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HAND DELIVERED

March 1, 2007
In reply refer to SHEA-104962



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: 2006 Annual NPDES Discharge Monitoring Report
The Boeing Company, Santa Susana Field Laboratory,
Ventura County, California

Dear Sir/Madam:

The Boeing Company (Boeing) hereby submits this annual discharge monitoring report (DMR) for the Santa Susana Field Laboratory (SSFL) for the period of January 1, 2006 through December 31, 2006. This DMR is provided for all outfalls authorized by NPDES Permit No. CA0001309. This annual report utilizes three sets of permit requirements and permit limits. The Los Angeles Regional Water Quality Control Board (Regional Board) revised the 2004 NPDES Permit for the SSFL on January 19, 2006. This version of the NPDES permit became effective on March 10, 2006. The Regional Board then revised the permit again to implement the Los Angeles River Metals Total Maximum Daily Load (TMDL) and Los Angeles River Nutrients TMDL at the March 3, 2006 Regional Board Hearing. The Regional Board applied the Los Angeles River TMDL concentration-based limits for metals and nutrients to Outfalls 001, 002, 008, 011, and 018 where existing limits either were not in place or were higher than established TMDL allocations. The Regional Board required immediate implementation and compliance for these TMDLs and therefore issued an updated version of the 2006 NPDES Permit dated March 17, 2006, with an effective date of April 28, 2006. The following is a tabulated list of each permit issued.



NPDES Permit Revisions	Order Number	Issue Date	Effective Dates
2004 Permit	R4-2004-0111	July 12, 2004	August 20, 2004 to March 9, 2006
2006 Amendment	R4-2006-0008	January 27, 2006	March 10, 2006 to April 27, 2006
2006 Amendment with TMDL	R4-2006-0036	March 17, 2006	April 28, 2006 to December 31, 2006

This annual DMR provides information and data, including summary tables of surface water sample analytical results, rainfall summaries, liquid waste shipment summaries, and analytical laboratory QA/QC procedures and certifications. In lieu of a 3 1/2" computer diskette of this report (as discussed in the permit), a compact disk with the report tables, figures and attachments is being submitted. This document will be made available electronically at:

www.boeing.com/aboutus/environment/santa_susana/programs.html. Additionally, hard copies of this report are available at the following: California State University at Northridge Library; Simi Valley Library; and the Platt Branch, Los Angeles Library.

REPORT CONTENTS

This annual DMR summarizes analytical data collected from the permitted outfalls during 2006. Data for this report have been summarized in tabular form. Therefore, in addition to the report text, this DMR includes the following:

- SSFL facility map showing the outfall locations (Figure 1)
- Summary of Annual Rainfall (Table 1)
- Summary of Liquid Waste Disposal (Table 2)
- Summary of Permit Limit Exceedances (Table 3)
- Outfall-specific Summary Tables and Charts of Analytical Results (Sections 1 through 13)
- Summary of Reasonable Potential Analysis (RPA) (Section 14)
- Storm Water Pollution Prevention Plan Annual Evaluation (Section 15)
- Analytical Laboratory QA/QC Procedures and Certifications (Section 16)

OVERVIEW OF THE 2006 REPORTING PERIOD AT SSFL

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



As reported in previous DMRs and annual reports submitted by Boeing to the Regional Board, Boeing's investigations have shown that most of the constituents detected in storm water result from naturally occurring contributions and atmospheric deposition, or were detected at concentrations consistent with regional background concentrations. In addition, concentrations of certain constituents are almost certainly influenced by the late September 2005 Topanga Wildfire at the Site. Furthermore, based on SSFL operations and activities, Boeing's position is that most of the constituents exceeding permit limits are not the direct result of a known discharge or release from an industrial process or historical contamination at the site. In some cases, former industrial activities at the SSFL may have impacted localized areas of onsite soils and sediments that could have potentially affected storm water quality. However, under regulatory supervision, Boeing has completed numerous mitigation actions to manage surface water impacts potentially resulting from former industrial activities. These actions include soil removal, covering areas with plastic tarp, and implementing an extensive system of BMPs. Boeing has deployed and continues to deploy and improve BMPs to minimize transport of soils and/or sediment that may be associated with constituents regulated in the SSFL NPDES permit. Additionally, numerous BMPs are designed to remove dissolved constituents from stormwater.

Unlike most typical facilities regulated through the NPDES Program, the SSFL is a predominantly natural habitat. Greater than ninety percent of the facility is natural and undeveloped, and is covered with natural vegetation, sandstone rock outcrops, and weathered sandstone sediment and soil. At SSFL, the vast majority of discharges are from storm water and not industrial operations, and storm water discharges are not continuous, consistent, or scheduled. Water discharge results from rainfall becoming surface flow, and occurs through natural, unlined drainages. Compounds that naturally occur in rocks and sediment (e.g., metals) are therefore present in the surface water that flows through these drainages. Furthermore, as with all areas around the Los Angeles River Basin, there is a contribution of constituents from atmospheric deposition. The contributions from naturally occurring and atmospheric sources have been addressed in the Flow Science Technical Report "Potential Background Constituent Levels in Storm Water at Boeing's Santa Susana Field Laboratory," February 23, 2006, (herein "Flow Science Background Report"). Boeing continues to evaluate this issue, while aggressively striving to achieve our goal of surface water compliance at the SSFL.

Since storm water runoff is sporadic and highly variable in intensity and volume, it is expected that the concentration of these naturally occurring compounds will also vary from sampling event to sampling event. This is discussed in further detail in the following sections.

Best Management Practices (BMPs)

In 2006 Boeing continued to take action to improve surface water quality by implementing its iterative BMP work plan in accordance with the 2005 13267 response (MWH, 2005). Boeing improved and upgraded multiple BMPs as listed in the Corrective Action section of this report, in order to address previous exceedances and improve surface water discharge quality. Boeing provided a summary of recent BMP activities in its first annual SSFL BMP Implementation Report to the Regional Board on October 1, 2006 (MWH, 2006a). This report described the preliminary draft plans, specifications and activities already completed or currently underway at the time to upgrade onsite BMPs. Furthermore, during 2006 Boeing continued to implement its BMP filtration media pilot test and BMP materials analysis which began in the 2nd Quarter of 2006. The results of the pilot test were submitted by Boeing to the Regional Board on October 24, 2006 (MWH 2006b). Also, BMP materials tests that were completed prior to February 23, 2006, are presented in the Flow Science Background Report, and additional results on tests completed since then will be provided to the Regional Board when available.

Automated influent and effluent sampling units have been installed above and below BMPs at Outfalls 003, 004, 006, 010, and 011 to analyze for suspended sediment concentration during storm events as a means of estimating the constituent removal effectiveness of BMPs. Boeing will continue to operate this program in the current storm season, and results of the monitoring and testing will be reported to the Regional Board in accordance with the schedule provided in the work plan.

An outfall by outfall detail of the BMPs implemented in 2006 is further described in the Corrective Action Section later in this document.

Wildfires

Wildfires, the effects of which have been widely documented and have been observed at the SSFL site, release significant amounts of metals and dioxins, and storm water runoff following forest fire events has been observed to carry significantly higher concentrations and loads of these constituents. Atmospheric deposition rates of metals have been observed to rise several-fold during fires. Atmospheric concentrations of dioxin are also elevated during fires. Fires leave behind ash and destroy vegetation, resulting in significant changes in the hydrologic response of watersheds, including higher runoff volumes, higher flow rates, and higher concentrations of total suspended solids (TSS), which in turn carry regulated constituents (Flow Science Background Report). These effects have been observed at the SSFL and are documented in the 1st and 2nd quarter reports for 2006 and in the Flow Science Background Report.

Boeing's position that the conditions at the SSFL following the September 2005 Topanga Wildfire, the majority of vegetation and many installed BMPs at SSFL were destroyed, thus the reason for the increase risk of exceedances of several



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regulated constituents. As discussed above, the ground surface of the SSFL was impacted with ash and/or charred material, which are known to contain naturally occurring constituents such as dioxins (TCDD) and metals (Nestrick et al., 1983; Sheffield, 1985; Clement and Tashiro, 1991; Aronsson and Ekelund, 2004; and USEPA, 2000). Fires and the ash left behind by fires have been shown to increase soil pH and to cause an increase in nitrate, ammonia, and other plant-nutrient-related compounds (Higgins, et. al., 1989; Earl and Blinn, 2003).

