The Boeing Company
Santa Susana Field Laboratory
5800 Woolsey Canyon Road
Canoga Park, CA 91304-1148

Federal Express

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In reply refer to SHEA-111152

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

Attention: Information Technology Unit

Reference: Compliance File CI-6027 and NPDES No. CA0001309

Subject: First Quarter 2011 NPDES Discharge Monitoring Report Submittal – Santa Susana Site

Dear Sir/Madam,

The Boeing Company (Boeing) hereby submits the First Quarter 2011 Discharge Monitoring Report (DMR) for the Santa Susana Field Laboratory (Santa Susana Site). In conformance with National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001309 (NPDES Permit), this report includes the field actions and results from activities related to the Santa Susana Site surface water outfalls (**Figure 1**) that occurred during the period of January 1 – March 31, 2011 (First Quarter 2011). Included are summary tables of surface water sample analytical results, rainfall summaries, liquid waste shipment summaries, and surface water sample laboratory analytical reports.

Hard copies of this DMR are available to the public at California State University at Northridge Library; Simi Valley Library; and the Platt Branch of the Los Angeles Library. An electronic version of this DMR is located at:

www.boeing.com/aboutus/environment/santa_susana/programs.html.

FIRST QUARTER 2011 DMR CONTENTS AND DISCHARGE SUMMARY

Figure 1 is a map showing the location of the regulated outfalls for the Santa Susana Site. A summary of the First Quarter 2011 measured precipitation at the Santa Susana Site is presented in **Appendix A**. All sanitary wastes from the domestic sewage treatment plants (STPs I, II, and III) were shipped off-site for disposal. These data and details of all other liquid waste shipments are summarized in **Appendix B**.

The Santa Susana Site experienced 15 daily rain events that produced greater than 0.1 inch of rainfall within a 24-hour period (see **Appendix A**). Prior to and following each rain event, stormwater outfall location field inspections were conducted to determine flow volume at each outfall for each rainfall event. In accordance with NPDES Permit requirements, First Quarter sampling was performed at specific outfalls where discharge occurred, as a result of more than 0.1 inch of rainfall in a 24-hour period. **Table 1** summarizes the First Quarter 2011 sampling record by outfall/location where flow was observed, and sample type collected per the requirements of the NPDES Permit.

Table 1. First Quarter 2011 Sampling Record -- Boeing SSFL

Date	Outfall/Location	Samples Collected (i.e., grab, composite)
1/3/2011	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
	Outfall 008 (Happy Valley)	Grab & Composite
	Outfall 009 (WS-13 Drainage)	Grab & Composite
1/6/2011	Outfall 019 (GETS)	Grab & Composite
1/7/2011	Outfall 019 (GETS)	Composite
2/16/2011	Outfall 009 (WS-13 Drainage)	Grab & Composite
2/17/2011	Outfall 018 (R-2 Pond)	Grab
2/18/2011	Outfall 018 (R-2 Pond)	Composite
2/19/2011	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
2/24/2011	Arroyo Simi Receiving Water/Sediment (RSW-002)	Grab
	Outfall 019 (GETS)	Grab
2/25/2011	Outfall 002 (South Slope below R-2 Pond)	Grab
	Outfall 009 (WS-13 Drainage)	Grab & Composite
	Outfall 019 (GETS)	Composite
2/26/2011	Outfall 002 (South Slope below R-2 Pond)	Composite
	Outfall 008 (Happy Valley)	Grab & Composite
	Outfall 010 (Building 203)	Grab & Composite
	Outfall 018 (R-2 Pond)	Grab & Composite
2/27/2011	Outfall 018 (R-2 Pond)	Composite
3/3/2011	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
	Outfall 009 (WS-13 Drainage)	Grab & Composite
3/7/2011	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
	Outfall 009 (WS-13 Drainage)	Grab & Composite
3/9/2011	Arroyo Simi Receiving Water (RSW-002)	Grab
3/14/2011	Arroyo Simi Receiving Water (RSW-002)	Grab
3/19/2011	Arroyo Simi Receiving Water (RSW-002)	Grab

3/20/2011	Outfall 001 (South Slope below Perimeter Pond)	Composite
	Outfall 002 (South Slope below R-2 Pond)	Grab & Composite
	Outfall 006 (FSDF-2)	Composite
	Outfall 008 (Happy Valley)	Grab
	Outfall 009 (WS-13 Drainage)	Grab & Composite
	Outfall 011 (Perimeter Pond)	Composite
	Outfall 018 (R-2 Pond)	Grab & Composite
3/21/2011	Outfall 001 (South Slope below Perimeter Pond)	Grab
	Outfall 006 (FSDF-2)	Grab
	Outfall 008 (Happy Valley)	Composite
	Outfall 010 (Building 203)	Grab & Composite
	Outfall 011 (Perimeter Pond)	Grab
3/24/2011	Outfall 001 (South Slope below Perimeter Pond)*	Grab
	Arroyo Simi Receiving Water (RSW-002)	Grab
3/25/2011	Outfall 009 (WS-13 Drainage)	Grab
3/29/2011	Outfall 001 (South Slope below Perimeter Pond)*	Grab
	Arroyo Simi Receiving Water (RSW-002)	Grab
3/30/2011	Outfall 009 (WS-13 Drainage)	Grab

* Receiving water requirements for RSW-001 were satisfied at Outfall 001.

