and other naturally occurring sources over which Boeing has no reasonable control.

A report completed by the Stormwater Expert Panel, *SSFL Stormwater Dioxin Background Report*[7], underscores the significant role of background dioxins (TCDD) in stormwater discharges from Outfalls 001, 002, 008, and 009 at the Santa Susana site. Among other things, the Stormwater Expert Panel explains that dioxins are ubiquitous in the environment and come from wildfires and atmospheric deposition from widespread offsite emissions. As a result, "natural background soils are a significant source of dioxins in stormwater" at Santa Susana.

Stormwater Outfall 002

General Approach for Achieving Compliance at Outfall 002

As was done for Outfall 001, a detailed discussion of the benchmark exceedances by constituent type and potential sources of these exceedances for Outfall 002 is noted in the paragraphs below. The approach in place for Outfall 001 is also in place for Outfall 002. These steps have been summarized in Table C of this

[6] Monthly average permit limits are calculated based on the State of California's Policy for the Implementation of Toxics Standards for Inland Waters, Enclosed Bays, and Estuaries (State Implementation Policy), and the EPA's Technical Support Document for Water Quality-based Toxics Control methodology developed for continuous, end of pipe discharges, such as Publicly Owned Treatment Works or industrial wastewater discharges. This methodology often uses California Toxics Rule chronic criteria as the basis for average monthly permit limits.

[7] Available at http://www.boeing.com/aboutus/environment/santa_susana/tech_reports.html.

report and are primarily focused on stabilization of streambed channel banks to reduce sediment erosion through the planting of native vegetation and hydroseeding. Boeing believes that implementing these stabilization and erosion control measures is the most effective way to meet effluent standards while not severely impacting the adjacent undisturbed habitats. These activities will continue to be re-evaluated and upgraded as needed to minimize the occurrence of any future benchmark exceedances.

Exceedance Summary

During the 2010 monitoring period, samples collected at Outfall 002 had eight exceedances for three constituents with benchmark limits, as summarized in Table 3:

- On January 19, manganese was detected at a concentration of 86 µg/L, which is above the daily maximum benchmark limit of 50 µg/L.
- On January 19, iron was detected at concentrations of 2 mg/L, which is above the daily max benchmark limit of 0.3 mg/L.
- On January 19, TCDD-TEQ was detected at a concentration of 6.4×10^{-7} µg/L, which is above the daily max benchmark limit of 2.8×10^{-8} µg/L.
- On February 5, iron was detected at concentrations of 0.6 mg/L, which is above the daily max benchmark limit of 0.3 mg/L.
- On February 28, manganese was detected at a concentration of 130 µg/L, which is above the daily maximum benchmark limit of 50 µg/L.
- On February 28, iron was detected at concentrations of 7.4 mg/L, which is above the daily max benchmark limit of 0.3 mg/L.
- On February 28, TCDD-TEQ was detected at a concentration of 6.8×10^{-7} µg/L, which is above the daily max benchmark limit of 2.8×10^{-8} µg/L.
- On December 19, iron was detected at concentrations of 2.7 mg/L, which is above the daily max benchmark limit of 0.3 mg/L.

Exceedance Discussion

Iron and Manganese

Benchmark limit exceedances for iron and manganese occurred at Outfall 002 in 2010. Outfall 002 is located in the undeveloped portion of the property where no industrial activities have occurred. The reduction of TSS in stormwater runoff is likely to be the most effective approach for reducing concentrations of these metals. The background concentrations of these metals in the soil are likely a contributing factor as well. Boeing continues to investigate erosion sources and erosion control measures

at the site, and will improve BMPs as appropriate, to better control sediment and associated metals transport into the surface water.

TCDD TEQ

The reported concentrations of TCDD TEQ in the samples collected on January 19 and February 28, 2010 from Outfall 002 exceeded the daily max benchmark limit of 2.80×10^{-8} µg/L.

As discussed for Outfall 001, Boeing believes the metals concentrations in stormwater runoff from the SSFL are associated with TSS consisting of native sediments and soils, and that TSS and metals loading will vary based on rainfall intensity, duration, and erosion characteristics. Continued monitoring of surface water and aggressive actions taken as noted above and in Table C to control sediment transport is underway until this issue is resolved.

