

The Boeing Company  
Santa Susana Field Laboratory  
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Via Federal Express

May 14, 2008  
In reply refer to SHEA-107350

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 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 First Quarter of 2008. This DMR provides the results of the sampling that occurred for the SSFL Outfalls (Figure 1) for the period of January 1st through March 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.

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

Figure 1 is a site location map indicating the locations of the regulated outfalls at the SSFL. A summary of the First Quarter 2008 precipitation measured at SSFL is presented in Appendix A. All sanitary wastes from the domestic sewage treatment plants (STPs I, II, and III) were shipped off-site. Details of all liquid waste shipments are summarized in Appendix B.

As detailed in Appendix A, Boeing observed 17 rain events with greater than 0.1 inches of rainfall in a 24-hour period during the First Quarter 2008. These rainfall events occurred on January 4-7, January 22-28, February 3, and February 20-24. Due to a scheduled power outage at the facility, no rainfall depth measurements were recorded March 22-24, but no storm events occurred during this 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 First Quarter 2008 sampling record (Table 1), by outfall/location per the requirements of the NPDES Permit. The Groundwater Extraction Treatment System (GETS) is currently under construction; therefore no discharges occurred from Outfall 019.

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

Date	Outfall/Location	Date	Outfall/Location	
1/5/2008	Outfall 004 (SRE)	2/1/2008	Outfall 005 (FSDF-1)	
	Outfall 006 (FSDF-2)	2/3/2008	Outfall 001 (South Slope below Perimeter Pond)	
	Outfall 009 (WS-13 Drainage)		Outfall 002 (South Slope below R-2 Pond)	
	Outfall 010 (Building 203)		Outfall 003 (RMHF)	
	Outfall 012 (Alfa Test Stand)		Outfall 004 (SRE)	
	Outfall 013 (Bravo Test Stand)		Outfall 006 (FSDF-2)	
	Outfall 014 (APTF)		Outfall 008 (Happy Valley)	
1/22/2008	Outfall 010 (Building 203)		2/20/2008	Outfall 009 (WS-13 Drainage)
	Outfall 014 (APTF)	Outfall 010 (Building 203)		
1/23/2008	Outfall 018 (R-2A Pond)	Outfall 011 (Perimeter Pond)		
1/24/2008	Outfall 004 (SRE)	Outfall 014 (APTF)		
	Outfall 006 (FSDF-2)	Outfall 018 (R-2 Spillway)		
	Outfall 009 (WS-13 Drainage)	Outfall 002 (South Slope below R-2 Pond)		
1/25/2008	Outfall 013 (Bravo Test Stand)	2/22/2008		Outfall 014 (APTF)
	Outfall 001 (South Slope below Perimeter Pond)		Outfall 006 (FSDF-2)	
	Outfall 002 (South Slope below R-2 Pond)		Outfall 009 (WS-13 Drainage)	
	Outfall 003 (RMHF)		Outfall 010 (Building 203)	
	Outfall 007 (Building 100)		2/24/2008	Outfall 001 (South Slope below Perimeter Pond)
	Outfall 008 (Happy Valley)			Outfall 004 (SRE)
Outfall 012 (Alfa Test Stand)	Outfall 008 (Happy Valley)			
1/27/2008	Outfall 013 (Bravo Test Stand)	2/25/2008	Outfall 013 (Bravo Test Stand)	
			Outfall 018 (R-2 Spillway)	
			Outfall 012 (Alfa Test Stand)	
		2/28/2008	Arroyo Simi Receiving Water/Sediment Sampling (Frontier Park - City of Simi Valley)	

Samples collected for compliance purposes were submitted to and analyzed by a State of California-certified analytical laboratory. Appendices C and D contain summary tables of analytical results for surface water samples collected during the First Quarter 2008. These



tables identify the outfalls, the constituents evaluated (analytes), the date of sampling, the analytical result, and data validation qualifiers.

A summary table of NPDES Permit limit exceedances 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

During the First Quarter 2008, there were a total of eleven separate constituent concentrations that exceeded their permit limits, and twenty-six concentrations that exceeded their benchmark limits. There were three exceedances of a monthly average permit limits or benchmark limits. Additionally, calculations indicated that daily mass loading permit limits or benchmark limits were exceeded a total of four times during the First Quarter 2008. Calculated monthly average mass loadings exceeded their permit limits or benchmark limits three times during the First Quarter 2008. The following sections summarize noncompliance by constituent.

