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HAND DELIVERED

November 14, 2007
In reply refer to SHEA-106610

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: Third Quarter 2007 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 Third Quarter of 2007. This DMR provides the results of the sampling that occurred for the SSFL outfalls (Figure 1) for the period of July 1st through September 30th of 2007 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.

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.

EXECUTIVE SUMMARY

During the Third Quarter of 2007, Boeing continued to upgrade its best management practices (BMPs) and worked to improve its compliance record. Unfortunately, despite best efforts, samples taken during a storm event on September 21-22, 2007 resulted in a large number of exceedances and record detection levels for multiple constituents. The majority of the exceedances and the record detection levels

occurred at Outfall 002. Boeing personnel, who were inspecting the outfall the morning of September 22 to see if it was flowing for sampling purposes, observed a landslide which deposited soil directly into the streambed just upstream of Outfall 002. Other slope failures were observed in the area and in other canyons in the undeveloped portion of the site where Outfall 002 is located. The last inspection of Outfall 002 conducted prior to the September storm event was on September 7, 2007. None of the slope failures had been observed during this inspection.

In accordance with the NPDES permit, a sample was taken at the outfall despite the fact that the discharge was full of sediment due to the landslide that had just been observed. The results of the sampling showed, as might be expected given the unusually high and atypical amount of sediment in the sample, extremely high levels of total suspended solids (TSS) and elevated levels of 28 regulated constituents.

The landslide and slope failures that occurred were unexpected. The slopes in the areas of Outfall 002 had erosion control best management practices (BMPs) such as straw wattles in place. Additionally, hydromulch was applied to these slopes by helicopter in late 2005 to early 2006 following the 2005 Topanga fire. However, it appears that the hydromulch that had been applied in the areas of Outfall 002 is no longer providing the level of protection against erosion that it did in the first storm season after the fire. (Due to the low rainfall during the 2006-2007 storm season, Outfall 002 did not flow until this storm event, last sample collected from Outfall 002 was on May 11, 2006). Furthermore, slopes in these areas are bare or exhibit minimal re-growth of annual grasses, a lasting effect of the Topanga fire. Also, as shown in the Phase 2 Post-Fire Soil Hydrophobicity and Recovery of Infiltration report (Geosyntec, 2007), soils in the Outfall 002 watershed were found during the Spring 2007 survey to have severe water repellency, indicating severe burn intensities in these locations and therefore the potential for increased runoff volumes and associated erosion impacts. In summary, the high soil water repellency in this area due to the Topanga fire, along with the minimal revegetation that has occurred and the steepness of the natural slopes, all likely contributed to the landslides.

To address the unstable soils, Boeing has begun a number of measures to stabilize the slopes in the area. Multiple soil stabilization BMPs have been added to those already in place. Since September 22, 2007, Boeing has vacuumed the residual sediment and ash in the channel and on surrounding hillsides to reduce, to the extent feasible, further sediment transport down the channel. Measures are underway to hydroseed the hillside to stabilize the soil. Hydroseed is a semi-liquid organic binder blended with paper or wood fiber/pulp and native seed mixture that is dispersed onto and adheres to the ground surface and soil surface to protect an area from further soil erosion, to aid in minimizing sediment transport, and to decrease the potential for landslides.

While the sampling results would appear to be cause for concern, it should be noted that the results are consistent with the levels of such constituents in naturally occurring background soils and ash at the SSFL that are unaffected by past industrial activities. As discussed in more detail later in this report, the total suspended solids (TSS) concentration in the sample collected from Outfall 002 was 33,000 mg/L. If the observed soil constituent concentrations in water are converted to concentrations in soil (by assuming the constituents are occurring in the suspended sediment, rather than dissolved phase), the resulting sediment concentrations are below SSFL soil and ash background levels reported (MWH, 2005; Flow Science 2006). Thus, it appears that the presence of the natural background sediments and ash in the sample from Outfall 002 could, by itself, result in the exceedances of the permit limits at this outfall and do not indicate or suggest impacts of contamination resulting from historical site operations.

