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STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:	**Docket No. 01-AFC-19C**
SMUD Cosumnes Power Plant Project Licensing Case Compliance	**SFA'S PETITION FOR POST CERTIFICATION LICENSE AMENDMENT**

The Sacramento Municipal Utility District Financing Authority ("SFA") hereby submits this Petition for Post Certification License Amendment ("Petition") for the SMUD Cosumnes Power Plant ("CPP") project ("Project") Licensing Case Compliance pursuant to Section 1769(a), Title 20, California Code of Regulations, to the California Energy Commission ("CEC"). By this Petition, SFA requests approval to modify the project description and air quality conditions of certification consistent with the revised specifications and parameters for the cooling tower at the CPP.

As an officer of SFA, I hereby attest, under penalty of perjury, under the laws of the State of California, that the contents of this Petition are truthful and accurate to the best of my knowledge and belief.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
FINANCING AUTHORITY

Respectfully submitted,

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Dated: Nov. 7, 2007

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PETITION FOR POST CERTIFICATION LICENSE AMENDMENT SMUD COSUMNES POWER PLANT

01-AFC-19C

Sacramento Municipal Utility District Financing Authority

November 2007

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1.0 INTRODUCTION

1.1 Overview of Amendment

In September 2003, the California Energy Commission (CEC or Commission) approved the Cosumnes Power Plant (CPP) project. The project is located adjacent to the Rancho Seco Plant in southern Sacramento County. Submitted in September 2001, the Application for Certification (AFC) for the CPP analyzed the impacts associated with four General Electric Model 7241FA gas turbines exhausting into four unfired heat recovery steam generator (HRSG) units. The project included two condensing steam turbine generators and two nine-cell cooling towers. The preliminary design concept assumed eight of the nine cells in the cooling tower would operate concurrently, with the ninth used as a spare. The initial operation of Phase 1 of the CPP (two gas turbines, two HRSGs, one condensing steam turbine, one cooling tower) began in October 2005 and this phase of the project was available for commercial operation in February 2006.

As part of the Commission's approval of Phase 1 of the CPP project (01-AFC-19C), the Commission summarized the plant's operational characteristics in the project description, and imposed a number of air quality and visual conditions of certification on the project. The project description and conditions of certification included those specific to the cooling tower and other plant equipment. At this time, the Sacramento Municipal Utility District Financing Authority (SFA) is seeking approval for minor changes to the project description, cooling tower specifications, and operating parameters based upon final design, the desire to optimize plant operation, and concurrent data collected during plant operation.

Specifically for the cooling tower project description: during final design, the equipment vendors determined that there would be insufficient space for all nine cells, and proposed an eight cell cooling tower that met the heat rejection parameters. Prior to ordering the cooling tower, the project applicant, Sacramento Municipal Utility District (SMUD), submitted updated information to the CEC for the purchase of this long-lead item. SMUD's vendor heat rejection curves specified an eight-cell design; however, it was not clearly stated in a submittal to the CEC that the ninth cell was eliminated from the design. SMUD did not detect the project description discrepancy during its review of the Presiding Members Preliminary Decision in August 2003. The license was issued by the CEC in September 2003 containing the original nine-cell language in the project description. In preparing this petition to address cooling tower specifications, SFA became aware of the project description discrepancy and reviewed the CPP project license in light of any potential environmental impacts based on the eight-cell design.

1.2 Summary of Environmental Impacts

Section 1769(a)(1)(E) of the CEC Siting Regulations requires that an analysis be conducted to address any potential impacts the proposed modification may have on the environment and proposed measures to mitigate significant adverse impacts. Section 1769(a)(1)(F) requires a discussion of the impact of proposed modification on the facility's ability to comply with

applicable laws, ordinances, regulations, and standards (LORS). Section 3.0 of this document discusses the potential impacts of the Amendment on the environment, as well as the consistency of the requested change with LORS. Section 3.0 concludes that there will be no significant adverse environmental impacts associated with this Amendment and that the project, as amended, will comply with applicable LORS.

1.3 Consistency of Amendment with License

Section 1769(a)(1)(D) of the CEC Siting Regulations requires a discussion of whether the modification being sought is based on new information that changes or undermines the assumptions, rationale, findings, or other basis of the final decision. If the project is no longer consistent with the license, an explanation of why the modification should be permitted must be provided. The changes proposed herein are consistent with the project's CEC license and do not undermine any basis for the CEC's licensing decision.