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

During the First Quarter of 2008, TCDD TEQ concentrations exceeded NPDES permit limits a total of seven times. TCDD TEQ benchmark concentration limits were exceeded a total of five times. NPDES permit limits were exceeded at Outfall 004 on January 5, January 24, and February 24; Outfall 011 on January 27; and Outfall 018 on January 23, February 3, and February 24, 2008. Benchmark limits were exceeded at Outfall 002 on January 25; Outfall 009 on February 3; Outfall 012 on February 25; and Outfall 014 on January 22 and February 3, 2008. Monthly averages were calculated in excess of the permit limits and benchmark limits at Outfalls 001 and 011 in January 2008 for TCDD. Reported concentrations can be found in Appendix E of this DMR.

Boeing is in the process of increasing the capacity of its best management practices (BMPs) across the site to meet the proposed Design storm criteria of 2.5 inches in a 24 hour period. Additional dioxin removal can be facilitated by increasing the retention time of the water within activated carbon media contained in the BMPs installed at those outfall locations with structural BMPs where TCDD exceeded its applicable limit (Outfalls 004, 011, and 018). However, it is unclear exactly what retention time would be necessary to achieve the water-quality based effluent limit of  $2.8 \times 10^{-8}$  ug/l for TCDD TEQ. Dioxin congeners are hydrophobic molecules that partition readily into the organic fraction of sediments and solid materials. Activated carbon is believed by United States Environmental Protection Agency (EPA) to be best available technology for the removal of dioxins from water (<http://www.epa.gov/OGWDW/dwh/t-soc/dioxin.html>). However, studies have not been conducted to support the development of technology-based effluent limits for dioxin when activated carbon is used and Boeing is unaware of any studies documenting what retention time, if any, in activated carbon can achieve this effluent limit. In fact, specific studies of the use of activated carbon do not show effluent concentrations as low as the water quality based permit effluent limit of  $2.8 \times 10^{-8}$  ug/L. One of the few studies identified while researching the literature reported an effluent concentration just below  $8.1 \times 10^{-5}$  ug/l

(Torrens, 2000). Nevertheless, Boeing is committed to attempting to achieve the water quality based effluent limit, if possible.

Boeing is also working with an independent outside expert panel on the development of engineered natural treatment system (ENTS) in the Outfall 008/009 watershed to meet its effluent numeric limits. Plans are in development with construction scheduled to begin in Summer 2008.

### **pH**

pH measurements at Outfall 013 indicated a pH of 8.7 on January 5, 2008, which is slightly in excess of the NPDES benchmark limit of 8.5. The reason for the slightly elevated pH condition at this location has not been completely identified. The elevated pH value at Outfall 013 in January may have resulted from BMP filter media recently placed at the outfall. Prior to December 20, 2007, storm water samples were not monitored under the NPDES permit at Outfall 013. The January 5 rainfall event was the media's first contact with storm water, and the pH of the runoff may have been slightly elevated due to contact with activated carbon or zeolite. Activated carbon or zeolite when not pre-washed can be high in pH. Subsequent storm water samples collected from Outfall 013 on January 24 and February 24, 2008, did not have pH values that exceeded the NPDES benchmark limit. In future instances where new BMP media are installed, Boeing will flush the new media and capture the water to minimize the potential for benchmark limit exceedances of pH. Boeing will continue to monitor pH data at Outfall 013 and, if necessary, further rinse the BMP media as part of its efforts to prevent elevated pH measurements.

### **Chloride**

Chloride was detected at Outfall 012 on January 5, 2008, above its benchmark limit as indicated in Appendix E. A chloride concentration of 320 mg/L was recorded, which is in excess of the 150 mg/L benchmark limit. Prior to December 20, 2007, storm water samples were not monitored under the NPDES permit at Outfall 012. Three storm water samples were collected at Outfall 012 during the First Quarter 2008. A NPDES benchmark limit exceedance of chloride occurred only during the January 5 storm event.

Chloride is a naturally occurring compound (Hunter and Davis, 2001). BMP materials installed at the site include fresh sand, zeolite, and activated carbon. Sand and zeolite may contain chloride or other salts that could be flushed or rinsed from filter media. No activities other than BMP installation occurred at the site that could have introduced chloride at levels that would be expected to cause an exceedance.

Rinsing of the media was performed after the January 5 storm event and was expected to remove this chloride and other salts and reduce the likelihood of further exceedances. Subsequent storm water samples collected from Outfall 012 on January 25 and February 25, 2008, did not contain chloride at a concentration that exceeded the NPDES benchmark limit. This suggests that the chloride may have been residual in the media and should not recur.

Boeing will continue to monitor chloride concentrations at this outfall to try to identify sources. Measures to reduce chloride will be implemented to the extent possible. Additionally, where new BMP materials are added, Boeing will flush the materials and collect the rinse water to eliminate potential for benchmark limit exceedances in the future.



### **Metals**

Boeing permit limit or benchmark limit exceedances for cadmium, iron, lead and manganese occurred in the First Quarter of 2008. Outfall location, date and reported exceedances can be found in Appendix E of this DMR.