To reduce the impact of the ash and charred material on surface water quality, numerous activities were implemented as soon as feasible following the fire to help restore the natural, engineered and/or institutional controls that aid in minimizing the erosion of surface materials and the migration of sediment in surface water. Hydromulch was placed over approximately 800 acres of the undeveloped land at the SSFL. Hydromulch is a semi-liquid organic binder blended with hydromulch paper or wood fiber/pulp that is dispersed onto and adheres to the ground surface and soil surface to protect from further soil erosion, to aid in minimizing sediment transport, and to decrease the potential for landslides and debris flows. Hydromulch application occurred between December 23, 2005 and January 13, 2006.

Additionally, as part of the activities following the September 2005 Topanga Wildfire, Boeing removed accumulated ash (more than 2,200 tons of ash were removed in 2006) to the extent practicable from the drainages upstream of the outfalls.

Natural Occurrences of Regulated Constituents Affecting Surface Water Quality

Boeing's position is that most storm water monitoring data collected over the past several years have not indicated any specific onsite industrial or operational source(s) for many of the constituents measured in the runoff. This suggests that many, if not most, of the exceedances may be due to naturally occurring or regional background concentrations – from naturally occurring constituents in soils, impacts from onsite wildfires and ash deposition from wildfires occurring upwind, or due to regional atmospheric deposition. Attempts to find patterns in the exceedances or magnitudes of constituent concentrations have been generally unsuccessful to date. In most cases exceedances are not repeated with regularity or consistency, and most concentrations of constituents greater than permit limits have not been shown to be related to any potential onsite source area or site activity.

In cases when historical site operations appeared to impact surface water, extensive interim measures were taken, generally by way of removing impacted soils and backfilling with clean material, to mitigate such impacts. In some cases, tarping and other protective measures were placed to isolate impacted soils from storm water runoff. Following such interim measures, constituents in surface waters were generally within the ranges expected due to natural background conditions.

DISCHARGE STATUS





Precipitation during 2006 at SSFL is totaled for each month of the year in Table 1. During 2006, surface water samples were collected from Outfalls 001 through 011 and 018. Surface water samples were also collected from Outfall 012 (Alfa Test Stand) during engine test activities, which occurred five times prior to March 10, 2006, at which time engine test activities were permanently discontinued. Discharges did not occur at Outfalls 013 (Bravo Test Stand) or 014 (Advanced Propulsion Testing Facility [APTF]), as rocket and propulsion testing activities were not conducted at these locations. Additionally, as of March 2006, all rocket and propulsion testing activities have ceased at SSFL, so that no additional discharges will occur from Outfalls 012 through 014. All sanitary wastes from the domestic sewage treatment plants (STPs I, II, and III; Outfalls 015, 016, and 017, respectively) were shipped off-site to a permitted treatment and disposal facility. Details of the waste shipments are summarized in Table 2. Because discharge did not occur, samples were not collected from these outfalls. Sanitary waste management practices at the site are such that discharges from Outfalls 015 through 017 are not anticipated to occur in the future. Figure 1 illustrates the SSFL facility and the locations of the outfalls.

SURFACE WATER DISCHARGE ANALYTICAL RESULTS REPORTING

All analyses of surface water discharge samples were conducted at laboratories certified for such analyses by the Department of Health Services or approved by the Executive Officer and in accordance with current EPA guidelines, procedures, or as specified in the monitoring program. As specified in the NPDES permit, Page T-2, analytical results were designated Detected but not Quantified (DNQ) (similar to organic analyses being J-flagged by the laboratory or data validator) if the analytical result was greater than or equal to the laboratory's method detection limit (MDL), and less than the State Water Resources Control Board (SWRCB) Minimum Level (ML) or laboratory reporting limit (RL). For the purposes of determining compliance with permit limits, data that were designated DNQ or that were J-flagged (estimated values), were reported as such, but were not used to establish compliance because the value was estimated as it was less than the laboratories' RL.

Attachment T-A of the NPDES permit presents the SWRCB MLs for use in reporting and determining compliance with NPDES permit limits. The analytical laboratory achieved these MLs for 2006. However, some constituents' daily maximum and/or monthly average discharge limits in the NPDES permit are less than their respective MLs, and less than the laboratory RL. In cases where the permit limit is less than the RL and ML, the RL was used to determine compliance. As required in the NPDES permit, Section 16 of this report provides a summary table of constituents listed in the permit, their analytical laboratory methods, MDLs, and RLs, and copies of laboratory quality assurance and quality control procedures. California Department of Health Services Environmental Laboratory Accreditation

Program (ELAP) certifications are also included in Section 16, as required in the NPDES permit.

During 2006, specific constituents that had permit limits that were less than the RLs and ML were mercury (daily maximum permit limit of 0.10 and 0.13 ug/L, monthly average limit of 0.05 ug/L, RL of 0.2 ug/L); cyanide (monthly average limit of 4.3, RL of 5.0 ug/L); and bis-(2-ethylhexyl) phthalate (daily maximum permit limit of 4.0, RL of 5.0 ug/L). Of these compounds, only cyanide was detected at a concentration equal to or greater than its RL at Outfall 001 on January 2 (7.4 µg/L) and February 28, 2006 (7.3 µg/L), and at Outfall 002 on January 14 (5.3 µg/L) and February 18, 2006 (18 µg/L).



SUMMARY OF NON-COMPLIANCE AND CORRECTIVE ACTIONS

Analytical results for all surface water samples are summarized in Table 3 and in the Attachment -- Sections 1 through 13. Consistent with prior annual report submittals and in accordance with the NPDES permit, graphic presentation of the data collected has also been included for specific analytes and parameters that could be effectively graphed. Analytes that had a permit limit were graphed. Analytes that did not have permit limits were not graphed. Graphing consisted of charting an analyte's analytical result(s) with the sample date(s). The graphs are included in each section of the Attachment as described below.

The tabular and graphic data for all outfall locations where data was collected (Outfalls 001 through 011, and 018), and the Alfa Test Stand (Outfall 012) are provided in the Attachment as follows:

Attachment:

Section 1	Outfall 001	South Slope below Perimeter Pond
Section 2	Outfall 002	South Slope below R-2 Pond
Section 3	Outfall 003	RMHF
Section 4	Outfall 004	SRE
Section 5	Outfall 005	FSDF-1
Section 6	Outfall 006	FSDF-2
Section 7	Outfall 007	Building 100
Section 8	Outfall 008	Happy Valley
Section 9	Outfall 009	WS-13 Drainage
Section 10	Outfall 010	Building 203
Section 11	Outfall 011	Perimeter Pond Flume
Section 12	Outfall 012	Alfa Test Stand
Section 13	Outfall 018	R-2 Spillway

Included after Table 3 and at the beginning of the tables in the Attachment are the Annual Reporting Summary Notes. The Annual Reporting Summary Notes are a

compilation of notes, abbreviations, and data validation codes that are found in the analytical data summary tables contained in the Attachment.

As indicated in the attached tables and charts in Sections 1 through 13, and as summarized in Table 3, 2006 Summary of Permit Limit Exceedances includes:

- TCDD TEQ at Outfalls 001, 002, 004, 005, 007, 009, 010, 011, and 018
- Copper at Outfalls 001, 007, and 009
- Lead at Outfalls 001, 002, 007, 008, 009, and 011
- Iron at Outfalls 001 and 002
- Nitrate+Nitrite as Nitrogen at Outfalls 002 and 005
- Total Cyanide at Outfalls 001 and 002
- Manganese at Outfall 001
- Total Suspended Solids (TSS) at Outfall 018
- Biochemical Oxygen Demand (BOD 5 day) at Outfall 002
- Surfactants (MBAS) at Outfall 002
- Chloride at Outfall 005
- Total Dissolved Solids (TDS) at Outfall 005

Discussion of the Most Prevalent Permit Exceedances

As presented in Table 3, Summary of Permit Limit Exceedances, TCDD TEQ (dioxin) was reported to exceed daily maximum permit limits at nine compliance outfall locations, a total of 21 times. Of the other constituents that exceeded permit limits, none were reported at more than six compliance locations and none were reported more than six times. Due to the occurrences of TCDD, additional discussion regarding this constituent is included below.

