REASONABLE POTENTIAL ANALYSIS METHODOLOGY TECHNICAL MEMO
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
VERSION 1 - FINAL

Prepared for:

THE BOEING COMPANY

Prepared by:

Flow Science Incorporated
723 E. Green St.
Pasadena, California 91101

MWH Americas, Inc.
300 N. Lake Avenue, Suite 1200
Pasadena, California 91101

April 28, 2006

Boeing SSFL Technical Memo for RPA Procedures

Executive Summary

New administrative procedures in the 2006 SSFL NPDES Permit monitoring requirements require Boeing to submit a Reasonable Potential Analysis (RPA) with every quarterly monitoring report. Section 1, Paragraph D of the Monitoring and Reporting No. 6027 NPDES guidance for the SSFL states:

> Each quarterly report shall contain a separate section titled "Reasonable Potential Analysis" which discusses whether or not reasonable potential was triggered for pollutants which do not have a final effluent limitation in the NPDES permit. This section shall contain the following statement, "The analytical results for this sampling period did/did not trigger reasonable potential." If reasonable potential was triggered, then the following information should be provided:
>
> a. A list of the pollutant(s) that triggered reasonable potential;
> b. The Basin Plan or California Toxics Rule (CTR) criteria that was exceeded for each given pollutant;
> c. The concentration of the pollutant(s);
> d. The test method used to analyze the sample; and
> e. The data and time of sample collection.

Boeing requested in their Response to the Revised Tentative Waste Discharge Requirements, submitted to the Regional Board on December 30, 2005, that the Regional Board Staff conduct the quarterly RPA. Boeing believes that it is appropriate for the regulatory agency to conduct RPA rather than Boeing, Additionally, after thorough review of the RPA procedures used to date by the Regional Board, Boeing believes there are significant technical issues with those procedures, which make them inappropriate for evaluating RPA for storm water discharges. An appeal of the new limits was filed with the State Water Resources Control Board, which has issued a stay of certain permit limits. Detailed technical grounds for Boeing's position are set forth below:

- As detailed below, the Regional Board has used the reasonable potential procedures outlined in the State of California's Policy for the Implementation of Toxics Standards for Inland Waters, Enclosed Bays, and Estuaries ("State Implementation Policy," or "SIP") and EPA's Technical Support Document for Water Quality-based Toxics Control ("TSD"). The reasonable potential procedures outlined in these documents were developed and are therefore appropriate for steady-state discharges. However, storm flows are significantly different from these steady-state discharges in that they exhibit highly variable rates and water quality constituent concentrations both during and between storms. Thus, the procedures established in the SIP and TSD that are used by the RWQCB to establish reasonable potential are not applicable to storm flows. In fact, to our knowledge, there are no established,

promulgated, or published reasonable potential analysis procedures for storm water discharges.

- The Regional Board RPA methodology applies no background level constituent concentration or receiving water dilution credit to storm water runoff from the SSFL. Boeing believes that naturally occurring and atmospherically deposited background constituent levels should be considered in evaluating reasonable potential for metals and organic constituents found in storm water runoff.

- If the State Board finds that the TSD procedures apply to these discharges, Boeing believes that available monitoring data for certain constituents and at certain outfalls appear to be insufficient to characterize storm water quality and to determine reasonable potential for the site.

- The EPA's TSD specifies that chronic and acute aquatic life water quality criteria allow exceedances to occur once in a 3-year period.[1] The RWQCB, in their determination of RPA, has included constituents for which exceedances occurred less frequently than once in a 3-year period. This is inconsistent with EPA's TSD.

- Although the triggers specified in the SIP help determine whether reasonable potential exists for a given analyte, best professional judgment (BPJ) has often used by the RWQCB as the basis to determine if an effluent limit is to be developed. BPJ requires the permit writer to analyze all of the available information to determine if a limit should be stipulated. Many of the constituents regulated in the SSFL permit have effluent limitations that were established based not upon Tier 1 reasonable potential findings, but rather upon BPJ, as detailed in Tables A-1 and A-2 of Appendix A to this report. For many of these analytes, Boeing disagrees with the BPJ applied by Regional Board staff in the findings of reasonable potential.

The Regional Board adopted the 2006 NPDES permit on January 19, 2006 and further amended this permit on March 9, 2006. Attachments 1, 2, 3, and 4 of the 2006 NPDES Permit contain the results of the RPA analyses performed by the Los Angeles Regional Board for four different Outfall Groups. Regional Board staff have also provided the Microsoft Excel spreadsheets they utilized to conduct the RPA for the 2006 NPDES permit. Boeing has reviewed the quarterly RPA reporting requirements as outlined in the 2006 permit and the RPA procedures as outlined by the SIP, EPA TSD, and Excel spreadsheets provided by the Regional Board staff. As detailed below, Boeing will provide only the statistical results of the SIP and EPA TSD's RPA calculations. These calculations will mirror those performed by the Regional Board staff, or as directed by the RPA procedures in the SIP and EPA TSD, even though Boeing continues to assert that these procedures are inapplicable to the discharges at SSFL. However, Boeing will

[1] The EPA's Technical Support Document for Water Quality-based Toxics Control (EPA TSD), March 1991, pg. 36.

not make additional findings of reasonable potential based upon BPJ. In addition to the concerns listed above, Boeing has identified the following concerns regarding the Regional Board's application of RPA procedures.

1) Two RPA methods have been utilized by the Regional Board. For those constituents listed in the CTR, RPA procedures are based on the SIP methodology. For those constituents not listed in the CTR that are considered nonpriority pollutants, RPA procedures are based on the EPA EPA TSD reasonable potential determination for excursions above ambient criteria. These methods are explained in the following sections.

