

Via Federal Express

February 13, 2009  
In reply refer to SHEA-108287

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: Fourth Quarter 2008 NPDES Discharge Monitoring Report Submittal  
Santa Susana Field Laboratory

Dear Sir/Madam,

The Boeing Company (Boeing) hereby submits the Discharge Monitoring Report (DMR) for the Santa Susana Field Laboratory (SSFL) for the Fourth Quarter of 2008. This DMR provides the results of the sampling that occurred for the SSFL outfalls (Figure 1) for the period of October 1st through December 31st of 2008 as required by National Pollutant Discharge Elimination System (NPDES) Permit No. CA0001309 (NPDES Permit).

This quarterly DMR provides information and data, including summary tables of surface water sample analytical results, rainfall summaries, liquid waste shipment summaries, and surface water sample laboratory analytical reports. The DMR is provided for the SSFL outfalls authorized by the NPDES Permit. This document will be made available electronically at:

[www.boeing.com/aboutus/environment/santa\\_susana/programs.html](http://www.boeing.com/aboutus/environment/santa_susana/programs.html).

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

#### **FOURTH QUARTER 2008 DISCHARGE MONITORING REPORT (DMR) CONTENTS AND DISCHARGE SUMMARY**

Figure 1 is a site location map indicating the locations of the outfalls at SSFL. A summary of the Fourth Quarter 2008 precipitation measured at SSFL is presented in Appendix A. All sanitary wastes from the domestic sewage treatment plants (STPs)



(STPs I, II, and III) were shipped off-site and appropriately managed with no discharges occurring from these outfalls. Details of all liquid waste shipments including the STP waste are summarized in Appendix B.

As detailed in Appendix A, Boeing observed seven rain events with greater than 0.1 inches of rainfall in a 24-hour period. These rainfall events occurred on November 1, November 25, November 26, December 15-17, December 22, and December 25, 2008. Due to a scheduled power outage at the facility, no rainfall depth measurements were recorded November 3-4, but a backup station located at SSFL observed 0.18 inches of rainfall during that time.

Field inspections are conducted at the storm water outfall locations prior to and following each rain event. For storm events that occur after working hours, a field check and/or sampling is conducted at the first available opportunity when it is safe to access the outfall. The following table provides a summary of the Fourth Quarter 2008 sampling record (Table 1), by outfall/location per the requirements of the NPDES Permit.

Table 1. Fourth Quarter 2008 Sampling Record -- Boeing SSFL

<b>Date</b>	<b>Outfall/Location</b>
11/4/2008	Outfall 014 (APTF)
11/20/2008	Arroyo Simi Receiving Water/Sediment Sampling (Frontier Park - City of Simi Valley)
11/26/2008	Outfall 006 (FSDF-2)
	Outfall 009 (WS-13 Drainage)
	Outfall 010 (Building 203)
12/15/2008	Outfall 004 (SRE)
	Outfall 006 (FSDF-2)
	Outfall 009 (WS-13 Drainage)
	Outfall 010 (Building 203)
	Outfall 013 (Bravo Test Stand)

No flow was observed at any of the outfalls during the November 1, November 25, December 22, and December 25 rain events.

As part of the ongoing efforts to assess the structural best management practices (BMPs) installed at SSFL, BMP performance monitoring is conducted for sediment concentrations. Sediment concentrations analyzed are not required by the permit and therefore are not considered for compliance purposes. Effluent analytical results are provided in Appendix C.

Samples collected for compliance purposes were submitted to and analyzed by a California-certified analytical laboratory. Appendices C and D contain summary tables of analytical results for surface water samples collected during the Fourth



Quarter 2008. These tables identify the outfall, the constituents evaluated (analytes), the date of sampling, the analytical result, and data validation qualifiers.

A summary table of NPDES Permit limit exceedances and/or elevated concentrations of a benchmark limit 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. Quarterly Summary Notes are a compilation of notes, abbreviations, and data validation codes that are used in the analytical data summary tables and are included as a supplement in Appendices C, D, E and F.

## SUMMARY OF NONCOMPLIANCE

The following summary of noncompliance is organized by outfall location. Only those outfalls with NPDES Permit limits or benchmark limit exceedances are discussed in this report. Additionally, no constituents were detected in the receiving water sample greater than the receiving water limits for the Arroyo Simi.