TCDD (Dioxin): Discussion of Occurrence and Potential Sources

Due to the unique process by which TCDD concentrations are determined, a brief discussion of TCDD reporting is included. To enable a single total concentration (commonly called a Toxicity Equivalence (TEQ)) to be calculated from the sum of the 17 dioxin and furan congeners, 2,3,7,8-TCDD 'equivalent' concentrations are calculated for each congener by multiplying that individual congener's concentration by its toxic equivalency factor (TEF). The TEF is based on the toxicity of the congener compared to the toxicity of 2,3,7,8-TCDD. The TEFs published by the World Health Organization (WHO) in 1998 are used. The dioxin summary tables in the attachments show the TEFs for the various congeners. The common term for the sum of the factored concentration is TEQ. When subsequently used in this report, the term TCDD refers to the total equivalence of the seventeen 2,3,7,8-substituted dioxin and furan congeners (commonly called the TCDD TEQ).



For the purposes of evaluating compliance with permit limits (as stated in the NPDES permit on Page 40, Section II, C. 3), TCDD TEQ is based on detected congeners and does not include those congeners reported as ND (not detected) or detected, but not quantified (DNQ). A DNQ is a value less than the laboratory RL, but greater than the laboratory level of detection (LOD). Therefore, when evaluating whether a permit limit exceedance occurred, ND or DNQ data (the resulting estimated values) were considered zero in the calculation.

Prior to the revision of the permit in January 2006 that became effective in March 2006, limits for TCDD TEQ were not established for Outfalls 008 through 011 or 018. Therefore TCDD TEQ with DNQ values are provided as required by the permit.

During 2006, TCDD TEQ exceeded permit limits at Outfalls 001, 002, 004, 005, 007, 009, 010, 011 and 018. TCDD has been frequently detected in Department of Toxic Substances Control (DTSC)-approved non-impacted background soil sample locations (MWH 2005). In some areas, onsite operations have utilized combustion processes. However, the TCDD TEQ values in soils collected from these potentially impacted areas have been found either not to be elevated above background levels, or if elevated, they have been shown to decrease to near background levels within a short distance from the suspected source area.

Also, as documented in the Flow Science Background Report, TCDD TEQ concentrations in storm water runoff from offsite surface water sampling locations in undeveloped areas and in receiving waters during storm conditions are comparable to concentrations in storm water runoff from the SSFL.

Monthly Average Exceedance Discussion

Monthly average permit limits are not appropriate for inconsistent, sporadic, and infrequent storm water dominated discharges such as that at SSFL. Based on the data collected from the SSFL, monthly average permit limit exceedances are typically the result of a single exceedance of a daily maximum limit where there are no additional rainfall events, or monitoring data, during the month.

A monthly average based only on one or two data points is not representative of actual monthly average concentrations or constituent mass traveling to receiving waters over a one-month period. In addition, monthly average permit limits are calculated based on the State of California's Policy for the Implementation of Toxics Standards for Inland Waters, Enclosed Bays, and Estuaries (State Implementation Policy (SIP)), and the EPA's Technical Support Document for Water Quality-based Toxics Control (TSD) methodology developed for continuous, end of pipe, Publicly Owned Treatment Works (POTW) type discharges. This methodology often uses California Toxics Rule chronic criteria as the basis for average monthly permit limits. SSFL storm flows are often shorter in duration than chronic exposure



timeframes (i.e., shorter than 4 days (for metals) or 30 days (for ammonia)). Therefore, the average monthly permit compliance criteria and the calculated average monthly concentration may not be representative of appropriate permit criteria or actual monthly site conditions throughout at the SSFL.

Discussion of Permit Limit Exceedances

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



Outfall 001

Exceedance Summary

Outfall 001 had ten daily maximum permit limit exceedances, one mass-based daily maximum permit limit exceedance, and eight monthly average permit limit exceedances during the 2006 monitoring period. As summarized in Table 3:

- On January 2, and April 5, TCDD TEQ was detected at concentrations of 4.6×10^{-6} ug/L, and 3.82×10^{-7} ug/L, respectively, compared to the permit limit of 2.80×10^{-8} ug/L. Monthly average concentrations were also computed using all samples collected in a single month, and TCDD exceeded the monthly limit in January, February, and April at concentrations of 4.6×10^{-6} ug/L, 1.47×10^{-8} , and 1.95×10^{-7} , respectively.
- On January 2, February 28, March 29, April 5, and April 15 iron was detected at concentrations of 92 mg/L, 1.4 mg/L, 0.87 mg/L, 3.1 mg/L, 1.8 mg/L compared to the daily max permit limit of 0.3 mg/L. Additionally, on January 2, iron exceeded the mass-based daily max permit limit of 400 lbs/day at a concentration of 626 lbs/day.
- On January 2, lead was detected at a concentration of 160 ug/L compared to the daily max permit limit of 5.2 ug/L. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average permit limits for lead were exceeded in January and in April at concentrations of 81 ug/L and 2.95 ug/L, respectively; compared to the monthly average permit limit of 2.6 ug/L.
- On February 28, manganese was detected at 62 ug/L compared to the permit limit of 50 ug/L.
- On January 2, copper was detected at 55 ug/L, respectively, compared to the daily max permit limit of 14 ug/L. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average

permit limits for copper were exceeded in January at a concentration of 30 ug/L; compared to the monthly average permit limit of 7.1 ug/L.

- There were no daily exceedances of permit limit for total cyanide. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average permit limits for cyanide were exceeded in January and in February at concentrations of 7.4 ug/L and 7.3 ug/L, respectively; compared to the monthly average permit limit of 4.3 ug/L.



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Exceedance Discussion

January 2, 2006 was the first flow Outfall 001 following the 2005 Topanga Fire. TSS levels were substantially higher due to the loss of vegetation and increased erosion that likely led to many of the observed exceedances.

TCDD -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of these compounds in both background soil and other regional sources, including fire-related materials and atmospheric deposition, is well documented in the scientific literature as referenced above, and can contribute to surface water quality. Boeing's investigation has shown that the TCDD TEQ present in surface water is most likely coming from naturally occurring or regional background sources.

An activated carbon and zeolite filtration structural BMP has been placed at Outfall 011, which is upstream from Outfall 001. Activated carbon is well known to strongly adsorb dioxins and organic particulate matter, which may contain dioxins. Therefore, this filtration BMP is expected to capture TCDD that may be in stormwater flowing from Outfall 011.

Iron -- Iron is a naturally occurring constituent found in soil and sediment. Based on the extensive history of compliance with iron discharge limits at Outfall 001 both prior to and after these events, the concentrations appear to be based on rainfall, erosion, and TSS concentrations at the monitoring location. Surface water samples for iron on January 2, February 28, March 29, April 5 and April 15 indicate concentrations that above the permit limit. Boeing's position is that the five non-compliant events for iron are from naturally occurring sources.

The activated carbon and zeolite filtration structural BMP at Outfall 011 will remove iron and particulate matter containing iron from flows that discharge from Outfall 011. Zeolite is well known to have a high cation exchange capacity, which facilitates the removal of various dissolved metals and fine particulates containing metals.

Lead -- This single non-compliant lead result is more likely a result of heavy rainfall which increased sediment loading at the monitoring location. Surface water samples for lead on January 2 indicate concentrations that above the permit limit. Therefore, based on the data reviewed and an occasional sporadic exceedance, Boeing's position is that the one non-compliant event for lead results from naturally occurring sources and is affected by excessive rainfall and resultant increases in TSS.

The activated carbon and zeolite filtration structural BMP at Outfall 011 will remove some lead similarly to iron from storm flows.

Manganese -- Subsequent analysis of surface water samples taken after February 28, 2006 indicated concentrations that decreased to values less than the permit limit and RL. Similar to chromium (discussed below), excessive rainfall increased erosion that resulted in greater total suspended solids (TSS) loads. Boeing's position is that the increase in TSS loads resulted in increased manganese concentrations detected at the outfall location. Based on the data reviewed, this non-compliant event for manganese is infrequent and does not appear to be related to SSFL industrial activities.