Collected samples were submitted to and analyzed by a California-certified analytical laboratory per the NPDES Permit requirements. Analytical results from these First Quarter 2011 surface water samples are presented in tabular form by outfall location, constituents evaluated (analytes), sample dates, and data validation qualifiers in **Appendices C** and **D**.

A summary table of NPDES Permit effluent limit exceedances and/or benchmark limits based on the surface water analytical data is provided in **Appendix E**. In addition, the results of a reasonable potential analysis (RPA) utilizing updated monitoring data are provided in **Appendix F**. **Appendix G** contains copies of the laboratory analytical reports, chains of custody, and data validation reports.

Included in **Appendices C** through **F** are a compilation of notes, abbreviations, and data validation codes that are used in the analytical data summary tables.

FIRST QUARTER 2011 SITE-WIDE STORM WATER POLLUTION PREVENTION PLAN (SWPPP)/BEST MANAGEMENT PRACTICES (BMP) ACTIVITIES

Boeing continued to implement the site-wide Storm Water Pollution Prevention Plan (SWPPP) throughout First Quarter 2011. Specifically, Boeing:

- Conducted monthly inspections as required by the site-wide SWPPP to identify and mitigate any on-site conditions identified that may affect the quality of stormwater runoff from the Santa Susana Site.
- Continued implementation of the removal of structural features, concrete foundations, metal, and other debris from the Santa Susana Site.
- Conducted weekly, pre and post rain inspections and inspections every 24 hours during extended periods of rainfall according to requirements in the individual construction SWPPPs for specific projects.
- Conducted BMP maintenance in response to the weekly, monthly, pre- and post storm inspections conducted at the site.

Boeing also continued to implement Interim Source Removal Action (ISRA) related activities at Outfalls 008 and 009 and performed Northern Drainage cleanup activities and BMP upgrades. These activities are discussed more fully below, and summarized in **Table 2**.

Site-Wide Planting of Native Vegetation

As recommended by the Stormwater Expert Panel, Boeing continued to reintroduce native vegetative species along the Northern Drainage (Outfall 009 watershed) area during the First Quarter 2011 that included an additional 989 plants. Repopulated species include Mulefat, Elderberry, Creeping Wild Rye, Mugwort and Coyote Brush.

Outfall 008/009 ISRA and BMP Plan Related Activities

Pursuant to the December 3, 2008 Section 13304 Order issued by the Los Angeles Regional Water Quality Control Board (Regional Board), Boeing has been proceeding with Interim Source Removal Action (ISRA) activities in the Outfall 008 and 009 watersheds to address constituents that have exceeded NPDES Permit limits/benchmarks..

During the First Quarter 2011, Boeing:

- Presented confirmation soil sampling results from ISRA area B1-2 to RWQCB, and received RWQCB concurrence that excavations are complete;
- Completed 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;

- Installed temporary sediment control BMP (retention pond and discharge pipeline) at ISRA area B1-2 to collect, retain, and safely discharge stormwater runoff to a culvert that discharges to the Northern Drainage;
- Conducted a site tour for the public to review 2010 ISRA areas and review Outfall 008 and 009 BMP Plan implementation and progress. The Expert Panel led a presentation and site walk of Happy Valley, the Lower Parking Lot, and AP/STP;
- Collected performance monitoring and BMP subarea surface water samples during rain events in the First Quarter 2011;
- Conducted weekly SWPPP inspections during the rainy season.

Boeing continues to conduct weekly status meetings, and submit monthly and quarterly progress reports to RWQCB Staff on the progress of the ISRA activities[1].

Northern Drainage Activities

Boeing has actively worked to restore the Northern Drainage following clean-up activities performed under the oversight of the Department of Toxic Substances Control (DTSC) in accordance with the requirements of Regional Board Cleanup and Abatement Order (CAO) No. R4-2007-0054. Specifically, Boeing:

- Performed weekly inspection of native plants installed along the Northern Drainage by a biologist to observe the condition of new plants;
- Conducted culvert maintenance activities;
- 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.

Boeing continues to submit monthly progress reports to Regional Board Staff on the progress of Northern Drainage activities.

Outfalls 011 and 018 Treatment Systems

Based upon the results of the Outfall 011 and 018 temporary stormwater treatment system (TSTSs) testing completed in the previous storm season, Boeing is currently constructing permanent chemical treatment systems at these two locations for operation during future rainfall events.