2) The water quality criteria to which monitoring data are compared in the Regional Board's RPA evaluation for priority pollutants are the most conservative of all available criteria. Criteria are derived from both the Basin Plan and from the CTR (for protection of freshwater aquatic life from both acute and chronic toxicity, and for protection of human health from the consumption of organisms). For many priority pollutants, the most conservative criterion is the CTR freshwater criterion for protection of aquatic life from chronic toxicity. Chronic toxicity criteria are based on long-term exposures, with exposure periods ranging from 4 to 30 days. Thus, chronic CTR criteria do not appear to be applicable for storm flows lasting less than 4 days. Nevertheless, these chronic CTR criteria have been applied to storm flows lasting less than 4 days to determine RPA. We believe that this practice is not an appropriate use of the CTR or SIP. Rather, for exposures shorter than 4 days (for metals) or 30 days (for ammonia), acute CTR criteria are the more appropriate water quality objective. Despite this objection, Boeing will follow the RPA procedures utilized by the Regional Board, which evaluate reasonable potential using both chronic and acute criteria, without analysis of flow or storm duration.

3) Review of the Microsoft Excel spreadsheets provided by the Regional Board staff revealed discrepancies between SSFL monitoring data and the data used in the RPA. Multiple nondetected (ND) data points were input into the RPA procedures by the Regional Board staff as data points equal to the detection limit. According to the SIP, nondetect values should be entered as one half of the detection limit for calculation of statistical parameters to include the maximum observed effluent concentrations (MEC) and coefficient of variation (CV). Boeing will utilize the most recent monitoring data and enter ND values as half of the detection limit.

4) The Regional Board Staff has used monitoring data that are qualified with J, U, B, and DNQ qualifiers in past RPA.[2] Data with qualifiers may not

[2] Data qualifier definitions are:
J- The reported result is an estimate. The value is less than the minimum calibration level but greater than the estimated detection limit (EDL)
U- The analyte was not detected in the sample at the estimated detection limit (EDL)

accurately represent actual constituent concentrations due to laboratory and/or sampling variability and capabilities. The SIP's RPA procedures provide no clear guidance on how to address data with qualifiers. Use of data with qualifiers may result in statistical parameters and RPA results that may be inconsistent with the intent of the SIP and, therefore, inappropriate.[3] Until the SIP and EPA's TSD processes are modified such that appropriate guidance is given for performing RPA with datasets containing qualified data, Boeing will not utilize data with qualifiers in its RPA. The SIP explicitly states that all appropriate, valid, relevant, and representative data should be utilized to determine reasonable potential and to establish permit limits.[4] Because data qualified with J, U, B, DNQ, or other qualifiers indicate significant uncertainties regarding the actual presence or quantity of the constituent in the sample, Boeing believes that using such data would not be in accordance with the SIP. Therefore, Boeing will not use qualified data for RPA.

5) Boeing is unclear as to the source of evaluation criteria for many of the nonpriority pollutants for which the Regional Board performed RPA. Many of these evaluation criteria appear to be based on secondary drinking water MCLs and California Department of Health Services (CDHS) notification levels. Boeing believes that secondary drinking water standards and CDHS notification levels are inapplicable for RPA and for the derivation of permit limits for storm water discharges. Secondary MCLs are aesthetic standards not intended to protect human health or aquatic life. Notification levels are levels established by CDHS to require notification, not response or removal of the constituent. Response levels are typically significantly greater (10 to 100 times) than notification levels. Based on this, Boeing believes that secondary MCLs and notification levels are not applicable for RPA. Table A4 lists nonpriority constituents for which the Regional Board performed RPA using the procedures of the EPA TSD. Boeing will conduct RPA for the constituent, outfall, and evaluation criteria combinations as required by Section 1, Paragraph D of the Monitoring and Reporting Program number 6027, NPDES permit number CA0001309. This monitoring and report program requires that RPA be performed for constituents with adopted Basin

---

B- Analyte found in sample and associated blank

DNQ- Detected Not Quantified. Data entries with a DNQ qualifier are usually set equal to the Detection Limit or to 0.

[3] The SIP's RPA utilizes the maximum observed concentration (MEC) to determine if effluent concentrations have exceeded water quality criteria. If there is a finding of reasonable potential, the SIP then utilizes the coefficient of variation calculated from the available dataset to determine multipliers for calculation of the final permit limit. The RPA based on the EPA's TSD utilizes the coefficient of variation to estimate a maximum concentration and includes qualified data. Specifically, the statistical technique used in the TSD RPA computes the upper 99th confidence range of the 99th percent value of the log normal distribution of monitoring data.

[4] SIP, p. 5.

Plan and CTR criteria. Boeing will perform a RPA for constituent-outfall groups and comparison criteria in the following manner:

a. Boeing will conduct a SIP-based RPA for the same priority pollutant constituent-outfall groups evaluated in the Regional Board's RPA (see Table A-3).

b. Boeing will conduct an EPA TSD-based RPA for those nonpriority constituent-outfall groups that have adopted Basin Plan criteria and for which the Regional Board has previously performed RPA (see Table A-4).

6) Boeing will conduct the RPA using the statistical calculation procedures outlined in the SIP and in the EPA TSD. Boeing will provide this information to the Regional Board but will leave the application of BPJ to the discretion of the Regional Board.

RPA Methodology

Two methodologies have been used by the Regional Board to conduct the RPA. For CTR listed constituents, the Regional Board has utilized the RPA methodology provided in the SIP. For nonpriority constituents, the Regional Board's RPA is based upon the methodology outlined in EPA's TSD procedures for determining reasonable potential for excursions above ambient criteria using effluent data. Each of these RPA procedures, as performed by the Regional Board, is detailed below.

Note that if RPA is to be performed for new constituents, determination of which method to use should be made as part of the first quarterly RPA, the report of which is due to the Regional Board on May 15, 2006.

SIP Version of RPA (Section 1, California SIP)

Section 1 of the SIP provides the requirements for establishing water quality-based effluent limitations for priority pollutants. Section 1.1 provides guidelines for determining the applicable water quality criteria for priority pollutants; these guidelines are then used to evaluate monitoring data. The current water quality criteria for priority pollutants are taken from the CTR and from the Los Angeles Regional Water Quality Control Board (LARWQCB) Basin Plan.