Stormwater Outfall 003

There were no permit limit exceedances in discharges from Outfall 003 during 2010.

Stormwater Outfall 004

There were no discharges from Outfall 004 during 2010. Therefore there were no permit limit exceedances at Outfall 004 in 2010.

Stormwater Outfall 005

There were no discharges from Outfall 005 during 2010. Therefore there were no permit limit exceedances at Outfall 005 in 2010.

Stormwater Outfall 006

General Approach for Achieving Compliance at Outfall 006

Boeing is committed to fulfilling the requirements of the NPDES permit and continues to take actions to reduce discharges of regulated constituents. The actions taken at this outfall are specified in Table C of this report and include the redesign of the flow through filter bed for improved contact time, and the reformulation and use of a new mixed filter media.

A discussion as to the most probable source of the one exceedance is noted below.

Exceedance Summary

Outfall 006 had one exceedance of one constituent with NPDES permit limits collected at this outfall during the 2010 monitoring period, as summarized in Table 3:

- On January 19, TCDD TEQ was detected at a concentration of $1.7x10^{-6}$ µg/L, which is above the NPDES permit limit of $2.8x10^{-8}$ µg/L.

Exceedance Discussion

TCDD TEQ

The reported concentrations of TCDD TEQ in the sample collected on January 19, 2010 from Outfall 006 exceeded the NPDES permit limit of $2.80x10^{-8}$ µg/L.

TCDD congeners have been frequently detected in DTSC-approved, non-impacted background soils at the SSFL (MWH, 2005). In some areas, operations onsite have utilized combustion processes. However, when investigating these potentially impacted areas, the TCDD TEQ values in soils have been found either to be equivalent to background levels or, if elevated, they have been shown to decrease in relatively short distances to near background levels down slope or down drainage from the suspected source area.

As discussed above, scientific evidence shows that background conditions are significant contributors of regulated constituents, including TCDD. RWQCB Staff have recognized the likely presence of naturally-occurring elevated concentrations of regulated constituents and their importance in evaluating compliance with applicable standards and limits

Stormwater Outfall 007

There were no discharges from Outfall 007 during 2010. Therefore there were no permit limit exceedances at Outfall 007 in 2010.

Stormwater Outfall 008

General Approach to Achieving Compliance at Outfall 008

The compliance approach for Outfall 008 is addressed in the separate BMP plan discussed in the beginning of this report under the ***Outfall 008/009 ISRA and BMP Plan Related Activities*** section. The Outfall 008/009 BMP plan was developed in 2010 and its implementation activities will continue through 2012. A discussion as to the most probable source of the exceedances for this outfall is noted below.

Exceedance Summary

During the 2010 monitoring period, samples collected at Outfall 008 had seven exceedances for three constituents with benchmark, or permit limits, as summarized in Table 3. Permit limits for Outfall 008 became effective July 19, 2010,

- On January 18, lead was detected at a concentration of 7.9 µg/L, which is above the daily max benchmark limit of 5.2 µg/L.

- On January 18, TCDD-TEQ was detected at a concentration of $2.4x10^{-6}$ µg/L, which is above the daily max benchmark limit of $2.8x10^{-8}$ µg/L.

- On February 5, lead was detected at a concentration of 10 µg/L, which is above the daily max benchmark limit of 5.2 µg/L.

- On February 28, lead was detected at a concentration of 7 µg/L, which is above the daily max benchmark limit of 5.2 µg/L.

- On December 19, lead was detected at a concentration of 6.7 µg/L, which is above the daily max permit benchmark limit of 5.2 µg/L.

Exceedance Discussion

Lead

Benchmark limit exceedances for lead occurred at Outfall 008 in 2010 following the completion of the ISRA activities.

As discussed above, Boeing believes the metals concentrations in stormwater runoff from the SSFL are associated with TSS consisting of native sediments and soils, and that TSS and metals loading will vary based on rainfall intensity, duration, and erosion characteristics.