2.0 DESCRIPTION OF PROJECT AMENDMENT

Consistent with the CEC Siting Regulations section 1769(a)(1)(A) and (B), this section includes a complete description of the proposed project modification as well as the necessity for the Amendment.

When the Commission approved Phase 1 of the project in September 2003 (01-AFC-19C), the Commission imposed a number of air quality and visual resources conditions of certification and described the project based on the project design information used at that time. Included in the Commission's approval were air quality and visual resources conditions of certification specific to the cooling tower at CPP. Subsequent to the Commission's approval, SFA determined that minor changes to the specifications and operating parameters for the cooling tower would enhance the plant's operations.

Specifically, electrical conductivity of the circulating cooling water is continuously monitored and a correlation factor is used to convert measured conductivity to total dissolved solids (TDS) values. Based upon information supplied by the conductivity meter supplier, SMUD employed a factor of 0.46 parts per million TDS per microSiemens per centimeter for the CPP project,. Recently, during a routine inspection by the Sacramento Metropolitan Air Quality Management District, SFA was asked for additional information on TDS and conductivity. Cooling water grab samples were taken and analyzed in the laboratory. The results showed the TDS levels of the cooling water were higher than expected, which also meant that the correlation factor for the instrument needed to be adjusted to the higher factor of 0.7. SFA immediately adjusted its operations so that cooling tower PM_{10} limits would not be exceeded. This initially meant restricting power output so that the rate of heat rejection would be reduced. Furthermore, the plant operator was directed by SFA to install new electrical conductivity probes at both the cooling tower basin and cooling tower make-up water line. This is expected to provide plant operations staff with better data from which to assess cooling tower conditions and predict operational change. Although 2001 AFC water data was obtained from several sources, and

grab samples were obtained, it appears that TDS from the raw water source has varied from the data that was collected and used in the AFC.

Also, CPP's preliminary engineering design specified a nominal cooling tower circulating water flow rate of 125,867 gpm. After consultation with CPP's engineer-of-record for final plant design, Utility Engineering, the as-built nominal circulating water flow rate that optimizes cooling tower performance for system curves is 155,000 gpm. The increase in flow rate means water is being re-circulated faster in the cooling tower at any one time. This will not result in an increase in plant water use, which is already restricted under condition Water Res-1 and is closely monitored. The unexpected increase in TDS and the increased cooling tower flow rate that optimizes efficiency and power production are independent of one another. The unexpected increase in TDS though, in combination with the optimized increase in cooling tower flow rate, will result in an increase in PM_{10} emissions from the cooling tower drift, however this increase is small and certified air emissions testing has determined that CPP's total, actual PM_{10} emissions – including those from the cooling tower - are well below permitted levels.

In order to obtain the maximum plant efficiency and enhance power output during all ambient weather conditions, SFA is seeking permission from the CEC to make adjustments to cooling tower specifications.

Because these revised specifications and parameters are different than those analyzed during the Commission certification process, it is necessary to revise the CEC air quality conditions of certification to match the revised cooling tower specifications. In addition, due to the oversight in the number of cooling tower cells and dimensions, SFA is seeking minor changes to the project description section that describes the physical characteristics of the cooling tower. No changes to the visual resources conditions of certification are believed to be necessary.

The following table summarizes the revised specifications for the cooling tower at the CPP as compared with the cooling tower specifications in the 2001 AFC and the existing CEC conditions of certification. As shown in Table 1, the main difference between the cooling tower specifications in the existing conditions of certification and the proposed changes is the increase in the maximum total dissolved solids (TDS) level from 470 to 800 ppmw. This change is necessary due to higher than expected maximum TDS levels in the cooling water. The table also shows the maximum water circulation rate is increased to optimize cooling tower performance during all ambient weather conditions without restricting design power output.

Table 1
Cooling Tower Specifications

Parameter	2001 AFC	Existing COCs	Proposed Revised Specifications
Number of cells	9 (8 operating)	N/A*	8 (8 operating)
Maximum water circulation rate (gpm)	125,867 (tower total)	N/A*	155,000 (tower total)
Maximum water TDS level (ppmw)	470	470	800
Drift rate (%)	0.0005	0.0005	0.0005

Table 1
Cooling Tower Specifications

Parameter	2001 AFC	Existing COCs	Proposed Revised Specifications
Diameter of each cell vent (ft)	36	N/A*	30
Height of each cell vent (ft)	6	N/A*	14
Exhaust flow rate per cell (acfm)	1,436,258	N/A*	1,613,000
Average exhaust temperature (deg. F)	68	N/A*	68
Length of cooling tower (ft)	431	N/A*	440
Width of cooling tower (ft)	53	N/A*	74
Height of cooling tower from ground level to top deck (ft)	34	N/A*	39

Notes (Table 1):
* These parameters are not included in the existing COCs for the cooling tower.