Section 1.2 of the SIP states that discharger must provide all "available, valid, relevant, representative data and information"[5] to the Regional Board, whereby the Regional Board will determine if data are inappropriate or insufficient for use in implementing the RPA. Boeing will perform RPA for constituents for which new data are available since the last Regional Board RPA. Thus, RPA will be performed utilizing "appropriate, valid, relevant, and representative data" from August 2004 through the end of the most recent quarterly reporting period.[6]

Section 1.2 of the SIP also provides guidance for adjusting the water quality criteria with a discharger-specific Water Effect Ratios (WERs)[7], using site-specific hardness or pH values, or using site-specific conversion factors to describe the ratio of dissolved to total metals. None of these adjustment factors have been developed for the SSFL or downstream receiving waters, and thus cannot be used in RPAs or in establishing permit limits.

Section 1.3 of the SIP provides guidance for determining which priority pollutants require water quality-based effluent limits. All available, valid, relevant, representative

---

[5] SIP, p. 5.

[6] Quarterly reporting periods end March 31, June 30, September 30, and December 31.

[7] A Water Effects Ratio (WER) is a correction factor used to adjust a state or regional water quality standard to account for differences in the toxicity of a specific pollutant between laboratory water and site water. The EPA has set forth guidance on how to determine WERs in EPA's *1994 Interim Guidance on Determination and Use of Water-Effect Ratios for Metals* (EPA-823-B-94-001).

information shall be used in the analysis to determine whether the discharge may: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable priority pollutant criterion or objective. The step by step process for conducting the RPA is given on pages 6 and 7 of the SIP, and is summarized below along with concerns regarding their applicability to the SSFL (concerns with SIP procedures are presented in *italics*).

Step 1: Identify applicable water quality criteria and objectives. Utilize the most stringent water quality criterion or objective (given the variable "C"). Adjust the criterion for hardness and/or pH, or other RWQCB approved WERs.

Often, the CTR freshwater Criterion Continuous Concentration (CCC or "chronic" CTR Value) is significantly lower than the CTR freshwater Criterion Maximum Concentration (CMC or "acute" CTR criterion). Chronic toxicity is defined as toxicity that would occur with a relatively long exposure – for example, chronic toxicity criteria for metals are based on an exposure of four days or more, and chronic toxicity criteria for ammonia are evaluated for exposures of 30 days. By contrast, acute toxicity criteria generally evaluate a one-hour exposure. Because most SSFL storm water flows last less than 4 days, it is generally inappropriate to use chronic criteria to evaluate storm flow monitoring data. Boeing will note in its RPA where it believes reasonable potential is inappropriately triggered based on the use of chronic criteria for flows of shorter duration.

Step 2: Identify all effluent data for the pollutant as described in section 1.2 and proceed with Step 3. If effluent data are unavailable or insufficient go to *Step 5*.

Step 3: Determine the observed maximum effluent constituent concentration (MEC).

a. If the pollutant was detected go to Step 4.
b. If the pollutant was not detected in any of the effluent samples and any of the reported detection limits are below the C (criteria concentration), use the lowest detection limit as the MEC and proceed with *Step 4*.
c. If the pollutant was not detected in any of the effluent samples and all of the reported detection limits are greater than or equal to the C (criteria concentration), proceed with Step 5.

Step 4: Adjust the MEC by any translators, if applicable. Compare the MEC to the C from Step 1. If the MEC $\geq$ C, an effluent limitation is required and the RPA is complete. If the MEC $\leq$ C continue with *Step 5*.

Currently Boeing has no approved translators (site specific WERs or dissolved to total metals ratios).

Step 5: Determine the observed maximum ambient background concentration (given the variable "B"). If the pollutant was detected in the background (receiving water) monitoring go to Step 6. If B data are unavailable or insufficient go to *Step 7*.

At this site, the Regional Board gives no consideration for receiving water background constituent concentrations.

Step 6: Step 6 outlines the procedures for adjusting B based on site specific considerations, and comparing B to C.

Step 6 does not apply to Boeing SSFL because the Regional Board gives no consideration for receiving water background constituent concentrations.

Step 7: Review other information available to determine if a water quality-based effluent limitation is required. Other information may include:

a. facility type
b. discharge type
c. solids loading analysis
d. lack of dilution
e. history of compliance problems
f. potential toxic impact of discharge
g. fish tissue residue data
h. water quality and beneficial uses of the receiving water
i. CWA 303(d) listings
j. the presence of endangered or threatened species or critical habitat
k. other information