THIRD QUARTER 2007 DISCHARGE MONITORING REPORT (DMR) CONTENTS AND DISCHARGE SUMMARY

Figure 1 is a site location map indicating the locations of the 18 regulated outfalls at the SSFL. A summary of the Third Quarter 2007 precipitation measured at SSFL is presented in Appendix A. All sanitary wastes from the domestic sewage treatment plants (STPs I, II, and III; Outfalls 015, 016, and 017; respectively) were shipped off-site and appropriately managed with no discharges occurring from these outfalls. Details of all liquid waste shipments including the STP waste are summarized in Appendix B. Because discharge did not occur, samples were not collected from these outfalls. Discharges did not occur at Outfalls 012, 013 or 014 (Alfa Test Stand, Bravo Test Stand, or Advanced Propulsion Testing Facility [APTF]), as rocket and propulsion testing activities have ceased at the SSFL. Therefore, samples were not collected at these outfalls.

There was one dry weather discharge event during the Third Quarter 2007. On July 4, 2007, at an unknown time, a leak in the main drinking water supply pipeline occurred which caused approximately 150,000 – 160,000 gallons of drinking water to be discharged into the Outfall 004 best management practice (BMP). The leak was discovered on July 5, 2007, and immediately contained. This was the first discharge event for 2007 at Outfall 004; therefore, an annual sample was collected and submitted for analysis on July 5, 2007.

As detailed in Appendix A, Boeing observed only one rain event with greater than 0.1 inches of rainfall in a 24-hour period. This rainfall event began on September 21 and ended on September 22, 2007. The site rain gauge recorded a total of 1.32 inches of rain between 2:00 pm on September 21 and 11:00 am on September 22, 2007. A field inspection was conducted at the storm water outfall locations during and after this rain event. Flow was observed and samples were collected only at

Outfalls 002, 004, 006, 009 and 010 on September 22, 2007. The field inspection did not indicate flow at the remaining outfall locations.

Samples collected for compliance purposes were submitted to and analyzed by a California-certified analytical laboratory. Appendices C and D contain summary tables of analytical results for surface water samples collected during the Third Quarter 2007. These tables identify the outfall, the constituents evaluated (analytes), the date of sampling, the analytical result, and data validation qualifiers.

A summary table of NPDES Permit limit exceedances based on the surface water analytical data is provided in Appendix E. In addition, the results of a reasonable potential analysis (RPA) utilizing updated monitoring data are provided in Appendix F. Appendix G contains copies of the laboratory analytical reports, chains of custody, and data validation reports. Quarterly Summary Notes are a compilation of notes, abbreviations, and data validation codes that are used in the analytical data summary tables and are included as a supplement in Appendices C, D, E and F.

SUMMARY OF NONCOMPLIANCE

The following summary of noncompliance is organized by outfall locations. Only those outfalls with NPDES Permit limit exceedances are discussed in this report.

Outfall 002

Routine inspections are conducted throughout SSFL, including at Outfall 002, to inspect the BMPs in place. The inspection conducted at Outfall 002 prior to September 22, 2007 showed the newly installed and previously existing sediment control BMPs in place, and no slope failures were observed.

A field inspection during the storm event on September 22, 2007 was conducted at the storm water outfall locations during this rain event. Flow was not observed in the drainage below Outfall 018, the outfall located at the northern boundary of the undeveloped portion upstream of Outfall 002. Additionally flow was not noted in the drainage immediately below Outfall 018. In the undeveloped portion of the property towards Outfall 002, flow was observed coming from the side tributaries in the undeveloped property. At Outfall 002 the flow was very muddy, indicating that it was likely that multiple locations upstream of the outfall and along adjacent hillslopes had given way, depositing significant amounts of sediment and ash into the channel upstream of Outfall 002. A landslide located approximately 30 feet upstream of Outfall 002 was also noted by Boeing personnel and observed depositing mud directly into the streambed of Outfall 002. The storm water sample that was taken was observed to be dark, almost black in color, consistent with high sediment loading. Flow was measured at the Outfall 002 flume starting Saturday, September 22, 2007 at approximately 10:00 am and continuing to approximately

11:00 am the following morning (Sunday, September 23, 2007). The high levels of sediment in the sample caused multiple NPDES Permit limit exceedances.

The Post-Fire Soil Hydrophobicity and Recovery of Infiltration Capacity report (Geosyntec, 2007) submitted by Boeing on July 12, 2007, identified areas of severe water repellency in the Outfall 002 watershed. Wildfires often result in the deposition of a waxy or hydrophobic surface coating on burned soils, causing water repellency, which leads to increased surface runoff and, in turn, increased soil erosion.