The purpose of the proposed Amendment is to make the project description and air quality conditions of certification consistent with the revised specifications and parameters for the cooling tower at the CPP.

2.1 Necessity of Proposed Amendment

Sections 1769(a)(1)(B) and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed modifications and whether the modifications are based on information known by the petitioner during the certification proceeding.

As discussed above, the purpose of the proposed Amendment is to make the project description and air quality conditions of certification consistent with the revised specifications and operating parameters for the cooling tower at the CPP. The proposed changes to the air quality conditions of certification relating to TDS are the result of unexpected variations in raw water parameters and the associated instrument correlation factor that were discovered during plant operation, well after the completion of the CPP's certification process. The proposed changes for circulating water flow rate are the result of consultation with the final design engineer for optimum cooling tower operation in comparison with the corresponding system curve that were deemed necessary after the completion of the CPP's certification process. The proposed project description changes will correct the oversight that was carried through from the original project

description. SFA proposes to change the description from two nine-cell cooling towers to two eight-cell cooling towers.

3.0 ENVIRONMENTAL ANALYSIS OF THE AMENDMENT

This section examines whether the project change set forth in this Amendment may result in additional environmental impacts. An environmental analysis for the modification identified in this Amendment is included below. The analysis concludes that there will be no significant unmitigated adverse environmental impacts associated with this Amendment and that the project, as amended, will comply with all applicable LORS.

3.1 Air Quality

The following paragraphs discuss the effect on the Commission air quality conditions of certification (COCs) associated with the proposed changes to the cooling tower specifications and operating parameters. As discussed below, while there is a request to increase the hourly and daily respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}) emission levels for the cooling tower, SFA believes there is no need to increase the existing facility-wide PM_{10} quarterly or annual emission limits for the CPP. However, the Sacramento Metropolitan Air Quality Management District (SMAQMD), in its Authority to Construct issued June 12, 2007, determined that under their rules, the quarterly and annual facility-wide PM_{10} limits should be increased, thus triggering the need for additional emission PM_{10} offsets, as a result of the change in cooling tower specifications. On June 19, 2007, SFA surrendered the additional PM_{10} offsets required by the SMAQMD. As a result, no additional air quality mitigation is required for the proposed amendment. In addition, because the revised PM_{10} emissions associated with the cooling tower are less than the SMAQMD Best Available Control Technology (BACT) trigger level of 10 lbs/day, the requested change for the cooling tower does not trigger BACT requirements. Since the original AFC analysis restricted cooling tower operations to eight cells concurrently, there is no change in the analysis due to the project describing a nine-cell cooling tower.

PM_{10} Emission Limit for Cooling Tower

Conditions Affected:

- Condition AQ-18
- Condition AQ-19

Proposed Change:

- Condition AQ-18: Increase daily PM_{10} limit for cooling tower from 3.6 lbs/day to 7.4 lbs/day. Increase daily PM_{10} limit for facility from 435.6 to 439.4 lbs/day.
- Condition AQ-19: Increase maximum allowable PM_{10} emissions from the facility as follows:
    - Quarter 1: from 39,204 pounds to 39,550 pounds

- Quarter 2: from 39,640 pounds to 39,989 pounds
- Quarter 3: from 40,075 pounds to 40,428 pounds
- Quarter 4: from 40,075 pounds to 40,428 pounds
- Annual total: from 158,994 pounds to 160,395 pounds

Reason for Change:

As shown by the detailed emission calculations included as Attachment 1, the cooling tower PM_{10} emissions are based on the maximum cooling water recirculation rate, maximum TDS level in the cooling water, and drift rate. Because the maximum expected cooling water TDS level is increasing, there is a corresponding increase in the maximum hourly and daily PM_{10} emission rates for the cooling tower. While the maximum hourly and daily PM_{10} emission rates increase for the cooling tower, SFA believes there is no need to change the existing facility-wide quarterly and annual PM_{10} emission limits included in the COCs (i.e., Condition AQ-19). This is because SFA is confident that despite the increase in cooling tower PM_{10} emission levels, the overall facility-wide PM_{10} emissions will continue to remain below the existing quarterly and annual COC PM_{10} limits, which were designed with a substantial margin of safety with respect to worst-case plant operations. However, as discussed above, SMAQMD has determined that the facility total quarterly and annual PM_{10} emission limits must be changed as a result of the revised cooling tower specifications. The proposed revised quarterly and annual emission limits are those contained in the SMAQMD's June 12, 2007 Authority to Construct for the cooling tower specification modifications.