Background soils may have contributed to these exceedances, and additional removal of TSS is likely to be the best approach for reducing the number of metals exceedances in the future. Additionally, Boeing has investigated and continues to investigate potential sources of constituents believed to come from areas of historical Site industrial activity in coordination from the California Department of Toxic Substance Control (DTSC). Boeing continues to upgrade its BMPs across SSFL (Table 2) to mitigate the movement of these trace metals into the watershed from historical Site industrial areas. 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.



### **Total Residual Chlorine**

On February 3, 2008, Total Residual Chlorine (chlorine) concentrations were in excess of permit and benchmark limits at Outfalls 001, 002, 011, 018. As shown in Figure 1, flow from Outfall 011 discharges to Outfall 001, and flow from Outfall 018 discharges to Outfall 002. Daily mass loading was calculated in excess of its benchmark limit or permit limit for Outfalls 002 and 011 only, respectively. Reported concentrations can be found in Appendix E of this DMR.

Because there are no identified sources of chlorine that may have contributed to the presence of total residual chlorine in the stormwater samples taken at these four outfalls, Boeing believes that the reported exceedances are the result of errors in the method by which the samples were analyzed. All four outfalls where these exceedances occurred contained some level of turbidity, which may have led to the reported concentrations of residual chlorine. Turbidity, even low levels indistinguishable to the human eye, can lead to false readings with the residual chlorine analysis. An investigation into the data by the laboratory indicates that background corrections for turbidity were not performed on these samples. Boeing is continuing an investigation of the analytical measures used by its contracted laboratory to ensure the highest quality of data is provided. Laboratory analysts have been instructed to perform background verifications for all Boeing NPDES sampling for total residual chlorine analyses, and are receiving additional training in the laboratory's procedures. The lab will be revising their procedures to ensure this type of error does not occur in the future.

### **Fluoride**

Fluoride was detected at Outfall 012 on January 5, 2008, above its benchmark limit, as indicated in Appendix E. A fluoride concentration of 2.0 mg/L was recorded, which is in excess of the 1.6 mg/L benchmark limit. Prior to December 20, 2007, storm water samples were not monitored under the NPDES permit at Outfall 012. Three storm water samples were collected at Outfall 012 during the First Quarter 2008. A NPDES benchmark limit exceedance of fluoride occurred only during the January 5 storm event.

Fluoride is known to occur at low concentrations in potable water, zeolite, and other mineral materials. The low concentration observed in runoff from this site could be residual from potable water use for rocket engine testing, come from the zeolite in the BMP material placed in the drainage, or come from other mineral sources near the test stand. In response to the fluoride concentration observed, Boeing will implement housekeeping measures at the

test stand to attempt to remove residual fluoride that may be present at the test stand and flush any new BMP materials and collect the rinse water.

#### **Bis (2-ethylhexyl) phthalate**

Bis (2-ethylhexyl) phthalate was detected at Outfall 002 on January 25, 2008, above its benchmark limit, as indicated in Appendix E. A concentration of 5.7 ug/L was recorded, which is in excess of the 4.0 ug/L benchmark limit. As this was the first exceedance of bis(2-ethylhexyl) phthalate noted at the site and no other elevated concentrations were observed of other polycyclic aromatic hydrocarbons (PAHs), Boeing believes that this isolated exceedance is a result of the site sample becoming contaminated with this chemical while in the analytical laboratory. Bis (2-ethylhexyl) phthalate is a common laboratory contaminant and the level detected in Outfall 002 on January 25 was within the range seen in laboratory blanks used during analysis of the samples collected from this storm event. Since phthalates are common within the laboratory because of their use in products used in the laboratory such as tissues, paper products, and plastics, they can come into contact with site samples without necessarily contacting the method blank. The analytical laboratory has been advised to monitor low level detects of phthalates at the SSFL site and notify the Boeing chemist in the event a phthalate detect occurs again without an associated method blank detect. This way an immediate reanalysis can be performed to confirm the presence or absence on the site of this common laboratory contaminant.

#### **FIRST QUARTER 2008 CORRECTIVE ACTIONS TAKEN**

Throughout the First Quarter 2008, Boeing took actions to improve the quality of surface water discharges. These actions included the rinsing of the BMP material at various outfalls and the continued implementation of the site-wide Storm Water Pollution Prevention Plan (SWPPP). Specific activities by outfall are identified in Table 2.