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The sample collected at Outfall 002 showed exceedances of NPDES Permit exceedances in the Third Quarter of 2007 for the following constituents: arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, nickel, zinc, ammonia as nitrogen (N), total cyanide, chronic toxicity, gross alpha, gross beta, total combined radium (TCR), and TCDD. Details on these exceedances are discussed below. A summary of the NPDES Permit limit exceedances can be found in Appendix E.

To address this issue, Boeing placed multiple soil stabilization BMPs in place. Additionally, Boeing proceeded, to vacuum the residual sediment and ash in the channel and surrounding hillsides to reduce further sediment transport down the channel to the extent feasible. Since September 22, 2007, approximately 100 cubic yards of ash have been removed from the Outfall 002 drainage since the September 22, 2007 storm event. Measures are underway to hydroseed the hillside to stabilize the soil. Hydroseed is a semi-liquid organic binder blended with paper or wood fiber/pulp and native seed mixture that is dispersed onto and adheres to the ground surface and soil surface to protect from further soil erosion, aid in minimizing sediment transport, and decrease the potential for landslides. Hydromulch previously had been applied to the area in December 2005 and January 2006. Hydromulch is a semi-liquid organic binder blended with paper or wood fiber/pulp without the seed mixture. The hydromulch was applied by helicopter.

Outfall 002 is located in the undeveloped portion of the property where no industrial activities have occurred. Therefore the most reasonable explanation for the concentrations of constituents detected is the presence of naturally occurring sediments in an unusually high and atypical amount in the Outfall 002 channel flow due to the landslide that deposited mud directly into the streambed. Note the total suspended solids (TSS) result for this sample was 33,000 milligrams per liter (mg/L). Prior sampling events ranged from non-detect to 170 mg/L.

Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Nickel, and Zinc

The daily maximum and/or monthly average permit limit exceedances for these constituents, which have been frequently detected in Department of Toxic Substance

Control (DTSC)-approved background soil samples (MWH, 2005, are indicated in the Summary of Permit Limit Exceedances table in Appendix E of this report.

In addition, except for the dissolved concentrations for iron and manganese, all dissolved metal concentrations (including all those with aquatic toxicity and human health-based permit limits) were less than the total metal permit limits, even when a default CTR-based dissolved/total conversion factor is assumed. The permit limits for iron and manganese are not based on the protection of aquatic life or public health, but rather are based on cosmetic/aesthetic (taste and appearance) effects-based secondary drinking water standards. Furthermore, as the dissolved fraction represents the more bioavailable form for these constituents, toxicity impacts to aquatic receptors would not be expected despite the total metal permit limit exceedances. Table 1 summarizes these total and dissolved metal results for comparison with the daily maximum permit limits.

Table 1. Summary of Metal Permit Limit Exceedances at Outfall 002 on September 22, 2007 (exceeding values shown in **bold**)

Constituent	Units	Total Concentration	Dissolved Concentration	Daily Max. Permit Limit
Arsenic	ug/L	**35**	NA	10
Barium	mg/L	**2.3**	0.044	1
Beryllium	ug/L	**11**	ND (<0.90)	4
Cadmium	ug/L	**6.9**	ND (<0.22)	3.1
Chromium	ug/L	**100**	ND (<2.0)	16.3
Copper	ug/L	**100**	7.9	14
Iron	mg/L	**97**	**0.62**	0.3
Lead	ug/L	**310**	1.9	5.2
Manganese	ug/L	**11,000**	**260**	50
Nickel	ug/L	**110**	5.3	96
Zinc	ug/L	**790**	ND (<6.0)	119

Ammonia as Nitrogen (N)

Ammonia as nitrogen (N) was detected at a concentration of 5.9 mg/L in the storm water sample collected from Outfall 002 on September 22, 2007. This concentration was less than the daily maximum permit limit of 10.1 mg/L, but exceeded the monthly average permit limit of 1.96 mg/L (Appendix E). 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 in September, and this single sample result was used to evaluate monthly average permit compliance. Wild 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). Boeing believes that the ammonia as nitrogen

(N) concentration observed in this one sample is the result of the September 22 landslide causing the deposit of native soils and ash into the channel.

Total Cyanide

The total cyanide concentration at Outfall 002 exceeded the daily maximum of 8.5 micrograms per liter (ug/L) at a concentration of 10 ug/L. As this was the first and only flow event at Outfall 002 in 2007, this also resulted in an exceedance of the monthly average permit limit of 4.3 ug/L.