TCDD TEQ

The reported concentration of TCDD TEQ in the sample collected on January 18, 2010 from Outfall 008 exceeded the daily max benchmark limit of $2.80x10^{-8}$ µg/L.

TCDD congeners have been frequently detected in DTSC-approved, non-impacted background soils at the SSFL (MWH, 2005). In some areas, operations onsite have utilized combustion processes. However, when investigating these potentially impacted areas, the TCDD TEQ values in soils have been found either to be equivalent to background levels or, if elevated, they have been shown to decrease in relatively short distances to near background levels down slope or down drainage from the suspected source area.

Other Outfall 008 Detections

On January 18, and February 5, Gross Alpha was detected at concentrations of 25.8±5.5 pCi/L and 20.5 ± 4.0 pCi/L respectively, which is above the daily max benchmark limit of 15 pCi/L. In the First Quarter 2010 DMR, these results were identified as a potential concern, with compliance to be determined at the end of the calendar year. The average of all gross alpha samples collected through the calendar year at this outfall showed that the limit was met

Stormwater Outfall 009

General Approach to Achieving Compliance at Outfall 009

As noted in the Outfall 008 discussion, the compliance approach for Outfall 009 is addressed in the separate BMP plan discussed in the beginning of this report under the ***Outfall 008/009 ISRA and BMP Plan Related Activities*** section. The Outfall 008/009 BMP plan was developed in 2010 and its implementation activities will continue through 2012. A discussion as to the most probable source of the exceedances for this outfall is noted below.

Exceedance Summary

During the 2010 monitoring period Outfall 009 had eleven benchmark or permit limit exceedances for two constituents collected at this outfall, as summarized in Table 3: Permit limits for Outfall 009 became effective July 19, 2010,

- On January 19, February 5, February 28, March 7, and October 6, TCDD TEQ was detected at $3.4x10^{-6}$ µg/L, $7.2x10^{-7}$ µg/L, $1.1x10^{-6}$ µg/L, $2.9x10^{-8}$ µg/L, and $3.9x10^{-8}$ µg/L, respectively, which are above the daily max benchmark/permit limit of $2.8x10^{-8}$ µg/L. The detections on January 19, February 5, and February 28 were equivalent to a daily mass result of 6.9 $x10^{-8}$ lbs/day, $6.7x10^{-9}$ lbs/day, and $1.4x10^{-8}$ lbs/day, respectively. Each of these mass results is above the daily mass benchmark limit of $4.20x10^{-9}$ lbs/day.

- On January 19, February 28, and October 6, lead was detected at 9.3 µg/L, 8.9 µg/L, and 11 µg/L, respectively, which are above the daily max benchmark and permit limit of 5.2 µg/L.

Exceedance Discussion

TCDD TEQ

Concentrations of TCDD TEQ in samples collected from Outfall 009 during 2010 exceeded the daily max and daily mass benchmark/permit limit for TCDD TEQ.

TCDD congeners have been frequently detected in DTSC-approved, non-impacted background soils at the SSFL (MWH, 2005). In some areas, operations onsite have utilized combustion processes. However, when investigating these potentially impacted areas, the TCDD TEQ values in soils have been found either to be equivalent to background levels or, if elevated, they have been shown to decrease in relatively short distances to near background levels down slope or down drainage from the suspected source area.

Boeing continues to investigate sources of TCDD within outfall 009. As discussed above, substantial evidence, including a report from the Stormwater Expert Panel, shows that background conditions are significant contributors of regulated constituents, including TCDD at Outfall 009.

Boeing is committed to fulfilling the requirements of the NPDES permit and continues to take actions to reduce discharges of regulated constituents, including TCDD as described in the sections above of this report addressing Site-Wide Planting of Native Vegetation, Outfalls 008/009 ISRA and BMP Plan Related Activities, and Northern Drainage Activities, and in Table C below.

Lead

Lead was detected at Outfall 009 during 2010 in concentrations above its benchmark/permit limit, as indicated above and in Table 3.