[1] Available at http://www.boeing.com/aboutus/environment/santa_susana/isra.html

Construction activities for the final Outfall 011 and Outfall 018 stormwater treatment systems (STSs) configurations were performed during the First Quarter 2011. These activities included the following:

- Installed oxidation contact tanks, solids weir tank, mixer tank, supernatant tank, and solids holding tank at Oufall 018.
- Installed treatment pumps at Outfall 011 and Outfall 018.
- Installed supports for pumps and tanks at Outfall 011 and Outfall 018.
- Construction of plate settler at Outfall 018.
- Installation of electrical wiring and power for ACTIFLO system, miscellaneous STS components at both Outfall 011 and Outfall 018.
- Installation of sand filters at Outfall 011.
- Continued installation of main piping and valves between equipment at Outfall 011 and Outfall 018; continued pipe labeling.
- Continued installation of piping and valves to connect R-2A Pond, Silvernale Pond, and their Outfall 018 discharge location.
- Continued pouring concrete foundations for pumps, tanks, and electrical panels at Outfall 011 and Outfall 018.
- Poured concrete for anchor rods for treatment system components at Outfall 011.
- Tested ACTIFLO system and pumps at Outfall 018.

It is anticipated that the STSs will be completed in the Second Quarter 2011, with additional modification or optimization to be completed on the STSs throughout the dry season. While this system is currently under construction, storm water control measures in place to meet water quality objectives include existing flow through media beds.

The following is a summary of the specific BMP activities by outfall location that were conducted during the first quarter.

Table 2: Boeing's BMP Activities during the First Quarter 2011

OUTFALL (Location)	BMP ACTIVITIES DURING FIRST QUARTER 2011
001 (South Slope below Perimeter Pond)	Inspected sediment and erosion control BMPs, performed maintenance on the flume and conducted housekeeping activities at the sample location.
002 (South Slope below R-2 Pond)	Inspected sediment and erosion control BMPs, performed maintenance on the flume and conducted housekeeping activities at the sample location.
003 (RMHF)	Conducted structural BMP and stormwater filter system inspections. Completed electrical installation for conveyance

OUTFALL (Location)	BMP ACTIVITIES DURING FIRST QUARTER 2011
	system to move stormwater to consolidated location. Performed maintenance on flume and conducted housekeeping activities at the sample location.
004 (SRE)	Conducted structural BMP and stormwater filter system inspections. Completed electrical installation for conveyance system to move stormwater to consolidated location. Additional tanks were added for retention. Performed maintenance on flume and conducted housekeeping activities at the sample location.
005 (FSDF-1)	Conducted sedimentation basin inspections. Conducted housekeeping activities at the sample location. Completed electrical installation for conveyance system to move stormwater to consolidated location. Additional tanks were added for retention. .
006 (FSDF-2)	Conducted structural BMP and stormwater filter system inspections. Completed electrical installation for conveyance system to move stormwater to consolidated location. Additional tanks were added for retention. Performed maintenance on flume and conducted housekeeping activities at the sample location.
007 (Building 100)	Conducted BMP, sedimentation basin. Conducted housekeeping activities at the outfall and sample location. Completed electrical installation for conveyance system to move stormwater to consolidated location. Additional tanks were added for retention.
008 (Happy Valley)	Inspected and maintained sediment and erosion control BMPs. Performed maintenance on the flume, and conducted housekeeping activities at the sample location.
009 (WS-13 Drainage)	Inspected sediment and erosion control BMPs. Conducted ISRA work, including restoration and erosion control activities, such as planting native plants for erosion control. Irrigation was performed of the native plants that were installed. Performed maintenance on the flume and conducted housekeeping activities at the sample location.
010 (Building 203)	Conducted structural BMP and stormwater filter system inspections. Performed maintenance on flume and conducted housekeeping activities at the sample location. Completed improved retention to move stormwater to a consolidated location. Additional tanks were added for retention.

OUTFALL (Location)	BMP ACTIVITIES DURING FIRST QUARTER 2011
011 (Perimeter Pond)	Conducted BMP and drainage system inspections. Performed maintenance and conducted housekeeping at the sample location. Performed weed abatement.
012 (ALFA Test Stand)	Conducted inspection of structural BMPs. Performed maintenance and conducted housekeeping activities at the sample location. Completed electrical installation for conveyance system to move stormwater to consolidated location. Additional tanks were added for retention.
013 (BRAVO Test Stand)	Conducted inspection of structural BMPs. Performed maintenance and conducted housekeeping activities at the sample location. Completed electrical installation for conveyance system to move stormwater to consolidated location. Additional tanks were added for retention.
014 (APTF Test Stand)	Conducted inspection of structural BMPs. Performed maintenance and conducted housekeeping activities at the sample location.
018 (R-2 Spillway)	Conducted structural BMP inspections. Performed maintenance and conducted housekeeping activities at the sample location.
019 (GETS)	Groundwater Extraction Treatment System (GETS) operation is operational. Treated ground water is discharged below the Outfall 001 location.

SUMMARY OF NONCOMPLIANCE

The following summary of noncompliance results for First Quarter 2011 monitoring results is organized by outfall location. As indicated in the Permit, only exceedances of a permit limit or benchmark limits are discussed in this DMR. Those constituents that are detected but do not have a permit limit or benchmark limit are not included.