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 (Gallaher and Koch, 2004), some of which may have been used in combating the Topanga Wildfire.

Chronic Toxicity

Sampling for toxicity consists of both acute and chronic toxicity for SSFL samples. The acute toxicity test is performed on the fathead minnow *(pimephales promelas)* and the chronic toxicity test is performed on the water flea *(ceriodaphnia dubia)*. The survival results showed 100 percent survival for the acute and chronic toxicity test and No Observable Effect Concentration (NOEC) of 100 percent sample for chronic toxic units (TUc) value of 1.0, which meets compliance with the permit. However, there are two components to the chronic toxicity test: survival and reproduction. Typically, young organisms are more sensitive to chemicals than older organisms. Since reproduction is generally a sensitive endpoint, tests are continued until reproduction begins. The reproduction component of the test showed low reproduction counts when the sample concentration was higher than 6.25 percent (the NOEC). This results in a TUc of 16.0, which exceeds the permit limitation for this test and therefore chronic toxicity exceeded permit limits at Outfall 002 on September 22, 2007.

As previously described, a number of constituents detected in the September 22 sample exceeded their NPDES Permit limits, which most likely caused the chronic toxicity reading of 16.0 TUc. Because prior tests for chronic toxicity at this outfall have never exceeded the permit limit of 1.0 TUc, the most reasonable conclusion is that the elevated TUc value detected was the result of the unusually high amount of native soils present in this sample from the landslide previously described

TCDD TEQ

The reported concentration of TCDD TEQ in the sample collected on September 22, 2007, from Outfall 002 was 4.26×10^{-5} ug/L, which is above the NPDES Permit limit of 2.80×10^{-8} ug/L. As this was the first and only flow event at Outfall 002, this also resulted in an exceedance of the monthly average permit limit of 1.4×10^{-8} ug/L.

Additionally, based on measured flow at Outfall 002, TCDD TEQ also exceeded mass-loading daily maximum NPDES Permit limit of 3.70×10^{-8} pounds per day (lbs/day) and monthly average NPDES Permit limit of 1.90×10^{-8} lbs/day at resulting concentrations of 8.31×10^{-8} lbs/day and 2.82×10^{-8} lbs/day, respectively.

Prior TCDD TEQ results at this outfall have ranged from non-detect to 2.32×10^{-6} ug/L. Because of the difference between the September 22 event and prior events, it appears that the TCDD TEQ permit limit exceedances was most likely due to the high TSS concentrations caused by the landslide at Outfall 002. The presence of TCDD in both background soils and fire-related materials is well documented in scientific literature (USEPA, 2000; Gullet and Touati, 2003). These findings are further substantiated by previously completed on- and offsite studies (MWH, 2005) as presented in the Flow Science Background Report (Flow Science, 2006). These reports suggest that the levels of TCDD TEQ measured in surface water samples at the SSFL may result primarily from wildfire combustion processes, regional atmospheric deposition, and other off-site sources.

Comparison of Permit Exceedances to Background Soil Concentrations

Under the Resources Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Program at SSFL, DTSC-approved soil samples were collected from "background" areas of the site that represent ambient local background levels unaffected by industrial activities at SSFL (MWH, 2005). The TSS concentration in the sample collected from Outfall 002 was 33,000 mg/L. As shown in Table 2 below, if measured constituent concentrations in water at outfall 002 are converted to sediment concentrations by dividing by the TSS concentration (assuming that constituent concentrations are in the suspended sediment, rather than dissolved, phase), these calculated values are less than soil background levels, or in the case of TCDD, between background levels for soil and ash. Thus it appears that measured concentrations of regulated constituents at outfall 002 are consistent with high levels of background soil and ash in the sample.

Table 2 Comparison of additional background soil concentrations and TSS

ANALYTE	9/22/07 Result Outfall 002	Units	9/22/07 TSS Result Outfall 002	Calculated Equivalent Soil Concentration	Units	Soil Background Comparison Level Values (MWH, 2005)
Arsenic	35	ug/L	33,000	1.1	mg/kg	15
Barium	2.3	mg/L	33,000	70	mg/kg	140
Beryllium	11	ug/L	33,000	0.3	mg/kg	1.1
Cadmium	6.9	ug/L	33,000	0.2	mg/kg	1
Chromium	100	ug/L	33,000	3.0	mg/kg	37
Copper	100	ug/L	33,000	3.0	mg/kg	29
Iron	97	mg/L	33,000	2,939	mg/kg	28,000
Lead	310	ug/L	33,000	9.4	mg/kg	34
Manganese	11000	ug/L	33,000	333	mg/kg	495
Nickel	110	ug/L	33,000	3.3	mg/kg	29
TCDD TEQ	4.26×10^{-5}	ug/L	33,000	1.3	ng/kg	0.5 (1.6 for ash)
Zinc	790	ug/L	33,000	24	mg/kg	110