### **Outfall 004**

The following is a summary of permit limit exceedances at Outfall 004 (SRE). The following permit limit exceedances are provided in Appendix E.

#### pH

Measurements on storm water collected on December 15, 2008 at Outfall 004 indicated a pH of 9.1 which is outside the NPDES permit limit range of 6.5 to 8.5. The elevated pH condition at this location is believed to have been caused by inadequate rinsing of the extensive granular activated carbon (GAC) bed, which is used as part of the multimedia treatment system at this location, during pre-storm-season rinsing operations. All rinse water is collected and analyzed for proper disposal at an offsite facility. Boeing is conducting more extensive rinsing of the GAC bed for pH neutralization, which is a typical practice necessary for GAC to avoid high pH in GAC effluent. Boeing will continue to monitor pH data at Outfall 004 and, if necessary, continue to implement BMP measures to prevent elevated pH measurements in the future.

#### Chronic Toxicity

Measurements on storm water collected on December 15, 2008 at Outfall 004 indicated a chronic toxicity result of 1.0 TUc, which is above the NPDES permit daily limit of <1.0 TUc.

Sampling for toxicity consists of both acute and chronic toxicity for SSFL samples. The acute toxicity test is performed on the fathead minnow (*pimephales promelas*) and the chronic toxicity test is performed on the water flea (*ceriodaphnia dubia*). The survival results showed 100 percent survival for the acute and chronic toxicity test and No Observable Effect Concentration (NOEC) of 100 percent sample for

chronic toxic units (TUc) value of 1.0, which complies with the permit. However, there are two components to the chronic toxicity test: survival and reproduction. Typically, young organisms are more sensitive to chemicals than older organisms. Since reproduction is generally a sensitive endpoint, tests are continued until reproduction begins. The reproduction component of the test showed low reproduction counts at a sample concentration less than 100 percent (the NOEC). This results in a TUc >1.0, which exceeds the permit limitation for this test.

As previously described, measured pH of the December 15, 2008, Outfall 004 sample showed levels in excess of the NPDES benchmark limit, which may have contributed to the elevated chronic toxicity. The measured pH (9.1) is outside the range and, therefore, as described in the bioassay test method (EPA 2002), pH alone may be a cause of the observed impaired reproduction. Other constituents were within permit limits at this outfall and there is no indication that they would have contributed to the exceedance of the chronic toxicity reproductive criteria. The most likely explanation is the elevated pH, which is being corrected through more extensive BMP rinsing for pH neutralization. Boeing will continue to monitor for chronic toxicity at Outfall 004 and, if necessary, additional testing will be conducted per the NPDES Permit requirements.

#### **Outfall 006**

The following is a summary of permit limit exceedance at Outfall 006 (FSDF-2). The following permit limit exceedances are provided in Appendix E.

##### pH

Measurements on storm water collected at Outfall 006 on November 26, 2008, indicated a pH of 6.0 which is outside the NPDES permit limit range of 6.5 to 8.5. The reason for the decreased pH condition at this location could be associated with byproducts of biological activity. Boeing implemented measures to alleviate pH issues at this location that included air blowing to dry the media in addition to adding broken concrete to raise the pH to within permit limit range.

Boeing will continue to monitor pH at Outfall 006 and, if necessary, continue to implement BMP measures to prevent decreased pH measurements in the future.

#### **Outfall 009**

The following is a summary of exceedances of benchmark limits at Outfall 009 (WS-13 Drainage). The following benchmark limit exceedances are provided in Appendix E.