Boeing is committed to fulfilling the requirements of the NPDES permit and continues to take actions to reduce the regulated constituents. The actions taken at each outfall where exceedances were noted are detailed below.

Outfall 001

The following is a summary of exceedances of benchmark limits at Outfall 001 (South Slope below Perimeter Pond). The benchmark limit exceedances are further detailed in **Appendix E**.

Dioxins and Furans: TCDD Toxic Equivalent Quotient (TEQ)

TCDD TEQ in stormwater samples from Outfall 001 exceeded the TCDD TEQ daily permit limit on March 20 - 21, 2011. The measured concentration for the sample collected on March 20 - 21, 2011 is 3.27×10^{-8} µg/L. The value slightly exceeds the permit limit daily maximum of 2.8×10^{-8} µg/L.

TCDD congeners have been frequently detected in DTSC-approved, non-impacted background soils at the SSFL (MWH, 2005). In some areas, 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.

Additionally, the Stormwater Expert Panel's *SSFL Stormwater Dioxin Background Report*[2] 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 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.

Metals

Iron and manganese were detected in excess of their respective benchmark daily limits at Outfall 001 in the sample that was collected on March 20 - 21, 2011, as indicated in **Appendix E**. Iron was detected at 5.7 mg/L for the sample collected on March 20 – 21, 2011. This is in excess of the benchmark daily limit of 0.3 mg/L for iron. Manganese was found in the same sample, collected March 20 – 21, 2011 at a concentration of 81 µg/L. This value exceeds the benchmark limit daily maximum concentration of 50 µg/L.

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[1] It remains Boeing's position that it is not appropriate to calculate the monthly average concentration based on a single sample taken, and that the requirement to calculate a monthly average concentration for comparison with a monthly average limit should only apply when there has been more than one sample collected during the month.

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

The Stormwater Expert Panel study, *SSFL Metals Background Report: Sources of Metals in SSFL Watersheds*[3] 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 dioxin and metals concentrations in stormwater runoff from the Santa Susana site are associated with total suspended solids (TSS) consisting of native sediments and soils. TSS loading will vary based on rainfall intensity, duration, and erosion characteristics. The high rainfall intensity that occurred during the First Quarter 2011, and specifically during March, likely caused the elevated metal and dioxin concentrations observed and are thus likely predominately due to the erosion of native soils and ash, and their subsequent migration into stormwater.

BMPs upstream of Outfall 001 are designed to assist in controlling sediment transport into the surface water. Actions taken during the First Quarter 2011 at Outfall 001 to reduce discharges of regulated constituents, including TCDD and metals, are described in the sections above of this report addressing **Site-Wide Planting of Native Vegetation** and in **Table 2**. These actions are primarily focused on stabilization of streambed channel banks to reduce sediment erosion through the planning 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.

Outfall 002

The following is a summary of benchmark limit exceedances at Outfall 002 (South Slope below R-2 Pond). The benchmark limit exceedances are further detailed in **Appendix E.**

Dioxins and Furans: TCDD Toxic Equivalent Quotient (TEQ)

TCDD TEQ in stormwater samples from Outfall 002 exceeded the TCDD TEQ daily permit limit on March 20, 2011. The measured concentration for the sample

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

collected on March 20, 2011 is $4.98x10^{-8}$ µg/L. The value exceeds the permit limit daily maximum of $2.8x10^{-8}$ µg/L.

As described above for Outfall 001, TCDD congeners have been frequently detected in DTSC-approved, non-impacted background soils at the SSFL (MWH, 2005). The presence of TCDD in both background soils and fire-related materials is well documented in the scientific literature (USEPA, 2000), and substantiated by on- and offsite studies (MWH, 2005; Flow Science, 2006). These reports suggest that the levels of TCDD TEQ measured in surface water at the SSFL could originate from wildfire regional and atmospheric deposition, and other naturally occurring sources over which Boeing has no reasonable control.

The dioxin background report completed by the Stormwater Expert Panel[4], 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 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.

Metals

Iron was detected in excess of its benchmark limit daily maximum at Outfall 002 in the sample that was collected on February 19, 2011, as indicated in **Appendix E**. Iron was detected at 0.97 mg/L in the sample collected on February 19, 2011. This is in excess of the benchmark limit daily maximum of 0.3 mg/L for iron.

Iron was detected in excess of its benchmark limit daily maximum at Outfall 002 in the sample that was collected on February 25 - 26, 2011, as indicated in **Appendix E**. Iron was detected at 0.49 mg/L in the sample collected on February 25-26, 2011. This is in excess of the benchmark limit daily maximum of 0.3 mg/L for iron.