Table 2: BMP Activities during the First Quarter 2008 by Outfall

<b>OUTFALL</b>	<b>BMP ACTIVITIES DURING FIRST QUARTER 2008</b>
001 (South Slope below Perimeter Pond)	Inspected sediment control BMPs. Cleaned up debris in drainage system.
002 (South Slope below R-2 Pond)	Inspected sediment control BMPs. Removed hay bales from drainage. Cleaned up debris in drainage system.
003 (RMHF)	Conducted structural BMP and storm water filtration system inspections. Cleaned up debris in drainage system.
004 (SRE)	Conducted structural BMP and storm water filtration system inspections. Cleaned up debris in drainage system. Changed bag GAC/Zeolite media to bulk GAC/Zeolite media. Completed rinse of filter media.
005 (FSDF-1)	Conducted BMP and sedimentation basin inspections. Performed portable Baker tank and media filtration system inspections. Cleaned up debris in drainage system.
006 (FSDF-2)	Conducted structural BMP, sedimentation basin and storm water filtration system inspections. Cleaned up debris in drainage system.
007 (Building 100)	Conducted BMP and sedimentation basin inspections. Performed portable Baker tank and media filtration system inspections. Cleaned up debris in drainage system.





OUTFALL	BMP ACTIVITIES DURING FIRST QUARTER 2008
008 (Happy Valley)	Conducted drainage system and sediment control BMPs inspections. Installed new fiber rolls. Completed weed abatement conducted in upper drainage. Continued work on developing engineered natural treatment system. Cleaned up debris in drainage system.
009 (WS-13 Drainage)	Conducted drainage system inspections. Continued work on developing engineered natural treatment system. Installed flow meter instrumentation. Cleaned up debris in drainage system.
010 (Building 203)	Conducted structural BMP and sedimentation basin and filtration system inspections. Cleaned up debris in drainage system.
011 (Perimeter Pond)	Conducted BMP and drainage system inspections. Installed temporary storm water filtration system. Repaired flow meter. Cleaned up debris.
012 (Alfa Test Stand)	Conducted BMP inspections. Cleaned up debris.
013 (Bravo Test Stand)	Conducted BMP inspections. Rinsed filter media. Cleaned up debris.
014 (APTF Test Stand)	Conducted BMP inspections. Cleaned up debris.
018 (R-2 Spillway)	Conducted structural BMP and storm water filtration system inspections. Installed fiber rolls on hillside. Developed structural BMP upgrade design. Cleaned up debris
019 (GETS)	Groundwater Extraction Treatment System (GETS) under construction. Treated groundwater hauled off-site – no discharges.

### REASONABLE POTENTIAL ANALYSIS (RPA)

Outfall monitoring data collected during the First Quarter 2008 were added to the RPA data set per the MWH Americas, Inc. (MWH) and Flow Science 2006 RPA procedures. For the outfall monitoring groups (Outfalls 001, 002, 011, 018; Outfalls 003-010, and Outfalls 012-014) 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 submitted to the Regional Board on April 28, 2006 (MWH and Flow Science, 2006), 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 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. As noted

above, measures were implemented by the analytical laboratory to monitor and/or evaluate its low level detections by the laboratory are not an interference to ensure the potential cross contamination does not occur in the future. 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 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 the laboratory reporting limits (RLs) were elevated, the laboratory maximum detectable limits (MDLs) were below the State of California MLs. However, some constituents' daily maximum 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. Of these compounds, bis (2-ethylhexyl) phthalate was detected at a concentration of 5.7 ug/L on January 25, 2008 at Outfall 002. Bis- (2-ethylhexyl) phthalate has a daily maximum permit limit of 4.0, and a RL of 4.8 ug/L.

#### 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 14th of May 2008 at The Boeing Company, SSFL.

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 2008 Rainfall Data Summary
  - B First Quarter 2008 Liquid Waste Shipment Summary Tables
  - C First Quarter 2008 Summary Tables, Discharge Monitoring Data, Outfalls 001-014 and 018, and Receiving Water Location (Arroyo Simi – Frontier Park)
  - D First Quarter 2008 Radiological Monitoring Data, Outfalls 001-011 and 018
  - E First Quarter 2008 Summary of Permit Limit Exceedances
  - F Reasonable Potential Analysis (RPA) Summary Tables
  - G First 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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References Cited:

- Flow Science, 2006. Potential Background Constituent Levels in Storm Water at Boeing's Santa Susana Field Laboratory. February 23.
- Hunter, Phillip and Davis, Brian, 2001. "Naturally Occurring Concentrations of Inorganic Chemicals in Ground Water and Soil at California Air Force Installations." Air Force Center for Environmental Excellence, Brooks Air Force Base, Texas, and Department of Toxic Substances Control, Sacramento, California.
- MWH and Flow Science, 2006. Reasonable Potential Analysis Methodology Technical Memo- Version 1, Final, Santa Susana Field Laboratory, Ventura County, California. April 28.
- Torrens-KA, 2000. Getting dioxin out of groundwater/wastewater. Pollution Engineering v 32 no 9 Sept 2000. p. 31-4.