The activated carbon and zeolite filtration structural BMP at Outfall 011 will remove some manganese similarly to iron from storm flows.

Copper -- Copper is a naturally occurring metal and has been detected in DTSC-approved locations for background soil samples (MWH, 2005). Boeing's position is that these exceedances may be the result of post-fire increased sediment loads that transported a greater amount of native soil and ash, both of which contain copper, plus many other constituents. Boeing will continue to evaluate copper and antimony values across the site to better understand their occurrence and whether their occurrence diminishes as native vegetation returns and sediment load to the outfall location decreases. Boeing will continue to evaluate all data, improve BMPs, and implement measures to minimize sediment and resulting metals migration to and within surface water.

The activated carbon and zeolite filtration structural BMP at Outfall 011 will remove some copper similarly to iron from storm flows. Furthermore, because copper can be in dissolved form more readily than iron, manganese, or lead in surface waters, the zeolite filtration media has been installed to target dissolved metals such as copper.

Cyanide -- Total cyanide was not detected in storm water samples collected from Outfall 001 at concentrations that exceeded daily maximum permit limits. However, it was detected in storm water samples at Outfall 001 in January and February at concentrations that exceeded the monthly average permit limit. Since storm water flow was not consistent or continuous, subsequent samples could not be collected from this Outfall. Therefore, only one sample was collected from Outfall 001 during



both January and February, and these single sample results were used to evaluate monthly average permit compliance.

Cyanides can be produced by certain bacteria, fungi, and algae, and are found in a number of foods and plants. The potential for species of cyanide to be produced from wildfires is being studied by Los Alamos National Laboratory and studies also show that cyanides can be produced by the photo-oxidation of fire retardants, some of which may have been used in combating the Topanga Wildfire (Gallaher and Koch, 2004).



Outfall 002

Exceedance Summary

Outfall 002 had nine daily max permit limit exceedances, one mass-based daily max permit limit, and three monthly average permit limit exceedances for constituents with permit limits collected at this outfall during the 2006 monitoring period. As summarized in Table 3:

- On February 28, and April 4, TCDD TEQ was detected at concentrations of 3.95×10^{-7} ug/L, and 2.32×10^{-6} ug/L, respectively, compared to the daily max permit limit of 2.8×10^{-8} ug/L. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average permit limits for TCDD TEQ were exceeded in February at concentrations of 3.95×10^{-7} ug/L compared to a permit limit of 1.40×10^{-8} .
- On January 1, biochemical oxygen demand (BOD 5 day) was detected at 33 mg/L compared to the daily max permit limit of 30 mg/L.
- On January 1, nitrate+nitrite as nitrogen was detected at a concentration of 10 mg/L, compared to the daily max permit limit of 8 mg/L.
- On January 1, surfactants (as MBAS) were detected at 0.55 mg/L compared to the daily max permit limit of 0.50 mg/L.
- On February 28, iron was detected at 1.4 mg/L compared to the daily max permit limit of 0.3 mg/L.
- On February 28, total cyanide was detected at 18 ug/L compared to the daily max permit limit of 8.5 ug/L. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average permit limits for total Cyanide were exceeded in February at concentrations of 18 ug/L compared to a permit limit of 4.3 ug/L.

- On April 4, and May 11, lead was detected at concentrations of 6.9 ug/L, and 12 ug/L, respectively, compared to the daily max permit limit of 2.6. On April 4, TCDD was also detected at 1.48×10^{-7} lbs/day based on measured flow as compared to the mass-based permit limit of 3.7×10^{-8} lbs/day. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average permit limits for lead were exceeded in May at the concentration of 12 ug/L compared to a permit limit of 2.6 ug/L.

Exceedance Discussion

January, 2006 was the first flow Outfall 001 following the 2005 Topanga Fire. TSS levels were substantially higher due to the loss of vegetation and increased erosion that likely led to many of the observed exceedances.

TCDD -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of these compounds in both soil background and other regional sources, including fire-related materials, is well documented in the scientific literature as referenced above, and can contribute to surface water quality. As such, Boeing's position is that the TCDD TEQ present in surface water is most likely coming from naturally occurring or regional background sources.

An extensive activated carbon and zeolite filtration structural BMP has been placed at Outfall 018. Activated carbon is well known to strongly adsorb dioxins and organic particulate matter, which may contain dioxins. Therefore, this filtration BMP is expected to capture TCDD that may be in stormwater.

Biological Oxygen Demand (BOD) 5 Day -- BOD was detected at Outfall 002 exceeding the daily maximum permit limit as indicated in Appendix E. BOD is a measure of the rate of uptake of oxygen by microorganisms in the water sample and is typically correlated with soluble organic material in the water. The source of this increased BOD is not known; however, it may be attributable to an increase in partially burned vegetative matter from the Topanga Wildfire that was washed down into the drainage due to increased erosion.

As described for dioxins, the activated carbon filtration BMP at Outfall 018 is expected to remove non-specific organic compounds from water draining from developed portions of the watershed. Should there be recurring BOD within that water, which is not likely given site conditions, this BMP is expected to remove some of that BOD.

Nitrate+Nitrite as Nitrogen -- As referenced above, many studies of post wildfire sites indicate excess water-soluble nutrients in soils and ash following a fire (they are in excess because the plants that would have bound the nutrients within their plant tissue, were burned in the fires). These nutrients then drain into nearby streams and



bodies of water (Higgins et al., 1989). Nitrate and nitrite-nitrogen is very soluble and is a nutrient particularly prone to leaching from soil. Based on this, Boeing's position is that the nitrate/nitrite increases are naturally occurring and a result of the Topanga Wildfire. Boeing will continue to evaluate nitrate+nitrite as nitrogen values at this and other outfall locations across the site to better understand its occurrence and whether its occurrence diminishes as native vegetation returns.

Nitrate+nitrite as nitrogen was detected at Outfall 002 as indicated in Appendix E. The source of this increased nitrate+nitrite as nitrogen is not known; however, a comparison of the daily maximum permit limit exceedances against the extensive history of compliance with nitrate+nitrite as nitrogen discharge limits at Outfall 002 both prior to and after this event indicates that this concentration is typically greater than historic nitrate+nitrite as nitrogen concentrations at Outfall 002 and does not appear to be representative of the discharge water quality at this location before the fire.

January 1 was the first date in which flow occurred in this outfall following the Topanga Fire. It is well documented in the Flow Science Background Report that ash contains high concentrations of nitrates due to the combustion of the plant tissues, which contain proteins, which are made of amino acids. Nitrate is very soluble and so erosion control alone may not be sufficient to prevent migration of this naturally deposited nitrate. Subsequent flow events did not contain high nitrate concentrations. We suspect that this nitrate exceedance was a post-fire first flush event and will not recur.

Surfactants (MBAS) -- Surfactants were detected at Outfall 002 as indicated in Appendix E. The source of this increased surfactant concentration is not known; however, a comparison of the daily maximum permit limit exceedance at Outfall 002 against the extensive history of compliance with surfactants discharge limits at Outfall 002 both prior to and after this event indicates that this concentration is typically greater than historic surfactants concentrations at Outfall 002 and does not appear to be representative of the discharge water quality at this location.

January 1 was the first date in which flow occurred in this outfall following the Topanga Fire. Surfactants are typically very soluble and so erosion control alone may not be sufficient to prevent migration. Subsequent flow events did not contain high surfactant concentrations. We suspect that this surfactant exceedance was a post-fire first flush event and will not recur.

Iron -- Iron is also a naturally occurring constituent found in soil and sediment. Based on the extensive history of compliance with iron discharge limits at Outfall 002 both prior to and after these events, the concentrations appear to vary based on rainfall, erosion, and TSS concentrations at the monitoring location. Surface water samples for iron on February 28 indicate concentrations that were less than the



permit limit. Boeing's position is that the single non-compliant event for iron is from naturally occurring sources affected by excessive rainfall and resultant increases in TSS.