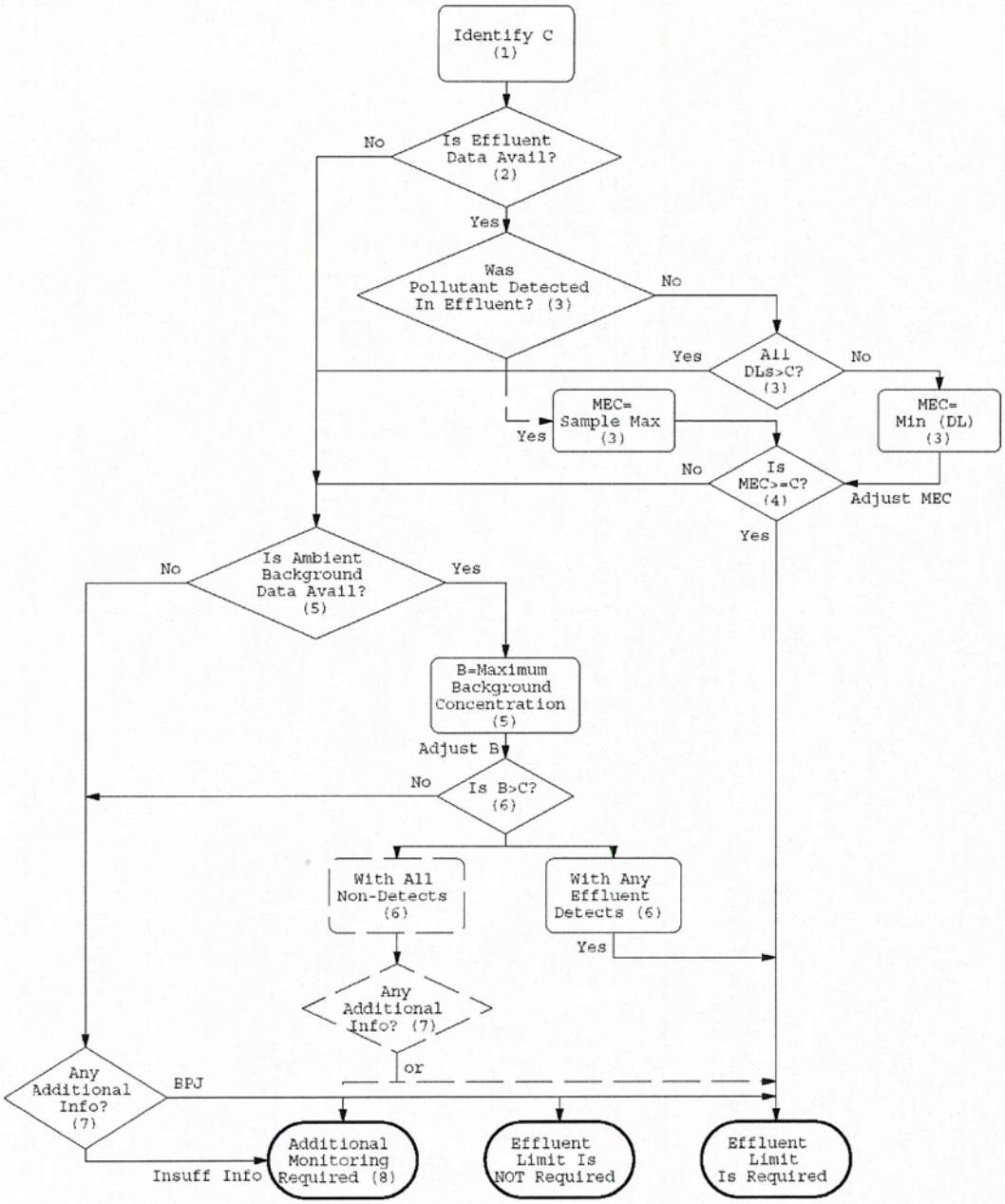
If a water quality based effluent limit is required proceed with *Step 8*.

Boeing can provide this other information as directed by the Regional Board, but is not able to conduct this step, as BPJ is required for determining what and how other information should be reviewed and be applied in determining the need for effluent limits. There are no clear guidelines as to what constitutes BPJ in this context.

Step 8: If the data are unavailable or insufficient, or if all reported detection limits of the pollutant are greater than or equal to the C value, the RWQCB shall require additional monitoring for the pollutant. Upon completion of additional monitoring, another RPA should be conducted for *Steps 1* through *7*. If upon completion of another RPA, a specific constituent was still not detected in any effluent samples, or if the analytical detection limits are greater than the applicable water quality criteria ("C"), the Regional Board may require periodic monitoring of the constituent.

Figure 1 below provides a flow chart for conducting the RPA using the procedures outlined in the SIP.

Figure 1: Determination of Pollutants Requiring Water Quality-Based Effluent Limitations[8]



[8] SIP, Appendix 2, pg. Appendix 2-1

EPA Version of RPA (Box 3-2, EPA TSD)

The EPA TSD states "EPA recommends finding that a permittee has 'reasonable potential' to exceed a receiving water quality standard if it cannot be demonstrated with a high confidence level that the upper bound of the lognormal distribution of effluent concentrations is below the receiving water criteria at specified low-flow conditions."[9]

EPA's TSD methodology for "Determining 'Reasonable Potential' for Excursions Above Ambient Criteria Using Effluent Data Only" (herein TSD RPA) is the basis for the Regional Board's 2006 RPA for nonpriority pollutants. Water quality criteria for nonpriority pollutants were taken by the Regional Board from the Basin Plan and from CDHS secondary drinking water MCLs and notification levels.

Boeing's RPA will utilize a logarithmic transformation of the data set to compute the statistical parameters and multipliers outlined in the EPA TSD process. A summary of the RPA analyses performed by the Regional Board to date using the TSD RPA methodology is provided in Table A-2 of Appendix A.

The steps that are followed in TSD RPA methodology are outlined below.

Step 1: Determine the number of total observations ("*n*") for a particular set of effluent data (concentrations or toxic units [TUs]), and determine the highest value from that data set.

Step 2: Determine the coefficient of variation for the data set. For a data set where $n<10$, EPA believes that the uncertainty in the Coefficient of Variance (CV) is too large to calculate a standard deviation or mean with sufficient confidence and the CV is taken to be 0.6. For a data set where $n\geq10$, the CV is calculated from monitoring data for a given discharge.

For monitoring events where the data are below the detection limit (DL), it appears that for most, the Regional Board has utilized half the detection limit in the statistical analysis. Boeing will thoroughly screen monitoring data and use a value equal to half the detection limit when monitoring data are below detection limits (Note that EPA does not specify a method for evaluating data below the detection limit; use of half the detection limit is consistent with the procedures specified in the SIP.)

Step 3: Determine the appropriate multiplier that when applied to the MEC will estimate the upper 99th confidence range of the 99th percent value of the lognormal distribution of monitoring data. This multiplier may be estimated utilizing EPA's TSD Tables 3-1 or 3-2. The Regional Board Staff has calculated this multiplier from the equation on page 52 of EPA's TSD, as shown on the following page.