Iron was detected in excess of its benchmark limit daily maximum at Outfall 002 in the sample that was collected on March 20, 2011, as indicated in **Appendix E**. Iron was detected at 5.4 mg/L in the sample collected on March 20, 2011. This is in excess of the benchmark limit daily maximum of 0.3 mg/L for iron. Additionally, Iron exceeded the mass-based benchmark limit of 400 lbs/day for March 20, 2011. The reported mass calculation is 468.23 lbs/day for March 20, 2011.

As discussed for Outfall 001, Boeing believes the dioxin and metals concentrations in stormwater runoff are associated with the high rainfall intensity that occurred during the First Quarter therefore causing erosion and elevated concentrations of

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

TSS consisting of native sediments and soils. TSS loading will vary based on rainfall intensity, duration, and erosion characteristics. As with Outfall 001, BMPs upstream of Outfall 002 are designed to assist in controlling sediment transport into the surface water, and the actions taken to minimize the occurrence of any future benchmark exceedances are described above for Outfall 001.

Outfall 009

The following is a summary of exceedances of permit limits at Outfall 009 (WS-13 Drainage). The permit limit exceedances are further detailed in **Appendix E**.

Dioxins and Furans: TCDD Toxic Equivalent Quotient (TEQ)

TCDD TEQ in stormwater samples from Outfall 009 exceeded the TCDD TEQ daily permit limit on March 20, 2011. The measured concentration for the sample collected on March 20, 2011 is 8.26×10^{-8} µg/L. The value exceeds the permit limit daily maximum of 2.8×10^{-8} µg/L. Additionally, TCDD TEQ exceeded the mass-based permit limit of 4.20×10^{-9} µg/L for March 20, 2011. The reported mass calculation is 8.02×10^{-9} for March 20, 2011.

As described above for Outfalls 001 and 002, 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 on- and offsite studies (MWH, 2005; 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 dioxin background report completed by the Stormwater Expert Panel[5], 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 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.

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

Boeing believes the dioxin concentrations in stormwater runoff are associated with the high rainfall intensity that occurred during the First Quarter therefore causing erosion and elevated concentrations of TSS consisting of native sediments and soils. TSS loading will vary based on rainfall intensity, duration, and erosion characteristics. Actions taken during the First Quarter 2011 to control sediment transport and minimize the occurrence of any future permit exceedances are 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 2**.

Outfall 011

The following is a summary of exceedances of permit limits at Outfall 011 (Perimeter Pond). The permit limit exceedances are further detailed in **Appendix E**.

Metals

Iron and manganese were detected in excess of their respective permit daily limits at Outfall 011 in the sample that was collected on March 20 – 21, 2011, as indicated in **Appendix E**. Iron was detected at 3.6 mg/L on March 20 – 21, 2011. This is in excess of the permit limit daily maximum for iron of 0.3 mg/L. Manganese was found in the same sample, collected March 20 – 21, 2011, at a concentration of 55 µg/L. This value exceeds the permit limit daily maximum concentration of 50 µg/L.

As discussed above for Outfalls 001, 002, 008 and 009, Boeing believes the metals concentrations in stormwater runoff from the SSFL are associated with the high rainfall intensity that occurred during the First Quarter therefore causing erosion and elevated concentrations of TSS consisting of native sediments and soils, and that TSS and metals loading will vary based on rainfall intensity, duration, and erosion characteristics.

A permanent Stormwater Treatment System (STS) at Outfall 011, located adjacent to R-1 Pond, for stormwater discharges is currently completing construction. This system will replace the temporary system that has been used in previous seasons and will supplement the flow through system at this location. During this transition period, stormwater discharges were regulated through the existing structural BMP at Perimeter Pond The heavy rainfall intensity during March severely taxed the existing system. It is expected that once the additional treatment system is on line that these peak flow will be consistently addressed. Additional BMP and SWPPP related actions at Outfall 011 are further described in T**able 2**.

Outfall 018

The following is a summary of exceedances of permit limits at Outfall 018 (R-2 Spillway). The permit limit exceedances are further detailed in **Appendix E**.

Metals

Iron was detected in excess of its permit daily limit at Outfall 018 in the sample that was collected on February 26 - 27, 2011, as indicated in **Appendix E**. Iron was detected at 0.74 mg/L in the sample collected on February 26 - 27, 2011. This is in excess of the permit daily limit for iron of 0.3 mg/L.

Iron was detected in excess of its permit daily limit at Outfall 018 in the sample that was collected on March 20, 2011, as indicated in **Appendix E**. Iron was detected at 1.1 mg/L in the sample collected on March 20, 2011. This is in excess of the permit daily limit for iron of 0.3 mg/L.

As discussed above for Outfalls 001, 002, 008, 009, and 011, Boeing believes the metals concentrations in stormwater runoff from the SSFL are associated with the high rainfall intensity that occurred during the First Quarter therefore causing erosion and elevated concentrations of TSS consisting of native sediments and soils, and that TSS and metals loading will vary based on rainfall intensity, duration, and erosion characteristics.