Will Change Result in any New Significant Impacts

To determine if there are any new significant air quality impacts associated with this requested change, a revised PM_{10} ambient air quality impact analysis was performed for the cooling tower. As with the analysis included in the 2001 AFC for the CPP, the revised ambient impact analysis for the CPP cooling tower was performed using the EPA-approved Industrial Source Complex Short-Term (ISCST3) model. In addition, as in the previous analysis, the revised modeling was performed using the SMAQMD-approved meteorological data collected at the Sacramento Executive Airport for the period from 1985 to 1989. Furthermore, the same receptor grids used for the 2001 analysis were also used for the revised ambient impact analysis. The revised modeling analysis includes the changes to the stack parameters and cooling tower dimensions shown in Table 1.

The following table compares the maximum PM_{10} impacts from the cooling tower shown in the 2001 AFC for the CPP with the revised impacts. As shown in Table 2, while the proposed maximum daily PM_{10} emissions have increased, the maximum modeled 24-hour average impacts have decreased due to the slightly higher exhaust flow rate. For annual average PM_{10} impacts, the maximum modeled impact has increased

slightly.[1] However, because this increase is well below the Prevention of Significant Deterioration (PSD) significance level for PM_{10} of 1.0 $\mu g/m^3$, this small net increase is negligible. Consequently, there are no new significant PM_{10} ambient impacts associated with the proposed changes to the COCs for the cooling tower. The detailed modeling files are included on the enclosed compact disc.

Table 2
PM_{10} Ambient Impacts (Single Cooling Tower)

	2001 AFC for CPP	Revised Impacts	Net Change
24-hour Impact ($\mu g/m^3$)	0.198*	0.177	-0.021
Annual Impact ($\mu g/m^3$)	0.017*	0.020	0.003

Note:
* Calculated based on one-half of combined impacts for both cooling towers that were analyzed in the 2001 AFC for the CPP (i.e., 0.396 $\mu g/m^3$ 24-hr impact, 0.0337 $\mu g/m^3$ annual impact). The second cooling tower is part of Phase 2, which has not yet been licensed.

Cooling Water TDS Level

Conditions Affected:

- Condition AQ-24

Proposed Change:

- Condition AQ-24: Increase maximum circulating water TDS level from 470 to 800 ppmw.

Reason for Change:

This change is necessary due to higher than anticipated maximum cooling water TDS levels.

Will Change Result in any New Significant Impacts

As discussed above, the proposed increase in cooling water TDS levels will result in a corresponding increase in the maximum hourly and daily PM_{10} emission levels for the cooling tower. In addition, as discussed above, SMAQMD has determined that the

[1] The SMAQMD's June 12, 2007 ATC for the revised cooling tower specifications would increase facility annual PM_{10} emissions by 0.9%. This increase does not affect the values shown in Table 2.

increase in TDS levels would result in slightly higher PM_{10} emissions on a quarterly and annual basis. As discussed above for COCs AQ-18 and AQ-19, there are no new significant air quality impacts associated with this change.

3.2 Biological Resources

The proposed Amendment will not result in biological resource impacts any different than those analyzed by the CEC during licensing of the project. Neither the proposed project description change nor the TDS increase, nor cooling tower recirculation flow rate increase will enlarge the footprint of the plant or extend its boundaries. There will be no increase in the currently established instantaneous or annual water limits that could affect biological resources.

3.3 Cultural Resources

The proposed Amendment will not result in cultural resource impacts any different than those analyzed by the CEC during licensing of the project. Neither the proposed project description change nor the TDS increase, nor cooling tower recirculation flow rate increase will enlarge the footprint of the plant or extend its boundaries.

3.4 Land Use

The proposed Amendment will not result in land use impacts any different than those analyzed by the CEC during licensing of the project. Neither the proposed project description change nor the TDS increase, nor cooling tower recirculation flow rate increase will enlarge the footprint of the plant or extend its boundaries.