ng/kg – nanograms per kilogram

Radiological Constituents

NPDES Permit limit exceedances occurred during the Third Quarter of 2007 for gross alpha, gross beta, and total combined radium 226 & 228. Exceedances of these radiological constituent permit limits occurred in annual storm water samples collected from Outfall 002 on September 22, 2007.

The reported concentration of gross alpha in the Outfall 002 September sample was 701±170 pico curies per liter (pCi/L). The NPDES Permit limit for gross alpha is 15 pCi/L. The reported concentration of gross beta in the Outfall 002 September sample was 426±95 pCi/L. The NPDES Permit limit for gross beta is 50 pCi/L.

Annual samples collected on September 22, 2007 from Outfall 002 were analyzed for gross alpha and gross beta as indicated in the NPDES Permit. Outfall 002 was tested for the remaining radiological constituents as well (total combined radium 226 & 228, strontium-90, and tritium). In accordance with the NPDES Permit, total combined radium was subsequently analyzed from the same sample. Total combined radium results were above the daily maximum permit limit, and therefore contingent analyses for strontium-90 and tritium were conducted as required in the NPDES Permit.

The reported concentration of total combined radium 226 & 228 in the Outfall 002 September sample was 17.01±1.30 pCi/L. The NPDES Permit limit for combined radium 226 & 228 is 5 pCi/L. Strontium-90 and tritium did not exceed the permit limits of 8 pCi/L and 20,000 pCi/L, respectively.

Page T-8, footnote 6 of the NPDES Permit indicates that following an exceedance of an annual constituent, monitoring frequency is increased to once per discharge until the results of four consecutive analyses demonstrate compliance with the effluent limitations. Therefore, Boeing will continue to monitor for gross alpha and gross beta, and radium 226 & 228 at Outfall 002 when flow occurs as required by the NPDES Permit.

Additional analyses not required by the NPDES Permit were conducted[1] on excess sample volume from Outfall 002 with radiological exceedances. Gamma spectroscopy analysis was performed, which can detect the presence of natural and man-made gamma emitting nuclides that may be a source of gross alpha and gross beta in the samples where NPDES Permit limit exceedances were detected.

Strontium-90, tritium and gamma spectroscopy results are reported in the data tables in Appendix D. These results include SSFL alpha- and beta-gamma contaminants of concern (cesium-134, cesium-137, cobalt-60, europium-152, europium-154, manganese-54, and uranium).

The gamma spectrometry analysis, however, was not able to determine if these exceedances were from natural or man-made sources as a result of global human activities such as nuclear weapons testing, nuclear research, nuclear power production, and isotope production for medical and industrial purposes known to result in atmospheric deposition of radioisotopes. Both natural and man-made

[1] According to Federal Drinking Water Standards (40 CFR Part 141), when gross alpha gross beta activity exceeds 15 pCi/L and 50 pCi/L,respectively; additional analyses are required that test for man-made alpha- and beta-gamma emitters. In the context of drinking water regulations, the purpose of this additional testing it is to ensure that potential doses from these beta/gamma-emitting radionuclides does not exceed four millirem per year. Note this standard assumes exposure through ingestion as drinking water, which is unlikely to occur in storm water runoff. Flow is so intermittent that drinking water standards based on a lifetime of consumption should not apply. Because drinking water limits are used as the basis for NPDES Permit limits, this additional step was followed to further investigate the cause of the gross beta exceedances.

sources of beta-gamma and natural sources of alpha were detected in the sample at Outfall 002, likely due to the highly turbid nature of the sample.

Using the high 33,000 mg/L total suspended solids to translate from pCi/L activity in turbid water to pCi/g activity in soil, the estimated soil concentrations are typical of non-contaminated soil (naturally occurring potassium-40, uranium, and thorium and their decay products plus cesium-137, and strontium-90 from global background soil concentrations from atmospheric deposition).