[9] EPA TSD, Box 3-2, p. 53

$$multiplier = \frac{C_{99}}{Cp_n} = \frac{\exp[z(0.99)\sigma - 0.5\sigma^2]}{\exp[z((1-0.99)^{1/n})\sigma - 0.5\sigma^2]}$$

$$where\ \sigma^2 = \ln(CV^2 + 1)$$

C_{99} = The 99th percentile of the monitoring data's lognormal distribution

Cp_n = The 99th percent confidence level of the 99th percentile of the monitoring data's lognormal distribution

z = The value of the standard normal curve, calculated in Excel by the function NORMSINV(*percentile*)

σ = The standard deviation of the monitoring data, calculated in the RPA Excel Template by the equation SQRT(ln(CV^2 + 1)) (This step logarithmically transforms the estimated coefficient of variation for the untransformed data set)

n = Number of samples in the data set

CV = Coefficient of Variation, which is equal to the standard deviation / average of the untransformed data set, calculated in the RPA Excel Template as STDEV(data array)/MEAN(data array)

Step 4: Multiply the highest observed value from the data set by the multiplier, (either estimated by the EPA TSD's Tables 3-1 or 3-2, or by the multiplier equation as determined in Step 3.) The Regional Board Staff has used the multiplier equation from Step 3 to determine the multiplier. The outfall-specific RPA templates prepared by Flow Science also utilize this multiplier equation. The maximum observed effluent concentration is then multiplied by the multiplier derived above, which is then multiplied by the appropriate dilution ratio (if available) to project the maximum receiving water concentration (RWC).

Note again that the Regional Board has assumed there is no dilution for these discharges. Note also that this maximum concentration is derived using different statistical evaluation procedures than are used in the SIP methodology, and will almost always produce a higher projected maximum concentration than that used in the SIP RPA. Thus, a finding of reasonable potential is far more likely for nonpriority pollutants than for priority pollutants.

Step 5: Compare the projected maximum RWC to the applicable standard (criteria maximum concentration [CMC], criteria continuous concentration [CCC], or reference ambient concentration[10]). EPA recommends that permitting authorities find reasonable potential when the projected RWC is greater than an ambient criterion.

[10] Reference Ambient Concentration is also known as Ambient Water Quality Criteria. EPA defines Ambient Water Quality Criteria as the "natural concentration of water quality constituents prior to mixing of either point or nonpoint source load of contaminants. Reference ambient concentration is used to

Accompanying Excel Spreadsheet SSFL RPA Template

The accompanying spreadsheet has been prepared to duplicate the RPA analysis procedures used by the Regional Board in its evaluation of RPA for the 2006 NPDES Permit for both CTR priority pollutants (based on the SIP RPA methodology) and nonpriority pollutants (based on the TSD RPA methodology). Comment boxes have been inserted for each step where appropriate.

Monitoring data entry requirements and format may be modified to facilitate ease of data transfer from the SSFL monitoring data base. The current layout includes three columns per constituent, as follows: (1) the first column is for reported value, (2) the second column lists nondetect values (ND) as the detection limit (DL), and (3) the third column lists ND values as half of the DL. (Note that the Regional Board's original RPA analysis included only two columns, which has led to instances of improper data entry whereby nondetect samples were entered as detected samples equal to the detection limit.)

The spreadsheet template has 5 separate sheets. There are a total of 126 CTR priority pollutants. These 126 constituents have been split into two sheets. The first 64 pollutants are included on the sheet entitled 'Priority Data (1)', and pollutants 65-126 are included on the sheet labeled 'Priority Data (2)'. The third sheet includes the calculations summarized in steps 1-8 steps of the SIP RPA for the CTR priority pollutants. The fourth sheet is for nonpriority pollutant data entry. The fifth and final sheet conducts the EPA TSD RPA for nonpriority pollutants.

The fifth and final sheet of the spreadsheet template performs a RPA on nonpriority pollutant constituents for which adopted Basin Plan criteria exist and for which the Regional Board has performed a RPA on in the 2006 NPDES permit. Nonpriority pollutant constituent outfall groups for which an EPA TSD based RPA will be performed are listed in Table A-4. Constituents with no adopted Basin Plan and or CTR criteria that the Regional Board has performed an EPA TSD-based RPA are listed in Table A-5. As there are no adopted Basin Plan or CTR criteria for these constituents, Boeing will not perform a RPA for the constituent outfall groups listed in Table A-5.

---

indicate the concentration of a chemical that will not cause adverse impact to human health." (On line at http://iaspub.epa.gov/trs/trs_proc_qry.navigate_term?p_term_id=16505&p_term_cd=TERMDIS)

Appendix A - Boeing SSFL NPDES RPA Supporting Tables and Information

Table A-1: RPA results for CTR priority pollutants in RPA performed by the Regional Board in support of the 2006 NPDES Permit (SIP RPA Method)

	Outfalls 1, 2, 11, 18	Outfalls 3-10	Outfalls 12-14	Outfalls 15-17
Tier 1 RPA Limit	Copper Lead Mercury TCDD	Copper Lead Mercury TCDD	Copper Lead Mercury TCDD	Cadmium Chromium III Copper Mercury Nickel Zinc TCDD
Tier 2 RPA Limit	None	None	None	None
BPJ RPA Limit **BPJ is used to decide that a limit is appropriate, or a limit is included to avoid "backsliding."**	Antimony Arsenic Beryllium Cadmium Chromium VI Nickel Selenium Silver Thallium Zinc Cyanide 1,1Dichloroethylene Trichloroethylene Pentachlorophenol 2,4,6-Trichlorophenol Bis(2-Ethylhexyl)Phthalate 2-4-Dinitrotoluene N-Nitrosodimethylamine Alpha-BHC	Antimony* Arsenic Cadmium Thallium	None	None

A Tier 1 limit indicates that the maximum observed effluent concentration (MEC) exceeds the lowest available water quality criterion for a given constituent. A Tier 2 Limit is used to incorporate information on dilution and background and receiving water concentrations; since the Regional Board considered SSFL to drain to the headwaters, a Tier 2 analysis was not performed for discharges from the SSFL.

* Regional Board RPA indicates that Best Professional Judgment was used to establish limit, but effluent monitoring data show that constituent MEC was greater than minimum water quality criterion and the RPA's Tier 1 should have been used as basis for limit.