The reduction of total suspended solids (TSS) in stormwater runoff is likely to be the most effective approach for reducing lead concentrations, since lead typically has low solubility and is associated with sediments. During cleanup activities, Boeing has implemented BMPs to minimize the transportation of sediment from these areas. Boeing continues to investigate erosion sources and implement erosion control measures in the Outfall 009 watershed. Specifically in the Northern Drainage, erosion and sediment control plans are being performed, including channel stabilization, and restoration activities as discussed further in this document.

Stormwater Outfall 010

General Approach for Achieving Compliance at Outfall 010

The approach used for achieving full compliance at this outfall is specified in Table C. of this report. It includes the redesign of the flow through filter bed for improved contact time, adding retention capacity, and the reformulation and use of a new mixed filter media as recommended by the Stormwater Expert Panel.

A discussion as to the most probable source of the exceedances is noted below.

Exceedance Summary

During the 2010 monitoring period, samples collected at Outfall 010 had three exceedances for one constituent with NPDES permit limits, as summarized in Table 3:

- On January 19, February 6, and February 28, TCDD TEQ was detected at 8.8×10^{-7} µg/L, 1.6×10^{-6} µg/L, and 1.0×10^{-6} µg/L, respectively, which are above the NPDES permit limit of 2.8×10^{-8} µg/L.

Exceedance Discussion

TCDD TEQ

TCDD TEQ concentration in stormwater samples from Outfall 010 exceeded the NPDES permit limit of 2.80×10^{-8} µg/L during 2010. TCDD TEQ congeners have been frequently detected in DTSC-approved, non-impacted background soils at Santa Susana (MWH, 2005). In some areas, operations onsite have utilized combustion processes. However, when investigating these potentially impacted areas, the TCDD TEQ values in soils have been found either to be equivalent to background levels or, if elevated, they have been shown to decrease in relatively short distances to near background levels down slope or down drainage from the suspected source area.

As discussed above, substantial evidence shows that background conditions are significant contributors of regulated constituents, including TCDD. RWQCB Staff have recognized the likely presence of naturally-occurring elevated concentrations of regulated constituents and their importance in evaluating compliance with applicable standards and limits.

Stormwater Outfall 011

Exceedance Summary

During the 2010 monitoring period, samples collected at Outfall 011 had eight exceedances for four constituents with NPDES permit limits, as summarized in Table 3:

- On January 21, manganese was detected at a concentration of 140 µg/L, which is above the NPDES permit limit of 50 µg/L.
- On January 21, iron was detected at concentrations of 9.7 mg/L, which is above the NPDES permit limit of 0.3 mg/L.
- On January 21, lead was detected at a concentration of 5.7 µg/L, which is above the NPDES permit limit of 5.2 µg/L.
- On January 21, TCDD-TEQ was detected at a concentration of $5.6x10^{-7}$ µg/L, which is above the NPDES permit limit of $2.8x10^{-8}$ µg/L.
- On February 7, manganese was detected at a concentration of 120 µg/L, which is above the NPDES permit limit of 50 µg/L.
- On February 7, iron was detected at concentrations of 2 mg/L, which is above the NPDES permit limit of 0.3 mg/L.
- On December 22-23, manganese was detected at a concentration of 62 µg/L, which is above the NPDES permit limit of 50 µg/L.
- On December 22-23, iron was detected at concentrations of 6.4 mg/L, which is above the NPDES permit limit of 0.3 mg/L.

Exceedance Discussion

Iron, Lead, and Manganese

Boeing believes the metals concentrations in stormwater runoff from the SSFL are associated with TSS consisting of native sediments and soils, and that TSS and metals loading will vary based on rainfall intensity, duration, and erosion characteristics. Indeed, there is substantial evidence showing that background conditions are significant contributors of regulated constituents, including metals.

A permanent Stormwater Treatment System (STS) at Outfall 011 is currently under construction as discussed above. This system will replace the temporary system that has been used in previous seasons. During this transition period, stormwater discharges have been regulated through the existing structural BMP at Perimeter Pond and flow was controlled to prevent over topping. Additional BMP and SWPPP related actions at Outfall 011 are further described in Table C.