The activated carbon and zeolite filtration structural BMP at Outfall 018 will remove iron and particulate matter containing iron from flows that discharge from Outfall 018. Zeolite is well known to have a high cation exchange capacity, which facilitates the removal of various dissolved metals and fine particulates containing metals. This filtration BMP at outfall 018 is expected to remove some iron that may be in stormwater flows.

Total Cyanide -- Total cyanide was detected in February in a storm water sample collected from Outfall 002 at a concentration that exceeded the daily maximum permit limit. Since storm water flow was not consistent or continuous, subsequent samples could not be collected from this outfall. Therefore, only one sample was collected from Outfall 002 during February, and this single sample was used to evaluate monthly average permit compliance.

The total cyanide concentration at Outfall 002 exceeded both the daily maximum and the monthly average. The source of this increased cyanide concentration is not known; a comparison of the daily maximum permit limit exceedance at Outfall 002 against the extensive history of compliance with total cyanide discharge limits at Outfall 002 both prior to and after this event indicates that this concentration is greater than historic total cyanide concentrations at Outfall 002.

Cyanides can be produced by certain bacteria, fungi, and algae, and are found in a number of foods and plants. The potential for species of cyanide to be produced from wildfires is being studied by Los Alamos National Laboratory and studies also show that cyanides can be produced by the photo-oxidation of fire retardants, some of which may have been used in combating the Topanga Wildfire (Gallaher and Koch, 2004).

Cyanide will continue to be monitored as part of the NPDES Program, and Boeing will continue to evaluate all data and improve BMPs, as appropriate.

Lead -- Based on the extensive history of compliance with lead discharge limits at Outfall 002, the non-compliant lead results do not appear to be representative of the discharge water quality at this location. Surface water samples for lead on April 4 and May 11 indicate concentrations that more than the permit limit. Therefore, based on the data reviewed and an occasional sporadic exceedance, Boeing's position is that these non-compliant events for lead are thought to be from naturally occurring sources and affected by excessive rainfall and resultant increases in which increased sediment loading at the monitoring location and TSS.



Additionally, the activated carbon and zeolite filtration structural BMP at Outfall 018 will remove some lead from storm flows.

Storm Water Outfall 003

There were no exceedances at Outfall 003 during the year.

Storm Water Outfall 004

Exceedance Summary

Outfall 004 had seven exceedances of a constituent with permit limits collected at this outfall during the 2006 monitoring period. As summarized in Table 3:

- On January 14, February 18, March 1, March 11, March 21, April 4, and April 14, TCDD was detected at concentrations of 3.17×10^{-8} ug/L, 2.98×10^{-7} ug/L, 6.18×10^{-7} ug/L, 3.22×10^{-8} ug/L, 3.06×10^{-8} ug/L, 8.37×10^{-7} ug/L, 7.65×10^{-7} ug/L, respectively; compared to the daily max permit limit of 2.8×10^{-8} ug/L.

Exceedance Discussion

TCDD -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of TCDD in both soil background and other regional sources, including fire-related materials, is well documented in the scientific literature, as referenced above, and can contribute to surface water quality. As such, and given the limited occurrence of these exceedances at Outfall 004, Boeing's position is that the TCDD TEQ present in surface water is most likely coming from naturally occurring or regional background sources.

An extensive activated carbon and zeolite filtration structural BMP has been constructed at Outfall 004 in late 2006. Activated carbon is well known to strongly adsorb dioxins and organic particulate mater, which may contain dioxins. Therefore, this filtration BMP is expected to capture TCDD that may be in stormwater flowing within this watershed. The BMP will be upgraded and improved in accordance with the 13267 workplan (Boeing, 2005) based on monitoring its ability to comply with permit requirements.

Storm Water Outfall 005

Exceedance Summary

Outfall 005 had eight permit limit exceedances for constituents with permit limits collected at this outfall during the 2006 monitoring period. As summarized in Table 3:



- On January 1, February 28, March 29, April 5, and April 15 nitrate+nitrite as nitrogen was detected at concentrations of 51 mg/L, 40 mg/L, 43mg/L, 23 mg/L, 22 mg/L, respectively, compared to the permit limit of 10 mg/L.
- On January 1, chloride was detected at 160 mg/L, respectively, compared to the permit limit of 150 mg/L.
- On January 1, total dissolved solids were detected at 980 mg/L compared to the permit limit of 850 mg/L.
- On April 15, TCDD was detected at 3.38×10^{-7} ug/L compared to the permit limit of 2.8×10^{-8} ug/L.

Exceedance Discussion

Nitrate+Nitrite as Nitrogen -- Permit limit exceedances for these nitrogen compounds were observed at Outfall 005. An evaluation by Boeing of potential onsite sources has not identified a direct source or cause for these permit limit exceedances. Furthermore, Boeing evaluated BMP materials at Outfall 005 for possible decomposition of natural material (i.e., decomposition of hay in straw wattles and hay bales) as a potential nitrogen source. Laboratory test results for hay samples from bales and straw wattle BMPs returned non-detect values for nitrates and nitrites.

Boeing has installed a retention system capable of containing the 10-year 24-hour storm at this location. Retaining the water within this system should allow for naturally occurring soil microbes to convert nitrate to nitrogen gas in the anoxic regions of the retention system and reduce nitrate concentrations. The retained water will be filtered through several media, including activated carbon to remove constituents prior to the water's discharge.

Boeing will continue to evaluate nitrate+nitrite as nitrogen values at this and other outfall locations across the site to better understand its occurrence and whether its occurrence diminishes as native vegetation returns

Chloride -- On January 1, chloride was detected at Outfall 005 at a level slightly over the permit limit. Subsequent flow events at this outfall did not have chloride concentrations in excess of permit limits. . A comparison of the daily maximum permit limit exceedance at Outfall 005 against the extensive history of compliance with chloride discharge limits at Outfall 005 both prior to and after this event indicates that this concentration is greater than historic chloride concentrations at Outfall 005.



Chloride is a naturally occurring compound (Hunter and Davis, 2001) and Boeing's position is that the concentrations of chloride will vary based on rainfall, erosion, and TSS concentrations at the monitoring location.

This chloride exceedance occurred on the first flow event in this watershed following the Topanga fire. Chloride is a naturally occurring salt, which typically is released upon combustion of native plant materials (Bayley, et al, 1992), thus increasing soil concentrations of chloride and other salts that constitute Total Dissolved Solids. Chloride is very soluble and likely to migrate rapidly with water. Subsequent flow events at this outfall did not have chloride concentrations in excess of permit limits. Boeing suspects that this chloride exceedance was the result of a first flush post-fire phenomenon and will not recur.

Outfall 005 contains a BMP system that is currently undergoing a BMP Effectiveness Monitoring Program, in accordance with Boeing's iterative BMP process. Boeing will continue to monitor for all data, improve BMPs, and implement measures to minimize impacts to storm water.

Total Dissolved Solids (TDS) -- TDS was detected at Outfall 005 on January 1 at a concentration of 980 mg/L, as compared to its permit limit of 850 mg/l. TDS will continue to be monitored in accordance with the NPDES permit and subsequent actions, if any, will be based on the recurrence of TDS at concentrations greater than the permit limit.

TDS is naturally occurring and is expected to be present in natural surface water that flows in natural drainages. Boeing's investigations have shown that the concentrations of TDS will vary based on rainfall near and at the monitoring location. Boeing's position is that the non-compliant event for TDS is from naturally occurring sources affected by the wildfires that denuded vegetation. The burning of this vegetation is likely to increase the soluble salt and minerals in surface soils that would be available to surface runoff.

This TDS exceedance occurred on the first flow event in this watershed following the Topanga fire. TDS is comprised of naturally occurring salts (including chloride), which typically are released upon combustion of native plant materials, thus increasing soil concentrations of salts that constitute TDS. TDS tends to be very soluble and likely to migrate rapidly with water.

Boeing will continue to evaluate all data, improve BMPs, and implement measures to minimize TDS migration to and within surface water.