Table A-2: RPA results for non- priority pollutants in RPA performed by the Regional Board in support of the 2006 NPDES Permit (EPA TSD RPA Method)

	Outfalls 1, 2, 11, 18	Outfalls 3-10	Outfalls 12-14	Outfalls 15-17
MEC > Receiving Water Quality Criterion. (These constituents **would have** reasonable potential under the SIP procedures)	Iron Manganese Settleable Solids Detergent (MBAS) Total Suspended Solids Oil and Grease Sulfate Total Dissolved Solids	Total Suspended Solids Oil and Grease Nitrate+Nitrite as Nitrogen	Total Suspended Solids Total Petroleum Hydrocarbons Naphthalene** Ethylene Dibromide	Perchlorate Nitrite as Nitrogen Total Residual Chlorine
MEC*Multiplier > Receiving Water Quality Criterion (These constituents **would not have** reasonable potential under the SIP procedures)	Perchlorate Nitrate+Nitrite as Nitrogen $BOD_5 20^oC$	Boron Sulfate	Settleable Solids 1-4 Dioxane Oil and Grease Tertiary Butyl Alcohol	Detergent (MBAS) Total Suspended Solids $BOD_5 20^oC$ Total Coliform Oil and Grease
MEC and MEC* Multiplier are both < Receiving Water Quality Criterion, **BPJ used to decide that limit is appropriate**	Barium Fluoride Chloride	Chloride Perchlorate	Total Dissolved Solids Perchlorate	Total Dissolved Solids Chloride Sulfate Fluoride Nitrate+Nitrite as Nitrogen Barium

** Although naphthalene is contained on the CTR list of priority pollutants (CTR #93), no numeric objectives are provided. Thus, the Regional Board staff conducted an RPA for naphthalene using nonpriority pollutant EPA TSD procedures.

Table A-3: Priority pollutant water quality criteria for which SIP RPA procedures would be used

CTR#	DATE	Units	C = Lowest Criterion	Source of "C"	Regional Board Conducted RPA for these outfall-constituent combinations			
					001, 002, 011, 018	003-010	012-014**	015-017**
1	Antimony	µg/L	6	Basin Plan	X	X	X	X
2	Arsenic	µg/L	50	Basin Plan	X	X	X	X
3	Beryllium	µg/L	4	Basin Plan	X	X	X	X
4	Cadmium*	µg/L	2	CTR Chronic	X	X	X	X
5a	Chromium III*	µg/L	207	CTR Chronic				
5b	Chromium VI	µg/L	11	CTR Chronic	X	X	X	X
6	Copper*	µg/L	9	CTR Chronic	X	X	X	X
7	Lead*	µg/L	3	CTR Chronic	X	X	X	X
8	Mercury	µg/L	0	CTR Human Health	X	X	X	X
9	Nickel*	µg/L	52	CTR Chronic	X	X	X	X
10	Selenium	µg/L	5	CTR Chronic	X	X	X	X
11	Silver*	µg/L	4	CTR Acute	X	X	X	X
12	Thallium	µg/L	2	CTR Human Health	X	X	X	X
13	Zinc*	µg/L	120	CTR Acute = CTR Chronic	X	X	X	X
14	Cyanide	µg/L	5	CTR Chronic	X	X	X	X
15	Asbestos	Fibers/L	None	None				
16	2,3,7,8-TCDD (Dioxin)	µg/L	0	CTR Human Health	X	X	X	X
17	Acrolein	µg/L	780	CTR Human Health	X	X	X	X
18	Acrylonitrile	µg/L	1	CTR Human Health	X	X	X	X
19	Benzene	µg/L	1	Basin Plan	X	X	X	X
20	Bromoform	µg/L	360	CTR Human Health	X	X	X	X
21	Carbon Tetrachloride	µg/L	4	CTR Human Health	X	X	X	X
22	Chlorobenzene	µg/L	21000	CTR Human Health	X	X	X	X
23	Dibromochloromethane	µg/L	34	CTR Human Health	X	X	X	X
24	Chloroethane	µg/L	None	None				
25	2-chloroethyl vinyl ether	µg/L	None	None				
26	Chloroform	µg/L	None	None				
27	Dichlorobromomethane	µg/L	46	CTR Human Health	X	X	X	X
28	1,1-Dichloroethane	µg/L	5	Basin Plan	X	X	X	X
29	1,2-dichloroethane		0.5	Basin Plan	X	X	X	X
30	1,1-Dichloroethylene	µg/L	3	CTR Human Health	X	X	X	X
31	1,2-dichloropropane	µg/L	5	Basin Plan	X	X	X	X
32	1,3-dichloropropylene	µg/L	0.5	Basin Plan	X	X	X	X
33	Ethylbenzene	µg/L	0.7	Basin Plan	X	X	X	X
34	Methyl bromide	µg/L	4000	CTR Human Health	X	X	X	X
35	Methyl chloride	µg/L	None	None				
36	Methylene chloride	µg/L	1600	CTR Human Health	X	X	X	X
37	1,1,2,2-tetrachlroethne	µg/L	1	Basin Plan	X	X	X	X
38	Tetrachloroethylene	µg/L	5	Basin Plan	X	X	X	X
39	Toluene	µg/L	150	Basin Plan	X	X	X	X
40	Trans 1,2-Dichloroethylene	µg/L	10	Basin Plan	X	X	X	X
41	1,1,1-Trichloroethane	µg/L	200	Basin Plan	X	X	X	X
42	1,1,2-trichloroethane	µg/L	5	Basin Plan	X	X	X	X
43	Trichloroethylene	µg/L	5	Basin Plan	X	X	X	X
44	Vinyl chloride	µg/L	0.5	Basin Plan	X	X	X	X