TCDD TEQ

Concentrations of TCDD TEQ in samples collected from Outfall 011 during 2010 exceeded the daily max permit limit of 2.80×10^{-8} µg/L. TCDD congeners have been frequently detected in DTSC-approved, non-impacted background soils at the SSFL (MWH, 2005). In some areas, operations onsite have utilized combustion processes. However, when investigating these potentially impacted areas, the TCDD TEQ values in soils have been found either to be equivalent to background levels or, if elevated, they have been shown to decrease in relatively short distances to near background levels down slope or down drainage from the suspected source area.

As discussed above, substantial evidence shows that background conditions are significant contributors of regulated constituents, including TCDD. RWQCB Staff have recognized the likely presence of naturally-occurring elevated concentrations of regulated constituents and their importance in evaluating compliance with applicable standards and limits.

Stormwater Outfall 012

There were no discharges from Outfall 012 during 2010. Therefore there were no permit limit exceedances at Outfall 012 in 2010.

Stormwater Outfall 013

There were no discharges from Outfall 013 during 2010. Therefore there were no permit limit exceedances at Outfall 013 in 2010.

Stormwater Outfall 014

There were no discharges from Outfall 014 during 2010. Therefore there were no permit limit exceedances at Outfall 014 in 2010.

Stormwater Outfall 018

Exceedance Summary

During the 2010 monitoring period, samples collected at Outfall 018 had five exceedances for three constituents with NPDES permit limits, as summarized in Table 3:

- On January 19, manganese was detected at a concentration of 140 µg/L, which is above the NPDES permit limit of 50 µg/L.

- On January 19, iron was detected at concentrations of 1.6 mg/L, which is above the NPDES permit limit of 0.3 mg/L.
- On January 19, TCDD TEQ was detected at $8.9x10^{-7}$ µg/L, which is above the NPDES permit limit of $2.80x10^{-8}$ µg/L.
- On February 7, manganese was detected at a concentration of 210 µg/L, which is above the NPDES permit limit of 50 µg/L.
- On December 20-21, iron was detected at concentrations of 2.3 mg/L, which is above the NPDES permit limit of 0.3 mg/L.

Exceedance Discussion

Iron and Manganese

Permit limit exceedances for iron and manganese occurred at Outfall 018 in 2010. Boeing believes that these metal exceedances are primarily due to the erosion and surface water transport of native uncontaminated soils as these concentrations are similar to those seen stormwater runoff from offsite and other open areas (Flow Science, 2006). Additionally, Boeing has investigated and continues to investigate potential sources of constituents coming from areas of historical Site industrial activity with coordination from the California Department of Toxic Substance Control (DTSC). Boeing continues to investigate erosion sources and erosion control measures at the Outfall 018 watershed, and will improve BMPs as appropriate, to better control sediment and associated metals transport into the surface water.

A similar approach to meet permit limits has been employed at Outfall 018 as discussed above for Outfall 011. This approach included the construction of a permanent STS at Outfall 018, located adjacent to the Silvernale pond. This system will replace the temporary system that has been used in previous seasons. During this transition period, stormwater discharges have been regulated through the existing structural BMP within the R-2 Pond spillway and flow was controlled to prevent over topping. Additional BMP and SWPPP related actions at Outfall 018 are further described in Table C.

TCDD TEQ

Concentrations of TCDD TEQ in samples collected from Outfall 018 during 2010 exceeded the daily max NPDES permit limit of $2.80x10^{-8}$ µg/L. Boeing has developed a substantial treatment system to treat water from this watershed prior to its discharge. Because of the size of the watershed and the low effluent limits, developing such a system required pilot testing. Boeing has been engaged in pilot testing of different aspects and process options for this treatment system for over two storm seasons. During the First Quarter of 2010, Boeing implemented a pilot-testing program at R-2 Pond proximate to Outfall 018 as discussed above and construction of the permanent stormwater treatment system is currently underway.

Treated Groundwater Outfall 019

In 2010, Boeing continued treatment of certain waste streams using a fixed groundwater treatment unit operating under the DTSC Permit-by-Rule. Treated effluent discharges from the Groundwater Extraction Treatment System (GETS) were hauled offsite for disposal. Therefore, no discharges were associated with Outfall 019.