##### Dioxins and Furans: TCDD Toxic Equivalent Quotient (TEQ)

TCDD concentrations in storm water samples from Outfall 009 exceeded the NPDES benchmark limit of  $2.80 \times 10^{-8}$   $\mu\text{g/L}$  on November 26, 2008 and December 15, 2008, as indicated in Appendix E. The reported concentrations of TCDD TEQ for the November 26, 2008 and December 15, 2008 samples were  $3.99 \times 10^{-7}$   $\mu\text{g/L}$  and  $1.83 \times 10^{-6}$   $\mu\text{g/L}$ , respectively. Additionally, TCDD TEQ exceeded the mass based

benchmark limit of  $4.20 \times 10^{-9}$  lbs/day for December 15, 2008. The reported mass calculation is  $6.23 \times 10^{-9}$  lbs/day. At this time, Boeing is uncertain where the TCDD in this sample originated, but Boeing will continue to investigate sources of TCDD onsite. The presence of TCDD in both background soils and fire-related materials is well documented in the scientific literature (USEPA, 2000; Gullett and Touati, 2003). These findings are further substantiated by previously completed onsite and offsite studies (MWH, 2005) as presented in the Flow Science Background Report (Flow Science, 2006) and reported in the first, second and fourth quarter 2006 DMRs. These reports suggest that the levels of TCDD TEQ measured in surface water samples at the SSFL may result primarily from wildfire combustion processes, regional atmospheric deposition, and other off-site sources over which Boeing has no control. Continued monitoring of surface water at the outfall locations during storm events will provide a more thorough dataset with which to further evaluate the occurrence of TCDD.

Consistent with the requirements of the Cease and Desist Order No. R4-2007-0056, Boeing is also working with an independent expert panel of stormwater researchers and practitioners on the development of Engineered Natural Treatment Systems (ENTS) in the Outfalls 008 and 009 watersheds to meet its the NPDES effluent numeric limits. This quarter's stormwater quality monitoring data will also be provided to them for their review and consideration as part of the ENTS planning effort. In addition, Boeing is also proceeding with source removal activities in the Outfall 008 and 009 watersheds to address constituents, including TCDD, that have exceeded NPDES permit limits /benchmarks, as stated in the RWQCB Cleanup and Abatement Order issued December 3, 2008. Workplans are in development with construction scheduled to begin in Summer 2009.

#### Lead

Lead was detected at Outfall 009 on December 15, 2008 in concentrations above its benchmark limit, as indicated in Appendix E. A lead concentration of 19 ug/L was recorded, which is in excess of the 5.2 ug/L NPDES benchmark limit.

During 2008, cleanup activities occurred and are ongoing in the Northern Drainage area to remove residual lead shot and clay pigeon debris under California Department of Toxic Substance Control (DTSC) oversight. Additionally, background soils could have contributed to this exceedance. The reduction of total suspended solids (TSS) in stormwater runoff is likely to be the most effective approach for reducing lead exceedances since lead typically has low solubility and is associated with sediments. Additionally, Boeing has investigated and continues to investigate potential sources of constituents, including lead, believed to come from areas of historical Site industrial activity in coordination with DTSC. Boeing continues to upgrade its BMPs across SSFL (Table 2) to mitigate the transport of trace metals from historical Site industrial areas into downstream areas of the watershed. 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.



Consistent with the requirements of the Cease and Desist Order No. R4-2007-0056, Boeing is also working with an independent expert panel of stormwater researchers and practitioners on the development of Engineered Natural Treatment Systems (ENTS) in the Outfall 008 and 009 watersheds to meet its the NPDES effluent numeric limits. This quarter's stormwater quality monitoring data will also be provided to them for their review and consideration as part of the ENTS planning effort. In addition, Boeing is also proceeding with source removal activities in the Outfalls 008 and 009 watersheds to address constituents, including lead, that have exceeded NPDES permit limits/benchmarks, as directed by the RWQCB Cleanup and Abatement Order issued December 4, 2008. Workplans are in development with construction scheduled to begin in Summer 2009.

#### **Outfall 014**

The following is a summary of exceedances of benchmark limits at Outfall 014 (APTF). The following benchmark limit exceedances are provided in Appendix E.

#### *Nitrate + Nitrite as Nitrogen, and Nitrate as Nitrogen*

Both nitrate + nitrite as nitrogen (N) and nitrate as nitrogen (N) were detected at a concentration of 9.3 mg/L in storm water collected on November 4, 2008 from Outfall 014. These concentrations exceed the NPDES benchmark limits of 8.0 mg/L for both constituents as indicated in Appendix E.