Boeing has investigated and continues to investigate potential sources of constituents coming from areas of historical Site industrial activity with coordination from the DTSC. Boeing continues to investigate erosion sources and erosion control measures at the Outfall 018 watershed, and will improve the treatment system processes, 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 Stormwater Treatment System (STS) at Outfall 018, located adjacent to the Silvernale pond. This system will replace the temporary system that has been used in previous seasons and will supplement the flow through system in place at this location.. During this transition period, stormwater discharges were regulated through the existing structural BMP within the R-2 Pond spillway and flow was controlled to prevent over topping; however, due to heavy rainfall intensity during March the system was severely taxed. The permanent STS is expected to address these peak flows in the future. Additional BMP and SWPPP related actions at Outfall 018 are further described in **Table 2**.

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 Regional Board 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 Regional Board "consider developing" implementation provisions for water quality standards to account for background conditions[6]. 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.

Arroyo Simi Receiving Water Sample Location – Frontier Park

The following is a summary of exceedances of permit limits at Arroyo Simi Receiving Water Location – Frontier Park. The permit limit exceedances are further detailed in **Appendix E**.

Bacteria

Monitoring requirements for bacteria were added to the Santa Susana NPDES Permit on June 3, 2010 in anticipation of the adoption in July 2010 of the Los Angeles River Watershed Total Maximum Daily Load (TMDL). In explaining why these requirements were added, the Board stated:

> "One of the [Basin Plan water quality] objectives [for Inland Surface Waters] included is bacteria, coliform. Since the water quality objective was not included in the current Order, the tentative permit includes a requirement to monitor for E. coli and for fecal coliform. The water quality objective is applicable to the Los Angeles River and Arroyo Las Posas which both have fresh water contact recreational beneficial uses. Consequently, the Discharger is required to monitor for the concentration of the constituents."

Response to Comments, The Boeing Company Santa Susana Field Laboratory Tentative Order No. R4-2-1—00XX, NPDES Permit No. CA0001309, CI No. 6027, at 14-15.

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[6] 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.

Escherichia Coli (E. Coli) was detected at 300 MPN/100mL, above the single sample maximum receiving water limit of 235 MPN/100mL) at Arroyo Simi – Frontier Park in the sample that was collected on February 24, 2011, as indicated in **Appendix E.**

E. Coli and Fecal Coliform were detected above the receiving water limits at Arroyo Simi – Frontier Park in the samples that were collected on March 19, 2011 and March 24, 2011, as indicated in **Appendix E.** E. Coli was detected at ≥1,600 MPN/100mL, above the permit daily limit for E. coli of 235 MPN/100mL. Fecal Coliform was detected at ≥1,600 MPN/100mL in samples collected on March 19, 2011 and March 24, 2011, above the permit limit for Fecal Coliform of 400 MPN/100mL.

The geometric mean for E. coli in March 2011 was calculated at 246 MPN/100mL, which is above the single sample maximum receiving water limits for E. coli of 126. The geometric mean for Fecal Coliform in March 2011 was calculated at 283 MPN/100mL and is above the single sample maximum receiving water limits for Fecal Coliform of 200 MPN/100mL and as indicated in **Appendix E.** [7]

Boeing collects all sanitary waste generated at the Santa Susana site and transports it to an offsite POTW for treatment and disposal. With the exception of the treated groundwater that is managed in a closed system until it is discharged, the permitted discharges consist entirely of stormwater. Thus, there is no indication that any human waste can be exposed to or enter any stormwater discharges from Santa Susana, and any bacteria detected in waters receiving stormwater discharges from the site, such as the Arroyo Simi, therefore must have originated from non- human, natural sources.

To confirm that bacteria present in the Arroyo Simi were not of human origin, Boeing collected a sample from the Arroyo Simi-Frontier Park location on March 24, 2011 and analyzed it for human-specific Bacteroides. The laboratory results indicate that "the total Bacteroides detected in the samples was not derived from human [sources]. It must be derived from other animal sources." See **Appendix G.**

Studies have shown that non-human sources, such as birds and wildlife, contribute to bacteria in stormwater runoff.[8] Fecal coliform bacteria can enter rivers through

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[7] In a separate letter to Regional Board Staff dated May 13, 2011, Boeing summarized the actions it is taking to satisfy the bacteria monitoring requirements established the Santa Susana NPDES Permit.

[8] See, e.g., CREST (Nov 2008), LA River bacteria source indentification study: Final Report, available at http://www.crestmdl.org/studies/BSI%20STUDY%20REPORT.pdf; Grant, et al, (2001), "Generation of Enterococci Bateria in a Costa Saltwater Marsh and Its Impact on Surf Zone Water Quality," Environ.Sci. Technol. 35(12):2407-2416; Griffin et al. (2001), "Marine Recreation and Public Health Microbiology: Quest for the Ideal Indicator," BioScience 51(10): 817-826; Tiefenthaler et al (2008), "Fecal indicator bacteria (FIB) levels during dry weather from Southern California reference streams," Environmental Monitoring and Assessment 155(1-4): 477-492.

direct discharge of waste from mammals and birds. Pets, especially dogs, can also contribute to fecal contamination of surface waters. Runoff from roads, parking lots, and yards can carry animal wastes to streams through storm sewers. Birds can be a significant source of fecal coliform bacteria. Wildlife present in the area include a variety of bird species; and small and large mammals such as ground squirrels, mice, bobcats, mountain lions, horses, dogs, all of which are sources of fecal coliform bacteria. Both fecal coliform and E. coli from a wide range of sources can be washed into, streams, rivers and creeks, during rainfall events.