3.5 Noise

The proposed Amendment will not result in noise impacts any different than those analyzed by the CEC during licensing of the project. Since only eight cooling tower fans would have operated at any given time even with a nine-cell cooling tower, there is neither an increase nor a reduction in noise associated with the change to the project description or cooling tower specifications.

3.6 Public Health

The cooling water used at CPP may contain some metal compounds that are classified as toxic air contaminants (TACs). Due to the possible presence of these compounds in the cooling water, it was necessary to calculate TAC emissions associated with the cooling tower. The detailed TAC emission calculations for the cooling tower are included in Attachment 2. Some of these compounds have both carcinogenic and non-cancer health effects. Under the Sacramento Metropolitan Air Quality Management District's (SMAQMD) toxics policy, new or modified projects with TAC emissions are required to perform a screening level risk assessment. Under

this policy, new or modified projects with TAC emissions are considered de minimis if the maximum excess cancer risk (MECR) is less than 0.1 in one million and the non-cancer Hazard Index (HI) is less than 1.0. A project with MECR greater than or equal to 0.1 in one million and less than 1.0 in one million is approvable with no further requirements. If the MECR is greater than or equal to 1.0 in one million, Toxics Best Available Control Technology (TBACT) is required. The MECR is capped at 10 in one million for all projects except for those that receive special overriding approval by the Air Pollution Control Officer. Additionally, the HI is capped at 1.0, except when special consideration is given in consultation with the State Office of Environmental Health Hazard Assessment (OEHHA).

As part of the 2001 AFC for the CPP project, a screening level risk assessment was performed for the gas turbines and cooling towers. This analysis determined the MECR and chronic/acute impacts for the project. While the proposed change to the TDS level of the cooling water is not expected to affect the TAC emissions associated with the cooling tower, as shown in Table 1 the proposed cooling tower water circulation rate and stack parameters are different than those analyzed as part of the 2001 AFC for the CPP. Consequently, to determine the change (if any) in the MECR and/or chronic/acute impacts associated with the proposed cooling tower specification changes, a revised screening level health risk assessment (HRA) was performed examining the impacts from only the cooling tower. This analysis was prepared using the California Air Resources Board's (CARB) Hotspots Analysis and Reporting Program (HARP) computer model (Version 1.2a, August 26, 2005) and associated guidance in the OEHHA's *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (August 2003). The HARP model was used to assess cancer risk as well as chronic and acute risk impacts. The following paragraphs describe the procedures used to prepare this screening level risk assessment.

Modeling Inputs

The risk assessment module of the HARP model was run using unit ground level impacts to obtain derived cancer risks for each TAC of interest.[2] Cancer risks were obtained for the average point estimate and high-end point estimate options. The HARP model output was cancer risk by pollutant and route for each type of analysis, based on an exposure of 1.0 $\mu g/m^3$. HARP model output showing the unit values is included as Attachment 3. Individual cancer risks are expressed in units of risk per $\mu g/m^3$ of exposure. To calculate the weighted risk, the annual average emission rate in g/s for each TAC was multiplied by the individual cancer risk for that pollutant in $(\mu g/m^3)^{-1}$. The resulting weighted cancer risks for each TAC were then summed for the cooling tower. An identical approach was used to determine the acute and chronic health impacts associated with the cooling tower. Details of the calculations of risk "rates" for modeling are shown in Attachment 4.

[2] Procedure is described in Part B of Topic 8 of the HARP How-To Guides: How to Perform Health Analyses Using a Ground Level Concentration.

Risk Analysis Method

The total weighted risk "rate" was used in place of emission rates in the modeling analysis. The weighted risk "rates" used for the cooling tower screening level risk assessment modeling are summarized in Attachment 4. The value calculated by the dispersion model was then total cancer risk at each receptor. As discussed above, the PM_{10} modeling analysis for the cooling tower was performed using the ISCST3 model, the 1985 through 1989 Sacramento Executive Airport meteorological data, and the stack parameters for the cooling tower shown on Table 1. Consequently, this same modeling approach was used for the HRA modeling. The contribution of each TAC to total cancer risk and total HI for each analysis method was then determined using the individual contribution of each compound to the total weighted risk "rate."

Summary of Results

The results of the screening level health risk assessment are summarized in the following table.