Arroyo Simi (Frontier Park, Receiving Water and Sediment Sampling Location)

There were no exceedances in the receiving water for the Arroyo Simi during 2010.

CORRECTIVE ACTIONS

Throughout 2010, Boeing took actions to improve the quality of surface water discharges as detailed above. In addition, Boeing continued implementation of the site-wide SWPPP. SWPPP activities throughout the Santa Susana site included site-wide inspections and metal and debris removal, and hydromulch at various areas throughout Santa Susana. The 2010 SWPPP annual evaluation is included as Section 12 of this report.

The following table lists the Outfall location and respective BMP activities completed during the 2010 calendar year:

Table C. 2010 BMP Activities

OUTFALL	BMP ACTIVITIES DURING 2010
001 (South Slope below Perimeter Pond)	Installed and inspected sediment and erosion control BMPs, performed maintenance on the flume, and conducted housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Planted outfall vegetation/native plants and irrigated new vegetation. Applied hydroseed along the drainage. Performed weed abatement. Performed maintenance on outfall access road.
002 (South Slope below R-2 Pond)	Installed and inspected sediment and erosion control BMPs, performed maintenance on the flume and conducted housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Planted outfall vegetation/native plants and irrigated new vegetation. Applied hydroseed along the drainage. Performed weed abatement. Performed maintenance on outfall access road.
003 (RMHF)	Conducted structural BMP and stormwater filter system inspections. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Added conveyance pump and containment downstream of the existing main BMP retention. Replaced GAC and Zeolite media in BMP media bed. Completed media rinse. Performed weed abatement. Performed maintenance on outfall access road.
004 (SRE)	Conducted structural BMP and stormwater filter system inspections. Performed maintenance on flume and conducted housekeeping activities

OUTFALL	BMP ACTIVITIES DURING 2010
	at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Added storage capacity to existing BMP berm upstream of outfall and transfer pumps to convey the water into a storage tank. Reset stormwater storage tank. Replaced GAC and Zeolite media in BMP media bed. Replaced media bed liner. Completed media rinse. Performed weed abatement.
005 (FSDF-1)	Installed and maintained temporary treatment system for Outfalls 005/007. Added additional storage tanks to increase storage capacity. Installed new liner for sedimentation basin. Conducted sedimentation basin and stormwater filter system inspections. Conducted housekeeping activities at the sample location. Installed fiber rolls. Planned for improved retention and movement of excess stormwater to a consolidated location. Performed weed abatement.
006 (FSDF-2)	Conducted structural BMP and stormwater filter system inspections. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Added a transfer pump upstream of the flume. Replaced GAC and Zeolite media in BMP media bed. Replaced media bed liner in sand filter bed. Raised berms upstream of the sand filter media bed. Installed gabion dam in sand filter bed. Completed media rinse. Performed weed abatement/vegetation removal.
007 (Building 100)	Installed and maintained temporary treatment system for Outfalls 005/007. Added additional storage tanks to increase storage capacity. Conducted BMP, sedimentation basin and stormwater filter system inspections. Conducted housekeeping activities at the outfall and sample location. Installed fiber rolls. Performed weed abatement.
008 (Happy Valley)	Inspected sediment and erosion control BMPs, performed maintenance on the flume, and conducted housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Added rip-rap to existing BMPs. Conducted ISRA work, including restoration and erosion control activities, such as, planting native plants for erosion control. Native plants were irrigated three times per week. Placed hydroseed in outfall area. Performed maintenance on outfall access road, including road abandonment measures as recommended by the Stormwater Expert Panel, and weed abatement.
009 (WS-13 Drainage)	Inspected sediment and erosion control BMPs, performed maintenance on the flume and conducted housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Conducted ISRA work, including restoration and erosion control activities, such as planting native plants for erosion control. Conducted irrigation of new plants three times per week. Reviewed implementation of erosion and sediment control plans for the Northern Drainage project areas. Performed weed abatement.