TCDD – There was a single permit limit exceedances on April 15. Boeing has investigated potential source areas of TCDD in the vicinity of Outfall 005 Under the direction of the DTSC and Boeing removed impacted soil and sediment upgradient



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of the outfall sampling location in 2001. Additional steps have been taken, such as BMP implementation, to mitigate further potential of TCDD and mercury impacts to surface water quality. However, the presence of this compound in both soil background and other regional sources, including fire-related materials, is well documented in the scientific literature, as referenced above, and can contribute to surface water quality.

Boeing has installed a retention system capable of containing the 10-year 24-hour storm at this location. The retained water will be filtered through several media, including activated carbon to remove constituents prior to the water's discharge. Activated carbon is well known to be effective at removing dioxins and fine organic particulates.

Storm Water Outfall 006

There were no exceedances at Outfall 006 during the year.

Storm Water Outfall 007

Exceedance Summary

Outfall 007 had four exceedances for constituents with permit limits collected at this outfall during the 2006 monitoring period. As summarized in Table 3:

- On January 1 and April 5, TCDD was detected at concentrations of 3.25×10^{-7} and 7.69×10^{-7} ug/L, respectively, compared to the permit limit of 2.8×10^{-8} ug/L.
- On April 5, copper was detected at 25 ug/L compared to the permit limit of 14 ug/L.
- On April 5, lead was detected at 18 ug/L compared to the permit limit of 5.2 ug/L.

Exceedance Discussion

TCDD -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of TCDD in both soil background and other regional sources, including fire-related materials, is well documented in the scientific literature, as referenced above, and can contribute to surface water quality. As such, and given the limited occurrence of these exceedances at Outfall 007, Boeing's position is that the TCDD TEQ being measured in surface water is most likely coming from naturally occurring or regional background sources.



Boeing has installed a retention system capable of containing the 2-year 24-hour storm at this location. The retained water will be filtered through several media, including activated carbon to remove constituents prior to the water's discharge. Activated carbon is well known to be effective at removing dioxins and fine organic particulates.

Copper -- Copper is naturally occurring and has been detected in DTSC-approved locations for background soil samples (MWH, 2005). Additionally, as indicated in the 1st and 2nd quarterly DMRs, similar copper concentrations in surface water from both onsite and offsite locations following the Topanga Wildfire in Fall 2005.

Boeing's investigations have shown that these exceedances may be the result of post-fire increased sediment loads that transported a greater amount of native soil and ash, both of which contain copper. Boeing will continue to evaluate copper values across the site to better understand their occurrence and whether their occurrence diminish as native vegetation returns and sediment load to the outfall location decreases. Boeing will continue to evaluate all data, improve BMPs, and implement measures to minimize sediment and resulting metals migration to and within surface water.

The retention and treatment system described above at this location has particulate filtration as well as activated carbon. This particulate filtration is expected to remove solids containing metal from the water prior to its discharge.

Lead – Based on the extensive history of compliance with lead discharge limits at Outfall 007, . Therefore, based on the data reviewed and an occasional sporadic exceedance, that the non-compliant events for lead are thought to be from naturally occurring sources.

The retention and treatment system described above at this location has particulate filtration as well as activated carbon. This particulate filtration is expected to remove solids containing metals from the water prior to its discharge.

Storm Water Outfall 008

Exceedance Summary

Outfall 008 had one permit limit exceedance for constituents with permit limits collected at this outfall during the 2006 monitoring period, as summarized in Table 3:

- On April 15, lead was detected at 18 ug/L compared to the permit limit of 5.2 ug/L.



Exceedance Discussion

Lead -- Based on the data reviewed and an occasional sporadic exceedance, that this non-compliant event for lead from naturally occurring sources.

Erosion control within this watershed has been improved to try to prevent excessive solids loading, which may result in exceedances of constituents such as lead, which occur naturally in the soils within the watershed.



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Storm Water Outfall 009

Exceedance Summary

Outfall 009 had three permit limit exceedances for constituents with permit limits collected at this outfall during the 2006 monitoring period, as summarized in Table 3:

- On April 4, TCDD was detected at 1.77×10^{-5} ug/L compared to the daily max permit limit of 2.8×10^{-8} ug/L.
- On April 4, copper was detected at 26 ug/L compared to the daily max permit limit of 14 ug/L.
- On April 4, lead was detected at 64 ug/L compared to the daily max permit limit of 5.2 ug/L.

Exceedance Discussion

TCDD -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of TCDD in both soil background and other regional sources, including fire-related materials, is well documented in the scientific literature, as referenced above, and can contribute to surface water quality. As such, and given exceedance at Outfall 009, that the TCDD TEQ being measured in surface water is most likely coming from naturally occurring or regional background sources.

Erosion control within this watershed has been improved to try to prevent excessive solids loading, which may result in exceedances of constituents such as TCDD, which occur naturally in the soils within the watershed. Furthermore, extensive ash removal has taken place in this drainage to reduce the sources of TCDD and metals.

Copper -- A comparison of the copper result against historic copper results for Outfall 009 indicates concentration greater than previous concentrations. is a naturally occurring metal and been detected in DTSC-approved locations for background soil samples (MWH, 2005).

Erosion control within this watershed has been improved to try to prevent excessive solids loading, which may result in exceedances of constituents such as copper, which occur naturally in the soils within the watershed.

Lead -- Based on the extensive history of compliance with lead discharge limits at Outfall 009, the non-compliant lead result does not appear to be representative of the discharge water quality at this location. Therefore, based on the data reviewed and an occasional sporadic exceedance, that these non-compliant events for lead are naturally occurring sources and affected by excessive rainfall and resultant increases in which increased sediment loading at the monitoring location and TSS.

Erosion control within this watershed has been improved to try to prevent excessive solids loading, which may result in exceedances of constituents such as lead, which occur naturally in the soils within the watershed.

Storm Water Outfall 010

Exceedance Summary

Outfall 010 had three daily max permit limit exceedance for the constituents with permit limits collected at this outfall during the 2006 monitoring period. As summarized in Table 3:

- On March 29, April 5, and December 10, TCDD was detected at 3.54×10^{-7} ug/L, 5.70×10^{-7} ug/L, and 3.31×10^{-7} ug/L, respectively, compared to the daily max permit limit of 2.8×10^{-8} ug/L.

Exceedance Discussion

TCDD -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of TCDD in both soil background and other regional sources, including fire-related materials, is well documented in the scientific literature, as referenced above, and can contribute to surface water quality. As such, and given the limited occurrence of these exceedances at Outfall 010, Boeing's position is that the TCDD TEQ being measured in surface water is most likely coming from naturally occurring or regional background sources.

An extensive activated carbon and zeolite filtration structural BMP has been placed at Outfall 010. Activated carbon is well known to strongly adsorb dioxins and organic particulate mater, which may contain dioxins. Therefore, this filtration BMP is expected to capture TCDD that may be in stormwater flowing within this watershed within the design parameters of the BMP. The BMP will be upgraded and



improved in accordance with the 13267 workplan based on monitoring its ability to comply with permit requirements.

In January 2007, upon becoming aware of the December 10 permit limit exceedance following installation of the new BMP, Boeing implemented an evaluation test of the BMP at Outfall 010 to determine its effectiveness in removal of permitted constituents. Water from a domestic supply source on site was applied to the area upstream of the BMP and influent and effluent samples were collected to determine the removal of total suspended solids, total dissolved solids, chloride, sulfate, mercury, and lead. Water used in this evaluation was captured and containerized to prevent discharges from the outfall. Boeing is currently evaluating this system. Once the results have been received and reviewed, additional upgrades and/or maintenance will be implemented as necessary.

Outfall 011

Exceedance Summary

Outfall 011 had two daily max permit limit exceedances, and four monthly average permit limit exceedances of constituents with permit limits collected at this outfall during the 2006 monitoring period. As summarized in Table 3:

- On March 29 and April 5, TCDD was detected at 3.24×10^{-7} ug/L, and 5.14×10^{-7} ug/L compared to the daily max permit limit of 2.8×10^{-8} ug/L. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average permit limits for TCDD TEQ were exceeded in March, and April at concentrations of 3.24×10^{-7} ug/L, and 5.14×10^{-7} ug/L, respectively, compared to the monthly average permit limit 1.40×10^{-8} ug/L.
- There were no daily exceedances of permit limit for lead. Monthly average concentrations were computed using all samples collected in a single month, and monthly average permit limits for lead were exceeded in March and April at concentrations of 3.0 ug/L, and 3.7 ug/L, respectively compared to the monthly average permit limit of 2.6 ug/L.