The reason for the elevated nitrate/nitrite condition at this location has not been identified. All forms of nitrogen, including organic nitrogen, that are released to surface waters may be transformed to nitrate by soil bacteria under aerobic conditions. Primary sources of organic nitrogen include organic material such as leaf litter, animal excrement, atmospheric deposition, and fertilizers. Though there is no fertilizer application occurring at SSFL, it is possible that nitrification and/or some other bacterial metabolic activities are occurring in the GAC of the filter BMPS, or accumulated decaying debris and organics may be causing an increase in nitrates. Since the outfall drainage area is relatively small, a 20,000-gallon Baker tank was installed at the outfall to collect and hold stormwater. The collected stormwater is then sampled to ensure its proper management. Demolition activities at this location are ongoing and scheduled to be completed in 2009.

#### **FOURTH QUARTER 2008 CORRECTIVE ACTIONS TAKEN**

Throughout the Fourth Quarter of 2008, Boeing took actions to improve the quality of surface water discharges. These actions included the installation and rinsing of BMP materials at various outfalls and the continued implementation of the site-wide Storm Water Pollution Prevention Plan (SWPPP). Activities throughout the SSFL site also continued, including site-wide inspections and metal and debris removal at various areas. Specific activities by outfall are identified in Table 2.

Table 2. BMP Activities during the Fourth Quarter 2008



OUTFALL	BMP ACTIVITIES DURING FOURTH QUARTER 2008
001 (South Slope below Perimeter Pond)	Inspected erosion control BMPs. Applied hydroseed on two acres of hill slopes to control sediment erosion. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed calibration check maintenance service of flow meter.
002 (South Slope below R-2 Pond)	Inspected and performed maintenance on erosion control BMPs. Applied hydroseed on 2.5 acres of eroding and poorly-vegetated areas. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed calibration check maintenance service of flow meter.
003 (RMHF)	Conducted structural BMP and stormwater filter system inspections. Placed hydroseed on 0.5 acres of hill slopes to control erosion. Increased the height of Gabion dam. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed media rinse. Performed calibration check maintenance service of flow meter.
004 (SRE)	Conducted structural BMP and stormwater filter system inspections. Applied hydroseed over 0.5 acres. Installed sand bag berm, HDPE liner, and piping system to direct stormwater from SRE to Outfall 004. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed calibration check maintenance service of flow meter.
005 (FSDF-1)	Conducted BMP, sedimentation basin and filtration system inspections. Conducted housekeeping activities at the sample location. Installed a stormwater treatment system consisting of 3 stages of filtration, two stages of ion exchange, and activated carbon. Note this treatment system treats water collected at Outfall 005 and 007 impoundments.
006 (FSDF-2)	Conducted structural BMP, sedimentation basin and storm water filtration system inspections. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed media rinse. Performed calibration check maintenance service of flow meter.
007 (Building 100)	Conducted structural BMP, sedimentation basin and filtration system inspections. Conducted housekeeping activities at the sample location. Installed a stormwater treatment system consisting of 3 stages of filtration, two



OUTFALL	BMP ACTIVITIES DURING FOURTH QUARTER 2008
	stages of ion exchange, and activated carbon. Note this treatment system treats water collected at Outfall 005 and 007 impoundments.
008 (Happy Valley)	Inspected erosion control BMPs. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed calibration check maintenance service of flow meter. Continued progress on permitting and design of ENTS.
009 (WS-13 Drainage)	Conducted structural BMPs inspections. Performed maintenance on flume and conducted housekeeping activities at the sample location. Culvert maintenance within the 009 watershed in progress. Performed calibration check maintenance service of flow meter. Continued progress on permitting and design of ENTS and reviewed implementation of erosion and sediment control plans for the Northern Drainage project areas.
010 (Building 203)	Conducted structural BMP and sedimentation/filtration basin inspections. Performed maintenance on flume and conducted housekeeping activities at the sample location. Performed calibration check maintenance service of flow meter.
011 (Perimeter Pond)	Conducted BMP and drainage system inspections. Performed media rinse. Performed maintenance on flume and conducted housekeeping activities at the sample location. Installed a stormwater treatment system consisting of 3 stages of filtration, two stages of ion exchange, and activated carbon. Performed media rinse. Performed calibration check maintenance service of flow meter.
012 (ALFA Test Stand)	Conducted inspection of structural BMPs. Performed housekeeping activities at the sample location. Performed media rinse.
013 (BRAVO Test Stand)	Conducted inspection of structural BMPs. Performed housekeeping activities at the sample location. Performed media rinse.
014 (APTF Test Stand)	Conducted inspection of erosion control BMPs and filtration systems. Performed housekeeping activities at the sample location. Demolition activities are currently ongoing at APTF and are scheduled to be completed in 2009.
018 (R-2 Spillway)	Conducted structural BMPs inspections. Performed housekeeping activities at the sample location. Installed a stormwater treatment system consisting of 3 stages of