Table 3
Revised Screening Level Risk Assessment

Risk Methodology	2001 AFC for the CPP	Revised Impacts
Modeled Residential Cancer Risk (in one million)		
Residential: Average Point Estimate	0.107*	0.228
Residential: High-end Point Estimate	0.107*	0.329
Modeled Acute and Chronic Impacts		
Acute HI	0.005*	0.005
Chronic HI	<0.001*	<0.001

Notes:
* AFC for the SMUD Cosumnes Power Plant, September 2001, Appendix 8.1E, Tables 8.1E-1, 8.1E-2, and 8.1E-3. To calculate the impacts from a single cooling tower, the combined impact from two cooling towers shown on these tables of the 2001 AFC were divided by two.

As shown in Table 3, the revised MECR associated with the cooling tower is below both the TBACT trigger level of 1 in a million and the significance level of 10 in one million. In addition, the revised acute and chronic health hazard indices for the cooling tower are well below the significance level of one. As shown in Table 3, there is an increase in the MECR for the cooling tower. This is due to two factors. First, as discussed above, the HARP model was used for the

revised analysis compared to the Health Risk Assessment (HRA) program that was used for the 2001 analysis of the CPP. Second, as shown in the TAC emission calculations included in Attachment 2, the revised emission rates include two new TACs, hexavalent chromium and chloroform.

Hexavalent chromium was included in the revised analysis because this compound is shown in one of the water quality tables[3] in the 2001 AFC for the CPP. There is some uncertainty regarding the actual presence of hexavalent chromium in the raw water supply to the CPP since the hexavalent chromium concentration shown in the 2001 AFC is equal to the detection level of the water quality test method. Despite this uncertainty, for consistency purposes hexavalent chromium was included in the revised screening level risk assessment for the cooling tower.

Chloroform was included in the revised analysis as a result of a study performed in 2004 on industrial process cooling towers for the EPA as part of the National Emission Standard for Hazardous Pollutants (NESHAP) program. The results of this study[4] indicate the presence of chloroform in the drift from cooling towers due to the use of chlorine in the cooling water as a biocide. Since chlorine is used in the cooling water at the CPP, chloroform was included in the revised TAC emissions calculations for the cooling tower.

While Table 3 shows an increase in the modeled MECR for the cooling tower from approximately 0.1 to 0.3 in one million, since the modeled MECR for the gas turbines in the 2001 AFC for the CPP was only about 0.1 in one million,[5] the overall MECR for the project remains below the TBACT trigger level of 1 in a million. Therefore, the proposed Amendment will not result in any new significant public health impacts.

3.7 Worker Safety & Health

The proposed Amendment will not result in worker safety and health impacts any different than those analyzed by the CEC during licensing of the project. Neither the proposed project description change, nor the TDS increase, nor cooling tower recirculation flow rate increase will affect the CPP operations Injury and Illness Prevention Plan.

3.8 Socioeconomics

The proposed Amendment will not result in socioeconomic impacts any different than those analyzed by the CEC during licensing of the project. There are no socioeconomic impacts, such as increase or decrease in construction or operations crew, or increase in operating costs associated with the proposed changes.

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[3] Cosumnes Power Plant, Application for Certification, September 2001, Table 7.1-2, Folsom-South Canal Raw Water Sampling Results.

[4] Estimated Worst-Case HAP Emissions for Industrial Process Cooling Tower and Chromium Electroplating Residual Risk Standards, EPA Contract 68-D-01-079, Prepared by RTI, Revised April 20, 2005.

[5] Cosumnes Power Plant, Application for Certification, September 2001, Table 8.1-3, Screening Level Risk Assessment SMUD Cosumnes Power Plant.

3.9 Agriculture & Soils

The proposed Amendment will not result in agricultural and soil impacts any different than those analyzed by the CEC during licensing of the project. Neither the proposed project description change nor the TDS increase, nor cooling tower recirculation flow rate increase will enlarge the footprint of the plant or extend its boundaries.

3.10 Traffic & Transportation

The proposed Amendment will not result in traffic and transport impacts any different than those analyzed by the CEC during licensing of the project. There are no traffic and transportation impacts, such as increases or decreases in the volume or flow of traffic associated with the proposed changes.

3.11 Visual Resources

Project Description for Cooling Tower Configuration

Conditions Affected

The proposed Amendment will not result in visual resource impacts any different than those analyzed by the CEC during licensing of the project. There are no conditions of certification affected; however, the project description and figures used in describing the cooling tower configuration are affected.

Proposed Change

Describe the cooling tower configuration as two eight-cell cooling towers rather than two nine-cell cooling towers, and update the descriptive text to match the dimensions of the eight-cell cooling tower listed in Table 1 of this Petition (Section 2.0).