Exceedance Discussion

TCDD -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of TCDD in both soil background and other regional sources, including fire-related materials, is well documented in the scientific literature, as referenced above, and can contribute to surface water quality. Boeing's position is that the TCDD TEQ being measured in surface water is most likely coming from naturally occurring or regional background sources.



An activated carbon and zeolite filtration structural BMP has been placed at Outfall 011. Activated carbon is well known to strongly adsorb dioxins and organic particulate matter, which may contain dioxins. Therefore, this filtration BMP is expected to capture TCDD that may be in stormwater flowing within this watershed within the design parameters of the BMP.

Lead -- Based on the data reviewed and an occasional sporadic exceedance, Boeing's position is that these non-compliant events for lead are thought to be from naturally occurring sources.

The activated carbon and zeolite filtration structural BMP at Outfall 011 will remove lead and particulate matter containing lead from flows that discharge from Outfall 011. Zeolite is well known to have a high cation exchange capacity, which facilitates the removal of various dissolved metals and fine particulates containing metals. This filtration BMP at Outfall 011 is expected to remove some lead that may be in stormwater flows within the design parameters of the BMP.

Storm Water Outfall 018

Exceedance Summary

Outfall 018 had two daily max permit limit exceedances, one mass-based daily max permit limit, and three monthly average permit limit exceedances for constituents with permit limits collected at this outfall during the 2006 monitoring period. As summarized in Table 3:

- On March 29 and April 4, TCDD was detected at 3.40×10^{-7} ug/L, and 1.26×10^{-6} ug/L compared to the daily max permit limit of 2.8×10^{-8} ug/L. On April 4, TCDD was also detected at 5.54×10^{-8} lbs/day based on measured flow as compared to the mass-based permit limit of 3.7×10^{-8} lbs/day. Monthly average concentrations were also computed using all samples collected in a single month, and monthly average permit limits for TCDD TEQ were exceeded in March, and April at concentrations of 1.77×10^{-7} ug/L, and 6.38×10^{-7} ug/L, respectively, compared to the monthly average permit limit 1.40×10^{-8} ug/L.
- There were no daily exceedances of permit limit for TSS. Monthly average concentrations were computed using all samples collected in a single month, and monthly average permit limits for TSS were exceeded in May at concentrations of 20 mg/L, compared to the monthly average permit limit of 15 mg/L.

Exceedance Discussion

TCDD TEQ (Dioxin) -- Boeing will continue to investigate sources of TCDD onsite. However, the presence of TCDD in both background soils and fire-related



materials is well documented in the scientific literature (USEPA, 2000, Gullet and Touati 2003) and substantiated by previously completed on- and offsite studies (MWH, 2005), and presented in the Flow Science Background Report. These reports suggest that the levels of TCDD TEQ measured in surface water at the SSFL could be primarily from wildfire combustion processes, regional atmospheric deposition, and other naturally occurring sources over which Boeing has no reasonable control.

An extensive activated carbon and zeolite filtration structural BMP has been placed at Outfall 018. Activated carbon is well known to strongly adsorb dioxins and organic particulate mater, which may contain dioxins. Therefore, this filtration BMP is expected to capture TCDD that may be in stormwater flowing within this watershed.

Total Suspended Solids (TSS) -- At Outfall 018 there was a single dry weather monitoring event that occurred on May 17, 2006. As indicated in the permit, TSS limits for Outfalls 001, 002, 011, and 018 apply only during dry weather discharges. Dry weather discharges are considered discharge events if they occur more than seven days after a storm event has passed. Although this sample was below the daily maximum permit limit, it exceeded the monthly average permit limit for Total Suspended Solids in dry weather discharges. Since there was only one sample for the month of May, (wet or dry weather,) other samples to more robustly determine the monthly average could not be collected following the initial monitoring event. Peak TSS concentrations and the variance in TSS concentrations following the Topanga fire have increased at all storm water and storm water dominated outfalls at the SSFL (Flow Science Background Report). Boeing has implemented, maintained, and evaluated BMPs across the Site, and will continue to update BMPs, as appropriate, in order to assist in controlling suspended solids transport in surface water runoff.

The activated carbon and zeolite filtration structural BMP is expected to remove particulate matter as well from storm flows passing through it due to its filtration action within the design parameters of the BMP.

CORRECTIVE ACTIONS

Throughout 2006, Boeing took numerous actions to improve the quality of surface water discharges as discussed previously in this document. In addition to those activities discussed above, Boeing completed Storm Water Pollution Prevention Plan (SWPPP) reviews, updates, and inspections in accordance with facility and project-specific SWPPPs and Best Management Practices Plans (BMPs). These documents, which are maintained per regulatory requirements, were updated in 2006 to better document Boeing's proactive efforts to mitigate the effects of the Topanga Wildfire and to minimize the potential for sediments, constituents, or onsite activities to



2006年5月17日，波音公司（Boeing）在SSFL（Stormwater Sampling and Filtration Laboratory）进行了TCDD（2,3,7,8-四氯二苯并-p-二噁英）的监测。监测结果显示，SSFL表面水中的TCDD TEQ水平可能主要来自野火燃烧过程、区域大气沉降以及其他自然发生的来源，而这些来源是波音公司无法合理控制的。

2006年5月17日，波音公司（Boeing）在SSFL（Stormwater Sampling and Filtration Laboratory）进行了TCDD（2,3,7,8-四氯二苯并-p-二噁英）的监测。监测结果显示，SSFL表面水中的TCDD TEQ水平可能主要来自野火燃烧过程、区域大气沉降以及其他自然发生的来源，而这些来源是波音公司无法合理控制的。

impact surface water. The SWPPP annual evaluation is included as Section 15 of this report.

The following table lists the Outfall location and respective BMP activities completed during the 2006 calendar year:

OUTFALL	BMP ACTIVITIES DURING 2006
001 (South Slope below Perimeter Pond)	Installed additional straw bales and fiber rolls; repaired and modified straw and fiber rolls; maintained drainage system consisting of culvert cleaning and debris removal. Maintained upstream erosion control measures and removed debris. BMP activities at Outfall 011 will also contribute to Outfall 001's improvements.
002 (South Slope below R-2 Pond)	Additional straw bales and fiber rolls; repaired and modified straw and fiber rolls; drainage system culvert and debris. BMP activities at Outfall 018 will also contribute to Outfall 002's improvements.
003 (RMHF)	Repaired and maintained BMPs such as straw bales, fiber rolls, silt fence, and media filter. Completed installation of structural at-grade three stage sand, granular activated carbon (GAC), and zeolite storm water filter system with high-density polyethylene (HDPE) underdrain flow barriers and a piping system to evenly distribute water flow across the media bed and to allow for adequate retention time.
004 (SRE)	Repaired and maintained BMPs such as plastic tarp, silt fencing, sandbag barrier dual media filtration under drain filtration system. Completed installation of a three stage sand, GAC, and zeolite storm water filter system with HDPE underdrain flow barriers and an underdrain hydraulic flow distribution device to uniformly distribute storm water over the surface of the filter bed.
005 (FSDF-1)	Repaired and maintained drainage system and BMPs such as, silt fencing, fiber rolls, media filter. Completed installation of retention basin for storm water and installation of a sand and GAC filtration system, with pumps and tanks to treat storm water prior to discharging.
006 (FSDF-2)	Repaired and maintained drainage system and BMPs such as, silt fencing, fiber rolls, dual media filter; installed fiber rolls around oak trees; repaired plastic tarp. Completed structural BMP installation that consists of a sand filter bed upstream of the GAC/zeolite media