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Table 3. Comparison of background radiological soil concentrations and TSS

Outfall 002 Radioisotopes										
Total Suspended Solids	33,000 mg/L 33 g/L								22-Sep-07	
Isotope	**Activity in Water (pCi/L)**			**Equivalent Activity in Soil (pCi/g)**			**Soil Background Range (pCi/g)**			**Source**
Gross alpha	701	+/-	170	21	+/-	5.2	3	-	30	1
Gross beta	426	+/-	95	13	+/-	2.9	22	-	35	1
Potassium-40	268	+/-	38	8.1	+/-	1.2	19	-	25	1
Ra-226 + Ra-228	17.01	+/-	1.301	0.52	+/-	0.04	0.5	-	1.5	1
Strontium-90	2.79	+/-	0.44	0.08	+/-	0.01	<0.005	-	0.13	2
Cesium-137	9.06	+/-	2.3	0.27	+/-	0.07	<0.03	-	0.21	2
Thorium-232	47.8	+/-	11	1.45	+/-	0.33	0.44	-	1.5	1

pCi/g pico curies per gram

1. Bell Canyon Sampling. http://www.etec.energy.gov/Health-and-Safety/Bell-Canyon.htr
2. Brandeis Bardin Sampling. http://www.etec.energy.gov/Health-and-Safety/Documents/BrandeisBardin/AddSoilandWaterSamp.pdf

Gross Alpha

Uranium analysis using gamma spectroscopy was non-detect, but the detection limits were very high. Total uranium could therefore not be subtracted from gross alpha prior to comparison to the 15 pCi/L drinking water limit as required by EPA protocols. However, as indicated in Table 3 above, a comparison of gross alpha activity in soil is within the range of soil background.

Gross Beta

The gross beta limit of 50 pCi/L (15 pCi/L in the new permit) is a screening limit. If the screening limit is exceeded, then potassium-40 should be subtracted and cesium-137, strontium-90 and tritium analysis performed and the total effective dose compared to the 4 millirem per year (mrem/y) exposure limit for beta/gamma emitters. Although, the potassium-40 subtracted gross beta value also exceeds the screening limits (426±95 – 268±38 = 158±102 pCi/L), the 4 mrem/y dose limit is met as shown in Table 4 below.

Table 4. Exposure from Beta/Gamma Emitters Compared to 4 mrem/y

Isotope	Activity (pCi/L)	EPA MCL (pCi/L)	Ratio	Dose (mrem/y)
Cesium-137	9.06	200	0.045	0.2
Strontium-90	2.79	8	0.349	1.4
Tritium	15.4	20,000	0.001	0.0
Total Dose				**1.6**

All outfall radiological monitoring data for the Third Quarter 2007 are included as Appendix D. Analytical laboratory reports are provided in Appendix G.

Outfall 004

The following is a summary of noncompliance at the stormwater only outfall locations on the north slope of SSFL. The following permit limit exceedances are provided in Appendix E.

TCDD TEQ

A NPDES Permit limit exceedance occurred during the Third Quarter of 2007 on September 22, 2007, for TCDD TEQ at Outfalls 004, as detailed in the Summary of Permit Limit Exceedances table in Appendix E of this DMR. The reported concentration\ of TCDD TEQ was 2.54×10^{-6} ug/L, for Outfall 004. This concentrations is above the NPDES Permit limit of 2.80×10^{-8} ug/L.

At this time, Boeing is uncertain where the TCDD in these samples originated, but Boeing will continue to investigate sources of TCDD onsite. The presence of TCDD in both background soils and fire-related materials is well documented in scientific literature (USEPA, 2000; Gullet and Touati, 2003). These findings are further substantiated by previously completed on- and offsite studies (MWH, 2005) as presented in the Flow Science Background Report (Flow Science, 2006) and as reported in the first, second and fourth quarter 2006 DMRs. These reports suggest that the levels of TCDD TEQ measured in surface water samples at the SSFL may result primarily from wildfire combustion processes, regional atmospheric deposition, and other off-site sources.