Table A-3 (Continued): Priority Pollutant List Water Quality Criteria

CTR#	DATE	Units	C = Lowest Criterion	Source of "C"	Regional Board Conducted RPA for these outfall-constituent combinations			
					001, 002, 011, 018	003-010	012-014**	015-017**
45	2-chlorophenol	µg/L	400	CTR Human Health	X	X	X	X
46	2,4-dihlorophenol	µg/L	790	CTR Human Health	X	X	X	X
47	2,4-dimethylphenol	µg/L	2300	CTR Human Health	X	X	X	X
48	4,6-dinitro-o-resol (aka2-methyl-4,6-Dinitrophenol)	µg/L	765	CTR Human Health	X	X	X	X
49	2,4-dinitrophenol	µg/L	14000	CTR Human Health	X	X	X	X
50	2-nitrophenol	µg/L	None	None				
51	4-nitrophenol	µg/L	None	None				
52	3-Methyl-4-Chlorophenol (aka P-chloro-m-resol)	µg/L	None	None				
53	Pentachlorophenol	µg/L	1	Basin Plan	X	X	X	X
54	Phenol	µg/L	4600000	CTR Human Health	X	X	X	X
55	2,4,6-Trichlorophenol	µg/L	7	CTR Human Health	X	X	X	X
56	Acenaphthene	µg/L	2700	CTR Human Health	X	X	X	X
57	Acenaphthylene	µg/L	None	None				
58	Anthracene	µg/L	110000	CTR Human Health	X	X	X	X
59	Benzidine	µg/L	0.0005	CTR Human Health	X	X	X	X
60	Benzo(a)Anthracene	µg/L	0.0490	CTR Human Health	X	X	X	X
61	Benzo(a)Pyrene	µg/L	0.0490	CTR Human Health	X	X	X	X
62	Benzo(b)Fluoranthene	µg/L	0.0490	CTR Human Health	X	X	X	X
63	Benzo(ghi)Perylene	µg/L	None	None				
64	Benzo(k)Fluoranthene	µg/L	0.0490	CTR Human Health	X	X	X	X
65	Bis(2-Chloroethoxy) methane	µg/L	None	None				
66	Bis(2-Chloroethyl)Ether	µg/L	1.4000	CTR Human Health	X	X	X	X
67	Bis(2-Chloroisopropyl) Ether	µg/L	170000	CTR Human Health	X	X	X	X
68	Bis(2-Ethylhexyl) Phthalate	µg/L	4	Basin Plan	X	X	X	X
69	4-Bromophenyl Phenyl Ether	µg/L	None	None				
70	Butylbenzyl Phthalate	µg/L	5200	CTR Human Health	X	X	X	X
71	2-Chloronaphthalene	µg/L	4300	CTR Human Health	X	X	X	X
72	4-Chlorophenyl Phenyl Ether	µg/L	None	None				
73	Chrysene	µg/L	0.0490	CTR Human Health	X	X	X	X
74	Dibenzo(a,h)Anthracene	µg/L	0.0490	CTR Human Health	X	X	X	X
75	1,2-Dichlorobenzene	µg/L	600	Basin Plan	X	X	X	X
76	1,3-Dichlorobenzene	µg/L	2600	CTR Human Health	X	X	X	X
77	1,4-Dichlorobenzene	µg/L	5	Basin Plan	X	X	X	X
78	3,3'-Dichlorobenzidine	µg/L	0.0770	CTR Human Health	X	X	X	X
79	Diethyl Phthalate	µg/L	120000	CTR Human Health	X	X	X	X
80	Dimethyl Phthalate	µg/L	2900000	CTR Human Health	X	X	X	X
81	Di-n-Butyl Phthalate	µg/L	12000	CTR Human Health	X	X	X	X
82	2,4-Dinitrotoluene	µg/L	9	CTR Human Health	X	X	X	X
83	2,6-Dinitrotoluene	µg/L	None	None				
84	Di-n-Octyl Phthalate	µg/L	None	None				
85	1,2-Diphenylhydrazine	µg/L	0.5400	CTR Human Health	X	X	X	X
86	Fluoranthene	µg/L	370	CTR Human Health	X	X	X	X

Table A-3 (Continued): Priority Pollutant List Water Quality Criteria

CTR#	DATE	Units	C = Lowest Criteria	Source of "C"	Regional Board Conducted RPA for these outfall-constituent combinations			
					001, 002, 011, 018	003-010	012-014**	015-017**
87	Fluorene	µg/L	14000	CTR Human Health	X	X	X	X
88	Hexachlorobenzene	µg/L	0.0008	CTR Human Health	X	X	X	X
89	Hexachlorobutadiene	µg/L	50	CTR Human Health	X	X	X	X
90	Hexachlorocyclopentadiene	µg/L	17000	CTR Human Health	X	X	X	X
91	Hexachloroethane	µg/L	9	CTR Human Health	X	X	X	X
92	Indeno(1,2,3-cd)Pyrene	µg/L	0.0490	CTR Human Health	X	X	X	X
93	Isophorone	µg/L	600	CTR Human Health	X	X	X	X
94	Naphthalene	µg/L	None	None				
95	Nitrobenzene	µg/L	1900	CTR Human Health	X	X	X	X
96	N-Nitrosodimethylamine	µg/L	8	CTR Human Health	X	X	X	X
97	N-Nitrosodi-n-Propylamine	µg/L	1	CTR Human Health	X	X	X	X
98	N-Nitrosodiphenylamine	µg/L	16	CTR Human Health	X	X	X	X
99	Phenanthrene	µg/L	None	None				
100	Pyrene	µg/L	11000	CTR Human Health	X	X	X	X
101	1,2,4-Trichlorobenzene	µg/L	None	None				
102	Aldrin	µg/L	0.0001	CTR Human Health	X	X	X	X
103	alpha-BHC	µg/L	0.0130	CTR Human Health	X	X	X	X
104	beta-BHC	µg/L	0.0460	CTR Human Health	X	X	X	X
105	gamma-BHC (aka Lindane)	µg/L	0.0630	CTR Human Health	X	X	X	X
106	delta-BHC	µg/L	None	None				
107	Chlordane	µg/L	0.0006	CTR Human Health	X	X	X	X
108	4,4'-DDT	µg/L	0.0006	CTR Human Health	X	X	X	X
109	4,4'-DDE	µg/L	0.0006	CTR Human Health	X	X	X	X
110	4,4'-DDD	µg/L	0.0008	CTR Human Health	X	X	X	X
111	Dieldrin	µg/L	0.0001	CTR Human Health	X	X	X	X
112	alpha-Endosulfan	µg/L	0.0560	CTR Chronic	X	X	X	X
113	beta-Endosulfan	µg/L	0.0560	CTR Chronic	X	X	X	X
114	Endosulfan Sulfate	µg/L	240	CTR Human Health	X	X	X	X
115	Endrin	µg/L	0.0360	CTR Chronic	X	X	X	X
116	Endrin Aldehyde	µg/L	0.8100	CTR Human Health	X	X	X	X
117	Heptachlor	µg/L	0.0002	CTR Human Health	X	X	X	X
118	Heptachlor Epoxide	µg/L	0.0001	CTR Human Health	X	X	X	X
119	Aroclor 1016	µg/L	0.0002	CTR Human Health	X	X	X	X
120	Aroclor 1221	µg/L	0.0002	CTR Human Health	X	X	X	X
121	Aroclor 1232	µg/L	0.0002	CTR Human Health	X	X	X	X
122	Aroclor 1242	µg/L	0.0002	CTR Human Health	X	X	X	X
123	Aroclor 1248	µg/L	0.0002	CTR Human Health	X	X	X	X
124	Aroclor 1254	µg/L	0.0002	CTR Human Health	X	X	X	X
125	Aroclor 1260	µg/L	0.0002	CTR Human Health	X	X	X	X
126	Toxaphene	µg/L	0.0002	CTR Human Health	X	X	X	X