OUTFALL	BMP ACTIVITIES DURING 2010
010 (Building 203)	Conducted structural BMP and stormwater filter system inspections. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Planned for improved retention and movement of excess stormwater to a consolidated location. Replaced GAC and Zeolite media in BMP media bed. Replaced media bed liner. Added wattles and fiber rolls upstream of BMP. Hydroseeded upstream of BMP. Completed media rinse. Performed weed abatement.
011 (Perimeter Pond Flume)	Conducted BMP and drainage system inspections. Performed maintenance and conducted housekeeping at the sample location. Installed sandbag berm and aboveground drainage piping. Performed flow meter calibration check in Fourth Quarter 2010. Completed installation of electricity for stormwater treatment equipment. Installed and demobilized temporary stormwater treatment equipment, pumps, and pipelines. Replaced/maintained fabric in filter bed. Installed erosion control measures. Performed maintenance on outfall access road. Performed weed abatement/vegetation removal. Began mobilization and construction of permanent stormwater treatment system.
012 (Alfa Test Stand)	Conducted inspection of structural BMPs. Performed maintenance and conducted housekeeping activities at the sample location. Added conveyance pump and retention tanks to existing BMP. Installed retention wall at existing BMP. Completed BMP media rinse. Performed maintenance on outfall access road. Performed weed abatement.
013 (Bravo Test Stand)	Conducted inspection of structural BMPs. Performed maintenance and conducted housekeeping activities at the sample location. Added pump and retention tanks to existing BMP. Installed retention wall at existing BMP. Completed BMP media rinse. Performed maintenance on outfall access road. Performed weed abatement.
014 (APTF Test Stand)	Conducted inspection of structural BMPs. Performed maintenance and conducted housekeeping activities at the sample location. Added retention tanks to existing BMP. Performed maintenance on outfall access road. Performed weed abatement.
018 (R-2 Spillway)	Conducted structural BMP inspections. Performed housekeeping activities at the sample location. Performed flow meter calibration check in Fourth Quarter 2010. Completed installation of electricity for stormwater treatment equipment. Installed and demobilized temporary stormwater treatment equipment, pumps, and pipelines. Performed weed abatement. Began mobilization and construction of permanent stormwater treatment system.
019 (GETS)	GETS operation is ongoing. Treated ground water hauled offsite. No discharges.

REASONABLE POTENTIAL ANALYSIS (RPA)

Outfall monitoring data were collected during the First (Outfalls 001, 002, 003, 006, 008, 009, 010, 011 and 018), Second (Outfalls 009 and 010) and Fourth (Outfalls 001, 002, 006, 008 009, 010, and 018) Quarters of 2010. Data from these quarters were added to the RPA data set, as per the MWH and Flow Science RPA procedures, for the following outfall monitoring groups: Outfalls 001, 002, 011, 018; Outfalls 003-010; and Outfalls 012-014 (MWH and Flow Science, 2006). The analytical results for 2010 did not trigger reasonable potential for any constituents not already regulated under the current NPDES Permit. Complete RPA tables for the outfall monitoring groups are provided in Section 11.

Boeing does not believe the currently used RPA procedures are appropriate for stormwater and stormwater-dominated discharges from the SSFL. The RPA procedures are outlined in the California State Implementation Plan (SIP) and EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD). It is inappropriate to use the RPA procedures for determining water quality impacts in the stormwater context because those procedures were developed for steady-state discharges. Stormwater discharges are not steady-state discharges, and during and between storms reflect highly variable flow rates and water quality COC concentrations[8].

CONCLUSIONS

Based on the reported data in 2010 and in previous years, and consistent with published studies referenced in this report, Boeing's belief is that a majority of the constituents that exceeded permit limits result from naturally occurring contributions (e.g., wildfires, native soil discharges into channels), or were detected at concentrations consistent with regional background concentrations and, therefore, were not the direct result of a known discharge or release from an industrial process or historical contamination on the site.