Additional dioxin removal can be facilitated by increasing the retention time of the water within activated carbon media contained in the BMP installed at Outfall 004. It is unclear exactly what retention time would be necessary to achieve the water-quality based effluent limit of 2.8×10^{-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. 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 effluent limit of $2.8x10^{-8}$ ug/L. One of the few studies identified while researching the literature reported an effluent concentration just below $8.1x10^{-5}$ ug/l (Torrens, 2000). Nevertheless, Boeing is committed to attempting to achieve the water quality based effluent limit, if possible. Since activated carbon is best available technology for dioxin removal from water, BMP upgrades are taking place to increase the hydraulic efficiency and retention time at Outfall 004. Specifically, bagged carbon is being replaced with bulk Mersorb®, which is a sulfur impregnated activated carbon. The bulk placement will reduce hydraulic short-circuiting and increase overall retention time. .

Mercury

Samples collected on September 22, 2007 from Outfall 004 show a permit limit exceedance of mercury, as indicated in Appendix E of this report. The reported concentration of mercury was 0.23 ug/L, which is above the NPDES Permit limit of 0.13 ug/L. The dissolved mercury result for this sample was detected but not quantified (DNQ) at an estimated value (J) of 0.055 ug/L between the laboratory detection limit and the laboratory reporting limit, below the permit limit for Mercury. Currently, upgrades at this outfall are in progress to include installation of Mersorb®, a sulphur-impregnated activated carbon that may help remove mercury, and replacing the bagged granulated activated carbon (GAC) with bulk Mersorb®. The bulk material will allow for more contact time with the filter media.

Outfall 009

Flow in the Outfall 009 drainage was from a side drainage that is fed from the area of the helipad and security parking lot at SSFL. A long term engineered natural treatment system approach is being developed and will include the helipad and parking lot area. Additionally, a remedial action is planned in the drainage of Outfall 009 under the direction of the DTSC and under a Clean-up and Abatement Order (CAO) issued by the Los Angeles Regional Water Quality Control Board (RWQCB) on November 6, 2007 to remove exposed waste observed in the drainage. Additional erosion and sediment controls are also being placed in the watershed.

TCDD TEQ

A NPDES Permit limit exceedance occurred during the Third Quarter of 2007 on September 22, 2007, for TCDD TEQ at Outfall 009, as detailed in the Summary of Permit Limit Exceedances table in Appendix E of this DMR. The reported concentration of TCDD_TEQ was $3.13x10^{-6}$ ug/L, for Outfall 009. This concentration is above the NPDES Permit limit of $2.80x10^{-8}$ ug/L.

At this time, Boeing is uncertain where the TCDD in these samples originated, but Boeing will continue to investigate sources of TCDD onsite. The presence of TCDD in both background soils and fire-related materials is well documented in scientific literature (USEPA, 2000; Gullet and Touati, 2003). These findings are further substantiated by previously completed on- and offsite studies (MWH, 2005) as

presented in the Flow Science Background Report (Flow Science, 2006) and reported in the first, second and fourth quarter 2006 DMRs. These reports suggest that the levels of TCDD TEQ measured in surface water samples at the SSFL may result primarily from wildfire combustion processes, regional atmospheric deposition, and other off-site sources.

Lead

Samples collected on September 22, 2007, from Outfall 009, show a permit limit exceedance of lead. The reported concentration of lead was 8.6 ug/L, which is above the NPDES Permit limit of 5.2 ug/L. However, the dissolved lead result for this sample was estimated at 0.87 ug/L, J(DNQ), which is below this CTR-based permit limit for lead. And because CTR toxicity criteria are based on the dissolved fraction as this represents the more bioavailable form of the metal, toxicity impacts to downstream aquatic receptors would not be expected here despite the total metal permit limit exceedance.

As stated above, a remedial action is planned in the drainage of Outfall 009 under the direction of the DTSC and under a November 6, 2007 CAO issued by the RWQCB to remove exposed waste within the drainage. Additional erosion and sediment controls are being placed in the watershed.

THIRD QUARTER 2007 CORRECTIVE ACTIONS TAKEN

Throughout the Third Quarter 2007, 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), including non-outfall related activities such as, site-wide inspections and metal and debris removal at various areas through-out SSFL. Specific activities by outfall are identified in Table 5.

Table 5. BMP Activities during the Third Quarter 2007

OUTFALL	BMP ACTIVITIES DURING THIRD QUARTER 2007
001 (South Slope below Perimeter Pond)	Sediment control BMPs inspected. Installed new fiber rolls.
002 (South Slope below R-2 Pond)	Sediment control BMPs inspected. Installed new fiber rolls. Plans were initiated to remove ash from the drainage, and install additional sediment and erosion control measures at the landslide areas.
003 (RMHF)	Conducted structural BMP and storm water filter system inspections. Installed gabion dam to retain and filter the 1 year 24-hour storm of 2.3 inches. Rinsed filtration media.