* CTR criterion for these metals are hardness dependent. CTR criterion were calculated using an average receiving water hardness of 100 mg/L.

** Boeing will perform RPA for these constituent-outfall combinations only if new monitoring data become available.

X Denotes those constituent-outfall groups for which the Regional Board has performed a SIP based RPA and for which Boeing will perform a SIP-based RPA utilizing available adopted CTR and Basin Plan criteria.

Table A-4: Nonpriority pollutants with approved Basin Plan Criteria for which Regional Board staff have performed RPA

Constituent	Units	Constituent Comparison Concentration Value	Basin Plan Reference and Beneficial Use Protection	2006 Permit Conducted RPA for Constituent Outfall Groups as Follows:			
				001, 002, 011, 018	003 to 010	012 to 014	015 to 017
Ammonia-N*	mg/L	10.1 or Table 3-1 to 3-4	Table 3-1 to 3-4, Nutrient TMDLs				
Barium	mg/L	1	Table 3-5 MUN BU	X			X
BOD_5 20°C	mg/L	30	Narrative	X		X	X
Boron	mg/L	1	Table 3-8		X		
Chloride	mg/L	150	Table 3-8	X	X		X
cis-1,2-Dichloroethylene*	mg/L	0.006	Table 3-7 MUN BU				
Detergents (as MBAS)	mg/L	0.5	Narrative	X			X
Ethylene dibromide	mg/L	0.05	Table 3-7 MUN BU			X	
Fluoride	mg/L	1.6	Table 3-6 MUN BU	X	X		X
Nitrate + Nitrite – N	mg/L	8/10	Narrative, Nutrient TMDLs	X	X		X
Nitrate-N*	mg/L	8/10	Narrative, Nutrient TMDLs				
Nitrite – N	mg/L	1	Narrative, Nutrient TMDLs				X
Oil and Grease	mg/L	15	Narrative	X	X	X	X
Settleable solids	ml/L	0.3	Narrative	X		X	
Sulfate	mg/L	300	Table 3-8	X	X		X
Total coliform	MPN/100mL	23	Narrative, REC-1 REC-2 BU				X
Total dissolved solids	mg/L	850/950	Table 3-8	X	X	X	X
Total Residual Chlorine	mg/L	0.1	Narrative				X
Total Suspended solids	mg/L	45	Narrative	X	X	X	X
Turbidity	NTU	50	Narrative			X	
Radioactivity- Combined Radium 226 & Radium 228*	pCi/L	5	Table 3-9 MUN BU				
Radioactivity- Gross Alpha*	pCi/L	15	Table 3-9 MUN BU				
Radioactivity- Gross Beta*	pCi/L	50	Table 3-9 MUN BU				
Strontium-90*	pCi/L	8	Table 3-9 MUN BU				
Tritium*	pCi/L	20,000	Table 3-9 MUN BU				

* These constituents have monitoring requirements and Basin Plan criteria. However, the Regional Board did not perform RPA for these constituents in the 2006 NPDES Permit. Therefore Boeing will not perform RPA for these constituents.

X Denotes those constituent-outfall groups for which the Regional Board has performed an EPA TSD based RPA and for which Boeing will perform an EPA TSD based RPA utilizing available adopted Basin Plan criteria.

Table A-5: List of Constituents For Which There Is No Adopted Basin Plan Or CTR Criterion And For Which Boeing Will Not Conduct RPA

	2006 Permit Conducted RPA for Constituent Outfall Groups as Follows:			
	001, 002, 011, 018	003 to 010	012 to 014	015 to 017
Iron	X			
Manganese	X			
Perchlorate	X	X	X	X
1,4- Dioxane			X	
Total Petroleum Hydrocarbons			X	
Naphthalene			X	
Methyl-tert-butyl-ether (MTBE)			X	
Tertiary-Butyl Alcohol			X	
Diisopropyl Ether			X	

X Denotes those constituent-outfall groups for which the Regional Board has performed an EPA TSD-based RPA utilizing comparison values that have not been adopted into the Basin Plan or CTR. As per the requirements of Section 1, Paragraph D of the Monitoring and Reporting Program number 6027, NPDES permit number CA0001309, Boeing is required to perform RPA based on CTR and Basin Plan criteria. Therefore, Boeing will not perform RPA for the above constituent-outfall combinations.