Reason for Change

The proposed project modification related to the cooling tower specifications and operating parameters were not known and could not have been known at the time of the AFC submittal in September 2001. Preliminary engineering provided a best estimate of parameters from similar cooling tower designs and similar projects. All power plant cooling towers are custom designed by individual vendors who provide their unique margins for warranties and guarantees. Due to SMUD's status as a public agency, it could not pre-select a vendor and obtain a specific design for this item during AFC development in 2001. Formal cooling tower bids were solicited by SMUD in November 2002. Furthermore, SMUD did not detect the project description discrepancy during its review of the Presiding Members Preliminary Decision in August 2003. The license was issued by the CEC in September 2003. As SFA was reviewing the documentation involving the TDS and cooling tower circulation flow rate increase during preparation of this petition, it came to our attention that the project description was inaccurate.

Will Change Result in Any New Significant Impacts

To determine if there are any significant impacts due to this description change, the visual simulations from the key observation points (KOPs) were reviewed.

KOP 1 is located at Clay East Road, approximately 0.2 mile southwest of the project site. The cooling tower is slightly visible at this location and is similarly slightly visible in the visual simulation. There is no significant change since the predominant features are the combustion turbine air intake structures, the heat recovery steam generators, and plant features on the west side. The cooling tower(s) is located on the east side of the plant and mostly obscured from view.

KOP 2 is located at the back yard of 11615 Kirkwood Street, near the intersection with Clay East Road. This viewpoint is approximately 1.1 miles southwest of the project site. The cooling tower is visible at this location and is visible in the visual simulation. There is no significant change since the predominant features are the combustion turbine air intake structures, the heat recovery steam generators, and the plant features on the west side. The cooling tower(s) is located on the east side of the plant and mostly obscured from view.

KOP 3 is located at the backyard of 11540 Clay Station Road, slightly over two miles northwest of the project site. The cooling tower is slightly visible at this location and it is slightly visible in the visual simulation. There is no significant change since the predominant features are the combustion turbine air intake structures, the heat recovery steam generators, and the plant features on the west side. The cooling tower(s) is located on the east side of the plant and mostly obscured from view.

KOP 4 is located at the swimming and picnic area at Rancho Seco Park. This viewpoint is approximately 1.6 miles southeast of the project site. The cooling tower is not visible at this location and is not visible in the visual simulation. There is no significant change since it is not visible.

The original AFC analysis restricted cooling tower operations to eight cells concurrently, so there is no change in the analysis due to the project describing a nine-cell cooling tower. This analysis is verified by referring to Data Responses, Set 1C, Data Request 108 (February 4, 2002). The response to this request notes, "...The data previously submitted for cooling tower performance is correct for 8 cells operating in each 9-cell cooling tower."

In addition, there is no change in the expected frequency or duration of cooling tower visible plumes. Visible plumes for cooling towers are mainly affected by exhaust temperatures. An increase in exhaust temperature will result in a corresponding decrease in the frequency and duration of visible plumes. Since there is no change in the exhaust temperature associated with the proposed revised cooling tower specifications, there is no expected impact on the frequency or duration of visible plumes for the proposed revised cooling tower specifications compared to the cooling tower analyzed in the 2001 AFC for CPP.

This review of the KOPs and licensing information has determined that there is no significant impact due to the dimensional changes and revised number of cooling tower cells proposed in Table 1 (Section 2.0).

3.12 Hazardous Materials Management

The proposed Amendment will not result in hazardous materials management impacts any different than those analyzed by the CEC during licensing of the project. There are no additional hazardous materials produced as a result of the proposed changes.

3.13 Waste Management

The proposed Amendment will not result in waste management impacts any different than those analyzed by the CEC during licensing of the project. There are no increases in the amount of plant waste as a result of the proposed changes.

3.14 Water Resources

The proposed Amendment will not result in water resource impacts any different than those analyzed by the CEC during licensing of the project. The proposed cooling tower recirculating water flow rate increases from 125,867 gpm to 155,000 gpm. Cooling tower makeup water rates are nearly the same. Although the circulation rate increases to provide optimum cooling efficiency, there is no increase in either near-instantaneous (gpm) or annual plant water use, which is currently restricted by Condition of Certification Water Res-1.

3.15 Geologic Hazards and Resources

The proposed Amendment will not result in geologic hazard and resource impacts any different than those analyzed by the CEC during licensing of the project. Since there is no increase in project footprint or boundaries, the proposed cooling tower changes neither reduce nor increase geological hazards and resources. The cooling tower, in its current configuration, was engineered to withstand geological and seismic events in accordance with the California Building Code.