OUTFALL	BMP ACTIVITIES DURING THIRD QUARTER 2007
004 (SRE)	Conducted structural BMP and storm water filter system inspections. Raised height of the sand filter flow barrier to retain and filter the 1 year 24-hour storm of 2.3 inches.
005 (FSDF-1)	Conducted BMP, sedimentation basin and filtration system inspections. Began installation of area for additional Baker tanks to store treated water.
006 (FSDF-2)	Conducted structural BMP and storm water filter system inspections. Began modifications of BMP to improve the hydraulic performance. Rinsed filtration media.
007 (Building 100)	Conducted structural BMP, sedimentation basin and filtration system inspections. Began installation of tanks to level area to allow for additional Baker tanks to store treated water for testing prior to discharge. Began converting the BMP system from diesel powered to electric powered.
008 (Happy Valley)	Sediment control BMPs inspected. Repaired and replaced straw bales and fiber rolls. Initiated project to develop engineered natural treatment systems. Hydroseeded areas within the watershed to control sediment erosion.
009 (WS-13 Drainage)	Completed installation of flume. Initiated project to develop engineered natural treatment systems.
010 (Building 203)	Conducted structural BMP and sedimentation/filtration basin inspections. Installed erosion and sediment controls. Redesigned access to BMP. Rinsed filtration media.
011 (Perimeter Pond)	Conducted BMP and drainage system inspections. Rinsed filtration media.
012 (ALFA Test Stand)	No activity. No longer in use.
013 (BRAVO Test Stand)	No activity. No longer in use.
014 (APTF Test Stand)	No activity. No longer in use.
015 (STP I)	Wastewater currently hauled offsite – no discharges.
016 (STP II)	Wastewater currently hauled offsite – no discharges.
017 (STP III)	Wastewater currently hauled offsite – no discharges.
018 (R-2 Spillway)	Conducted structural BMP and storm water filter system inspections. Rinsed filtration media.

REASONABLE POTENTIAL ANALYSIS (RPA)

Outfall monitoring data were collected during the Third Quarter 2007 for Outfalls 002, 004, 006, 009 and 010 only. Data from this quarter were added to the RPA data set as per the MWH and Flow Science 2006 RPA procedures for the two of the four outfall monitoring groups (a) Outfalls 001, 002, 011, 018, and (b) Outfalls 003-010 (excluding Outfall 008). 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. Laboratory analytical reports, including validation reports and notes, are included in Appendix G. Attachment T-A of the NPDES Permit issued to the SSFL presents the State of California Water Resources Control Board (SWRCB) minimum levels (MLs) for use in reporting and determining compliance with NPDES Permit limits.

The analytical laboratory achieved these MLs for this reporting period when technically possible. When the laboratory reporting limits (RLs) were elevated, the laboratory maximum detectable limits (MDLs) were below the California state MLs. However, some constituents' daily maximum or monthly average discharge limits in the NPDES Permit are less than their respective MLs, and less than the RL. In cases where the NPDES Permit limit is less than the RL and ML, the RL was used to determine compliance. The specific constituents that have NPDES Permit limits that are less than the RL and ML are: mercury (monthly average limit of 0.05 µg/L, RL of 0.1 µg/L); cyanide (monthly average limit of 4.3 µg/L, RL of 5.0 µg/L); and bis-(2-ethylhexyl) phthalate (daily maximum permit limit of 4.0, RL of 4.7 µg/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.

BOEING

Executed on the 14th of November 2007 at The Boeing Company, SSFL.

Sincerely,

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

Figure: 1 Storm Water Drainage System and Outfall Locations

Appendices:
- A Third Quarter 2007 Rainfall Data Summary
- B Third Quarter 2007 Liquid Waste Shipment Summary Tables
- C Third Quarter 2007 Summary Tables, Discharge Monitoring Data, Outfalls 002, 004, 006, 009 and 010
- D Third Quarter 2007 Radiological Monitoring Data, Outfalls 002, 004, and 006
- E Third Quarter 2007 Summary of Permit Limit Exceedances
- F Reasonable Potential Analysis (RPA) Summary Tables
- G Third Quarter 2007 Analytical Laboratory Reports, Chain-of-Custody, and Validation Reports

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

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