Coliforms include genera that originate in feces (e.g. Escherichia) as well as genera not of fecal origin (e.g. Enterobacter, Klebsiella, Citrobacter). The assay is intended to be an indicator of fecal contamination; more specifically of E. coli which is an indicator of microorganism for other pathogens that may not be present in feces. Presence of fecal coliforms in water may not be directly harmful, and does not necessarily indicate the presence of feces (Doyle, M.P., and M.C. Erickson. 2006).

In adopting the Los Angeles River Watershed Bacteria Total Maximum Daily Load (TMDL), the Regional Board has recognized that "there are natural sources of bacteria that may cause or contribute to exceedances of the single sample objectives and that it is not the intent of the Regional Board to require treatment or diversion of natural coastal creeks or to require treatment of natural sources of bacteria from undeveloped areas."[9] Given the Regional Board's expressed acknowledgment of such sources of bacteria such as the abundant and varied wildlife present throughout the Santa Susana site, Boeing will continue to monitor both E. Coli and human-specific Bacteroides in all samples collected for bacterial analysis at Frontier Park (as well as for fecal coliform, as required by the permit) to continue to verify that indicator bacteria at this sampling location are from animals and not human sources.

[9] Resolution No. R10-007, July 9, 2010, Amendment to the Water Quality Control Plan for the Los Angeles Region to Incorporate a Total Maximum Daily Load for Indicator Bacteria in the Los Angeles River Watershed, Attachment A at 2-3.

REASONABLE POTENTIAL ANALYSIS (RPA)

Outfall monitoring data were collected during the First Quarter 2011 for Outfalls 001, 002, 006, 008, 009, 010, 011, 018, and the Arroyo Simi Receiving Water sample point. Data from this quarter were added to the RPA dataset as per the MWH and Flow Science RPA procedures for the outfall monitoring group, Outfalls 001, 002, 011, 018 and 003-010) (MWH and Flow Science, 2006). The analytical results for this sampling period did not trigger reasonable potential for Zinc at Outfall 010 on February 26, 2011, as detailed below. Additionally, RPA analyses were performed for E.Coli at Outfall 009 for samples collected on February 16 and March 20, 2011; these analyses are discussed below and also did not trigger reasonable potential. RPA was not triggered for any other constituent not already regulated under the current NPDES Permit. Complete RPA tables for the outfall monitoring group are provided in **Appendix F**.

Boeing notes that the water quality objectives for indicator bacteria were updated by the Regional Board on July 8, 2010 (see Resolution No. 2010-005). This update eliminated water quality objectives for fecal coliform and added water quality objectives for E. Coli. In response to this change to objectives, RPA was not conducted for Fecal Coliform.

E. Coli

As noted above, Boeing collects all sanitary waste generated at the Santa Susana site and transports it to an offsite POTW for treatment and disposal. The discharge at Outfall 009 consists entirely of stormwater, As described above, Boeing has been working to improve the quality of the stormwater discharges at Outfall 009 through methods designed to preserve the natural conditions in the watershed to the maximum extent feasible by implementing erosion control/restoration measures such as the planting and maintenance of native plants and the application of hydroseed mulch, as well as through continuing with planned ISRA activities. Thus, there is no indication that any human waste can be exposed to or enter any stormwater discharges from Santa Susana, and any bacteria detected at Outfall 009 therefore must have originated from non- human, natural sources.

To confirm that bacteria present in the samples collected at Outfall 009 were not of human origin, Boeing collected a sample from this location on March 20, 2011 that was analyzed for human-specific Bacteroides. Laboratory results indicated that "the total Bacteroides detected in the samples was not derived from human [sources]. It must be derived from other animal sources." See **Appendix G**.

As noted above, a number of studies have shown that non-human sources, such as birds and wildlife, contribute to bacteria in stormwater runoff as a result of washoff of fecal matter. Notably, data collected by Los Angeles County demonstrate that stormwater runoff from a variety of land use types, including vacant lands and open spaces such as Santa Susana, exhibit concentrations of indicator bacteria that exceed water quality objectives.[10] Santa Susana is home to abundant and varied wildlife, for whom stormwater flowing into the Northern Drainage that discharges through Outfall 009 is part of their natural habitat. The data has shown that this wildlife is the likely source of the indicator bacteria detected at Outfall 009, where stormwater discharges leave the site with no opportunity for exposure to human sources of bacteria.