OUTFALL	BMP ACTIVITIES DURING 2006
	filter bed; with an HDPE underdrain flow barrier installed between the sand and GAC/zeolite to provide even water flow distribution.
007 (Building 100)	Repaired and maintained BMPs, such as, silt fencing, fiber rolls, vegetative barrier, and media filter. Completed installation of retention basin for storm water and installation of a sand and GAC filtration system, with pumps and tanks to treat storm water prior to discharging.
008 (Happy Valley)	Installed additional straw bales, fiber rolls, and silt fence; maintained velocity dissipation device and drainage system. Upstream maintenance of erosion control measures and debris removal.
009 (WS-13 Drainage)	Cleaned up debris; cleaned up drainage system; maintained upstream erosion control measures and removed debris.
010 (Building 203)	Completed structural BMP modification of sedimentation basin into a layered GAC/zeolite and sand filter bed with an underdrain system. Additionally, installed fiber rolls along the hillside of Building 203 and hydroseeded ground disturbed during construction activities.
011 (Perimeter Pond Flume)	Placed additional straw bales and fiber rolls; repaired straw bales in drainage north of perimeter pond. Installed activated carbon and zeolite filter bed to treat pond effluent. Maintained upstream erosion control measures and removed debris.
012 (Alfa Test Stand)	Designed, procured materials, and commenced construction for retention and pumping facility for Alfa Test Stand deluge water. This BMP will not be completed as no further rocket engine testing is planned at Alfa Test Stand. Test activities ceased as of March 9, 2006.
013 (BRAVO Test Stand)	No activity. No longer in use.
014 (APTF Test Stand)	No activity. No longer in use.
015 (STP I)	No activity. Wastewater currently hauled offsite – no discharges.
016 (STP II)	No activity. Wastewater currently hauled offsite – no discharges.
017 (STP III)	No activity. Wastewater currently hauled offsite – no discharges.



OUTFALL	BMP ACTIVITIES DURING 2006
018 (R-2 Spillway)	<p>Implemented upstream erosion control measures and cleaned up debris. Conducted R-2 pond spillway maintenance. Set up R-2 pond pilot test upstream of Outfall 018. (See Pilot Test description below.)</p> <p>Installed structural BMP that consists of a series of eight filter cells in the R-2 Pond concrete overflow channel. Each filter cell is connected in a parallel flow arrangement, with each filter cell filled with GAC and zeolite. The top of each filter cell is covered with 4-inches of 2-inch minus crushed rock to prevent erosion of the filter media. Underdrain pipes were installed on the bottom of each filter cell and covered with a filter sleeve and bedded in 6-inches of a coarse sand to prevent loss of GAC through the underdrain system.</p>

REASONABLE POTENTIAL ANALYSIS (RPA)

The 2006 NPDES Permit requires that Boeing perform a quarterly Reasonable Potential Analysis (RPA) and include it as part of each quarterly report. Boeing, in consultation with MWH and Flow Science Incorporated (Flow Science), has reviewed the quarterly RPA reporting requirements and procedures outlined in the 2006 NPDES permit; the RPA procedures as outlined in the SIP; the TSD; the RPA results reported in Attachments 1, 2, 3, and 4 of the 2006 NPDES permit; and Microsoft Excel spreadsheets utilized by the RWQCB staff to conduct the 2006 NPDES Permit RPA.

Following review of these documents, MWH and Flow Science provided a white paper entitled “Reasonable Potential Analysis Methodology Technical Memo; Santa Susana Field Laboratory, Ventura, California,” (MWH and Flow Science, 2006) that outlined the step-by-step process to be used by Boeing to conduct its quarterly RPA. This white paper was provided to the RWQCB on May 8, 2006, and contains full details of the RPA evaluation procedures used by Boeing, as required in the SSFL NPDES Permit.

Outfall monitoring data were collected only for Outfalls 001-012, and 018. Relevant data from were added to the RPA data set as per the MWH and Flow Science 2006 RPA procedures for three of the four outfall monitoring groups ((a) Outfalls 001, 002, 011, 018, (b) Outfalls 003-010, and (c) Outfalls 012-014), permit. Analytical results for 2006 did not trigger reasonable potential for any constituents not already regulated under the current NPDES permit. Complete RPA tables for the outfall monitoring groups are provided in Section 14.

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.

CONCLUSIONS

Based on the reported data in 2006 and in previous years, and consistent with published studies referenced in this report, Boeing's position is that most of the constituents that exceeded permit limits result from naturally occurring contributions (e.g., wildfires, native soils), or were detected at concentrations consistent with regional background concentrations and, therefore, were not the direct result of a known discharge or release from an industrial process or historical contamination on the site.

However, former industrial activities at the SSFL may have impacted localized areas of onsite soils and sediments that could have potentially affected surface water quality at some outfalls. Under DTSC supervision, mitigation actions were implemented in 2006 and previous years to manage surface water impacts potentially resulting from former industrial activities. These mitigation actions consisted of implementing an extensive system of BMPs. Boeing has deployed and continues to deploy BMPs to minimize the potential for surface water to contact contaminated onsite soils, sediment, or bedrock, and to minimize transport of soils and/or sediment that may be impacted with constituents regulated in the SSFL NPDES permit.

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

TCDD TEQ -- TCDD TEQ concentrations are monitored in accordance with the NPDES permit. An iterative BMP evaluation and implementation process is being used, as necessary and appropriate, to address TCDD TEQ exceedances. Under oversight by the DTSC, potential onsite sources will be evaluated within the RCRA regulatory framework. Due to how low the limits are and the prevalence of naturally occurring dioxins from non-site generated sources such as atmospheric deposition, compliance with the limits may not be possible.

Copper, Manganese, Iron, Lead, Nitrate+Nitrite as Nitrogen, TDS, Surfactants -- Copper, manganese, iron, lead, nitrate+nitrite as nitrogen, TDS, and surfactants concentrations are monitored in accordance with the NPDES permit. The aggressive BMPs implemented across the site during the third and fourth quarter of 2006 were installed to target particulate, metal, and organic constituents. Due to limited rainfall during the latter part of 2006, the effectiveness of the upgraded BMPs has not yet been determined. Future surface water sample results will be monitored and if



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exceedances recur, they will be evaluated with consideration of potential onsite sources as part of the RCRA program under the oversight of the DTSC. BMPs will be reviewed, evaluated, and implemented as necessary, to minimize the potential for permit limit exceedances.

Monthly average permit limits are not appropriate for inconsistent, sporadic, and infrequent storm water dominated discharge such as that at SSFL. Based on the data collected from the SSFL, monthly average permit limit exceedances are typically the result of a single exceedance of a daily maximum limit where there are no additional rainfall events, or monitoring data, during the month. Since industrial discharges are no longer occurring at SSFL, Boeing has requested that monthly limits be removed from the permit.

FACILITY CONTACT

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

CERTIFICATION

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

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

Executed on the 1st day of March 2006 at the Boeing Company, Santa Susana Field Laboratory.

Very truly yours,



Thomas D. Gallacher, Director
SSFL - Safety, Health, & Environmental Affairs
Shared Services Group

LW:bjc
Enclosures

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cc: Jim Pappas, Department of Toxic Substances Control
Stephen Baxter, Department of Toxic Substances Control
Robert Marshall, California State University – Northridge, Library
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ENCLOSURES:

Table 1 2006 Rainfall Summary
Table 2 2006 Liquid Waste Shipments
Table 3 2006 Summary of Permit Limit Exceedances

Figure 1 Storm Water Drainage System and Outfall Locations

Attachments:

Section 1	Outfall 001	South Slope below Perimeter Pond
Section 2	Outfall 002	South Slope below R-2 Pond
Section 3	Outfall 003	RMHF
Section 4	Outfall 004	SRE
Section 5	Outfall 005	FSDf-1
Section 6	Outfall 006	FSDf-2
Section 7	Outfall 007	Building 100
Section 8	Outfall 008	Happy Valley
Section 9	Outfall 009	WS-13 Drainage
Section 10	Outfall 010	Building 203
Section 11	Outfall 011	Perimeter Pond Flume
Section 12	Outfall 012	Alfa Test Stand
Section 13	Outfall 018	R-2 Spillway
Section 14	Reasonable Potential Analysis (RPA) Summary Tables	
Section 15	Storm Water Pollution Prevention Plan Annual Evaluation	
Section 16	Analytical Laboratory Methods, Method Detection Limits, Reporting Limits, QA/QC Procedures, and ELAP Certifications	

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