There is substantial evidence, including the Stormwater Expert Panel's Reports on Metals and Dioxins discussed above, showing that background conditions are significant contributors of regulated constituents. The RWQCB Staff has recognized that many chemical constituents "are naturally occurring in the environment" and that in many cases "these constituents may be naturally elevated above the [applicable] water quality objective," thereby resulting in exceedances of applicable effluent limits. For this reason, Staff has recommended that the RWQCB "consider developing" implementation provisions for water quality standards to account for background conditions[9]. Boeing agrees that continued monitoring of surface water will provide a more thorough dataset with which to evaluate further the occurrence and likely sources of regulated constituents

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[8] See Flow Science, Boeing SSFL Technical Memo for RPA Procedures (May 2006) (submitted to RWQCB May 8, 2006) available at: http://www.boeing.com/aboutus/environment/santa_susana/water_quality/tech_reports_10-11-10_ReasonablePotenAnalyMethodTechlMemo.pdf

[9] See Revised Staff Report for 2008-2010 Triennial Review (Mar. 18, 2010); available at: http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/basin_plan/BasinPlanTriennialReview/Addl_Documents2010_03_18/Revised%20Staff%20Report.pdf; see also Response to Comments on the Draft Triennial Review Staff Report and Tentative Resolution at 3-5 (Mar. 18, 2010); available at: http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/basin_plan/BasinPlanTriennialReview/Addl_Documents2010_03_18/Response%20to%20Comments%20on%20the%20Tentative%20Resolution%20and%20Staff%20Report.pdf.

However, former industrial activities at the Santa Susana site may have impacted localized areas of onsite soils and sediments that could have potentially affected surface water quality at some outfalls. Under DTSC and RWQCB supervision, mitigation actions were taken in 2010 and in previous years to manage surface water impacts potentially resulting from former industrial activities. These mitigation actions consisted of implementing an extensive system of BMPs. Boeing has installed and continues to install BMPs to minimize the potential for surface water to contact contaminated onsite soils, sediment, or bedrock, and to minimize transport of soils and/or sediment that may be impacted with constituents regulated in the Santa Susana NPDES permit.

Boeing will continue to evaluate patterns of compliance and non-compliance, potential source areas, and effectiveness of BMPs to minimize the potential for pollutants, whether naturally occurring or not, to impact surface water at Santa Susana.

FACILITY CONTACT

If there are any questions regarding this report or it enclosures, you may contact Mr. Paul Costa of Boeing at (818) 466-8778.

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.

Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for a knowing violation.

Executed on the 28th day of February 2011 at The Boeing Company, Santa Susana Field Laboratory.

Sincerely,

Thomas D. Gallacher
Director
Environment, Health and Safety

TG:bc

Figure 1 Stormwater Drainage System and Outfall Locations

Table 1 2010 Rainfall Summary

Table 2 2010 Liquid Waste Shipments
Table 3 2010 Summary of Permit Limit and Benchmark Limit Exceedances

Attachments:

Section 1 Outfall 001 South Slope below Perimeter Pond
Section 2 Outfall 002 South Slope below R-2 Pond
Section 3 Outfall 003 RMHF
Section 4 Outfall 006 FSDF-2
Section 5 Outfall 008 Happy Valley
Section 6 Outfall 009 WS-13 Drainage
Section 7 Outfall 010 Building 203
Section 8 Outfall 011 Perimeter Pond
Section 9 Outfall 018 R-2A Pond
Section 10 Receiving Water and Sediment Sample Location – Arroyo Simi (Frontier Park)
Section 11 Reasonable Potential Analysis (RPA) Summary Tables
Section 12 Stormwater Pollution Prevention Plan Annual Evaluation
Section 13 Analytical Laboratory Methods, Method Detection Limits, Reporting Limits, QA/QC Procedures, and ELAP Certifications

cc: Ms. Cassandra Owens, Regional Water Quality Control Board
Mr. Rick Brausch, Department of Toxic Substances Control
Mr. Gerard Abrams, Department of Toxic Substances Control
Mr. Robert Marshall, California State University – Northridge, Library
Mr. Gabriel Lundeen, Simi Valley Library
Ms. Lynn Light, Platt Branch, Los Angeles Library

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