Given that the Regional Board has recognized in the Los Angeles River Watershed Bacteria TMDL—the basis for the inclusion of the bacterial monitoring requirements in Boeing's NPDES Permit-- that there are natural sources of bacteria in undeveloped areas such as Santa Susana, and that the TMDL is not intended to require treatment of such sources, Boeing does not believe that reasonable potential has been demonstrated for bacteria at Outfall 009. Boeing will continue to monitor both E. Coli and human-specific Bacteroides in all samples collected for bacterial analysis at this and other outfalls (as well as for fecal coliform, as required by the permit) in order to continue to confirm that any indicator bacteria detected at the outfalls are from animals and not human sources.

Zinc

The sample collected at Outfall 010 on February 26, 2011 was observed to have a total zinc concentration of 161 ug/L, a dissolved zinc concentration of 70.5 ug/L, and a hardness of 86 mg/L. Boeing has evaluated reasonable potential for zinc using the provisions of the California Toxics Rule (CTR). The CTR specifies that, for a hardness of 86 mg/L, the acute water quality criterion for dissolved zinc is 105.3 ug/L.[11] The sample dissolved zinc concentration of 70.5 ug/L is below the CTR criterion for zinc, and the sample does not trigger a finding of reasonable potential.[12]

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[10] Los Angeles County Department of Public Works, Los Angeles Count 1994-2000 Integrated Receiving Water Impacts Report, available at http://dpw.lacountygov/wmd/NPDES/Int_report/Tables/Table_4-12pdf.

[11] Note that the dissolved fraction of a metal is the toxicologically relevant bioavailable fraction, and the CTR criteria are thus provided in terms of the dissolved fraction of the metal. "Freshwater and saltwater criteria for metals are expressed in terms of the dissolved fraction of the metal in the water column." Federal Register, Vol. 65, No. 97, Thursday, May 18, 2000 (CTR), at footnote m on p. 31716. The criterion for zinc for a hardness of 86 mg/L was calculated using the equations provided at p. 31717 of the CTR.

[12] Alternatively, the CTR criterion for dissolved zinc can be converted to a criterion value for total zinc using the sample-specific conversion factor (CF), which describes the fraction of total zinc that is present in the dissolved phase. The CF for this sample is (70.5/161) = 44%, which results in a CTR

Boeing does not believe the currently used RPA procedures are appropriate for storm water and storm water-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, but rather exhibit highly variable flow rates and water quality COC concentrations during and between storms.[13]

DATA VALIDATION AND QUALITY CONTROL DISCUSSION

In accordance with current EPA guidelines and procedures, or as specified in the NPDES Monitoring and Reporting Program, chemical analyses of surface water discharge and receiving water samples were completed at a State of California-certified laboratory. Data validation was performed on the analytical results and quality control elements were found to be within acceptable limits for the analytical methods reported, except as noted on the analytical summary tables. As noted above, measures were implemented by the analytical laboratory to monitor and/or evaluate its low level detections, to analyze for interferences and to ensure that cross contamination does not occur in the future. Laboratory analytical reports, including validation reports and notes, are included in **Appendix D**. Attachment T-A of the NPDES Permit issued to the SSFL presents the State of California Water Resources Control Board (SWRCB or "State Board") minimum levels (MLs) for use in reporting and determining compliance with NPDES Permit limits.

The analytical laboratory achieved these MLs for this reporting period when technically possible. When elevated laboratory reporting limits (RLs) were noted, the laboratory maximum detectable limits (MDLs) remained below the State of California MLs. However, some constituents' daily MDLs in the NPDES Permit are less than their respective MLs, and less than the RL. In cases where the NPDES Permit limit is less than the RL and ML, the RL was used to determine compliance. The specific constituents that have NPDES Permit limits that are less than the RL and ML are: mercury, bis(2-ethylhexyl)phthalate, cyanide, polychlorinated

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criterion for total copper of 251 ug/L. Thus, the total zinc concentration of the sample (161 ug/L) is below the CTR criterion for total zinc.

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

biphenyls (PCBs) (Aroclor congeners), chlordane, DDD, DDE, DDT, dieldrin, toxaphene, and chlorpyrifos. These compounds were either not a required analyte or below the RL in all of the surface water/receiving water samples collected during First Quarter 2011.

FACILITY CONTACT

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

CERTIFICATION

I certify under penalty of law that this document and all appendices 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 13th of May 2011, at The Boeing Company, Santa Susana Site.

Sincerely,

Tom Gallacher
Director
Santa Susana Field Laboratory
Environment, Health and Safety

LB:bjc

Figure: 1 Storm Water Drainage System and Outfall Locations

Appendices: A First Quarter 2011 Rainfall Data Summary

B First Quarter 2011 Liquid Waste Shipment Summary Tables
C First Quarter 2011 Summary Tables, Discharge Monitoring Data
D First Quarter 2011 Radiological Monitoring Data
E First Quarter 2011 Summary of Permit Limit Exceedances
F First Quarter 2011 Reasonable Potential Analysis (RPA) Summary Tables
G First Quarter 2011 Analytical Laboratory Reports, Chain-of-Custody, and Validation Reports

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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