OUTFALL	BMP ACTIVITIES DURING FOURTH QUARTER 2008
	filtration, two stages of ion exchange, one of activated carbon and a membrane. Performed media rinse. Performed calibration check maintenance service of flow meter.
019 (GETS)	Groundwater Extraction Treatment System (GETS) under construction. Treated groundwater hauled off-site – no discharges.

### REASONABLE POTENTIAL ANALYSIS (RPA)

Outfall monitoring data were collected during the Fourth Quarter 2008 for Outfalls 004, 006, 009, 010, 013 and 014. Data from this quarter were added to the RPA data set as per the MWH and Flow Science RPA procedures for the outfall monitoring groups, Outfalls 003-010 (excluding Outfall 008) and Outfalls 012-014 (MWH and Flow Science, 2006). The analytical results for this sampling period did not trigger reasonable potential for any constituents not already regulated under the current NPDES permit. Complete RPA tables for the outfall monitoring group are provided in Appendix F.

As summarized in the MWH and Flow Science Technical Memo, Boeing does not believe the currently used RPA procedures are appropriate for storm water and storm water-dominated discharges from the SSFL.

### DATA VALIDATION AND QUALITY CONTROL DISCUSSION

In accordance with current EPA guidelines and procedures, or as specified in the monitoring 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 a percentage of 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. Laboratory analytical reports, including validation reports and notes, are included in Appendix G. Attachment T-A of the NPDES Permit issued to the SSFL presents the State of California Water Resources Control Board (SWRCB) 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 the laboratory reporting limits (RLs) were elevated, the laboratory maximum detectable limits (MDLs) were below the California state MLs. However, some constituents' daily maximum or monthly average discharge limits 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 biphenyls (PCBs) (Aroclor congeners), chlordane, DDD, DDE, DDT, dieldrin, toxaphene, and chlorpyrifos. None of these compounds were detected in the receiving water sample for the Third Quarter of 2008.

### **FACILITY CONTACT**

If there are any questions regarding this DMR or its enclosures, you may contact Ms. Lori Blair at (818) 466-8741.

### **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 February 2009 at The Boeing Company, SSFL.

Sincerely,



Thomas D. Gallacher  
Director, Santa Susana Field Laboratory  
Environment, Health and Safety

LB:bjc  
Attachments

Figure: 1 Storm Water Drainage System and Outfall Locations

Appendices: A Fourth Quarter 2008 Rainfall Data Summary  
B Fourth Quarter 2008 Liquid Waste Shipment Summary Tables  
C Fourth Quarter 2008 Summary Tables, Outfalls 004, 006, 009, 010, 013, 014 Arroyo Simi Receiving Water, and BMP Effectiveness Effluent Discharge Monitoring Data  
D Fourth Quarter 2008 Radiological Monitoring Data, Outfalls 004, 006, 009, 010  
E Fourth Quarter 2008 Summary of Exceedances

F Reasonable Potential Analysis (RPA) Summary Tables  
G Fourth Quarter 2008 Analytical Laboratory Reports, Chain-of-  
Custody, and Validation Reports

cc: Mr. Jim Pappas, Department of Toxic Substances Control  
Mr. Stephen Baxter, Department of Toxic Substances Control  
Mr. Robert Marshall, California State University – Northridge, Library  
Ms. Dale Redfield, Simi Valley Library  
Ms. Lynn Light, Platt Branch, Los Angeles Library

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- Gullett, B., Touati, A., 2003. PCDD/F Emissions from Forest Fire Simulations. Atmospheric Environment, v. 37, p. 803-813.
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