3.16 Paleontological Resources

The proposed Amendment will not result in paleontological resource impacts any different than those analyzed by the CEC during licensing of the project. Since there is no increase in project footprint or boundaries there will be no earth moving activities, and the proposed cooling tower changes neither reduce nor increase impacts to paeleontological resources.

3.17 Cumulative Impacts

The proposed Amendment will not result in cumulative impacts any different than those analyzed by the CEC during licensing of the project.

3.18 Laws, Ordinances, Regulations, & Standards

The Final Decision certifying the CPP project found the project to be in compliance with applicable LORS. As described in this Amendment, the proposed changes to the air quality conditions of certification are also consistent with all applicable LORS, and the Amendment will not alter the assumptions or conclusions made in the CEC's Final Decision for the CPP project. Furthermore, with the exception of those COCs noted above, there are no changes to any other COCs with respect to changes in the TDS, the cooling tower water recirculation flow rate and the project description. Hence, the proposed changes are consistent with all applicable LORS, and the Amendment will not alter the assumptions or conclusions made in the CEC's Final Decision for the CPP project.

4.0 Proposed Modifications to the Conditions of Certification

Consistent with the requirements of CEC Siting Regulations Section 1769(a)(1)(A), potential modifications to the project's COCs were evaluated. SFA is requesting approval of the proposed changes to the COCs discussed in this petition and detailed in Attachment 5. Requested changes are shown in underline/strikeout format.

5.0 Potential Effects on the Public

Consistent with the CEC Siting Regulations Section 1769(a)(1)(G), this section discusses the proposed project modification effects on the public. The proposed project modifications contained in this Amendment will have no significant impacts on the environment, and will be in compliance with all applicable LORS. Accordingly, there will be no adverse impacts on the public associated with this Amendment.

6.0 List of Property Owners

CEC Siting Regulations Section 1769(a)(1)(H) requires a list of the property owners potentially affected by the proposed Amendment. SFA reviewed all property owners within the same corridor analyzed in the CPP AFC approved by the CEC in September 2003. There are no property owners potentially affected by the proposed Amendment.

7.0 POTENTIAL EFFECTS ON PROPERTY OWNERS

Consistent with the CEC Siting Regulation Section 1769(a)(1)(I), this section addresses potential effects of the proposed Amendment on nearby property owners, the public, and parties in the application proceeding. Because the proposed Amendment will have no significant impacts on the environment, there will not be any significant impacts to nearby property owners, the public, or nearby businesses.

ATTACHMENT 1

DETAILED PM_{10} EMISSION CALCULATIONS

Table 8.1B-5 (Revised 3/05/07)

Cooling Tower Emissions

Number of towers	1
Number of cells per tower	8
Fan stack diameter (ft)	30
Exhaust temperature (F)	68.00
Exhaust flow rate per cell (acfm)	1,613,000
Water Circulation Rate, gal/min	155,000
Drift Rate	0.0005%
Water Drift (lbs/hr)	387.35
TDS Level, mg/L	800
PM10 lb/hr per tower	0.31
PM10 emissions per cell, lb/hr	0.039
PM10 emissions per cell, g/s	0.005

ATTACHMENT 2

DETAILED TAC EMISSION CALCULATIONS

Table 8.1B-8 (Revised 3/05/07)

Non-Criteria Pollutant Emissions From Cooling Towers

Pollutant	Recirculation Water Concentration (ppmw)	Recirculation Water Drift Rate (lbs/hr)	1 Tower Emission Rate (lbs/hr) (each)	2 Towers Emission Rate (lbs/hr)	1 Tower Annual Emission Rate (ton/yr) (each)	2 Towers Annual Emission Rate (tons/yr)	Hourly Emission Rate Per Cell (g/sec) (each)	Annual Emission Rate Per Cell (g/sec) (each)
Aluminum	0.012	387.35	4.65E-06	9.30E-06	2.04E-05	4.07E-05	7.32E-08	7.32E-08
Ammonia[2,3]	1.000	387.35	3.87E-04	7.75E-04	1.70E-03	3.39E-03	6.10E-06	6.10E-06
Antimony[2]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic[1,2,3]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Barium	0.160	387.35	6.20E-05	1.24E-04	2.71E-04	5.43E-04	9.76E-07	9.76E-07
Beryllium[1,2]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Boron	0.230	387.35	8.91E-05	1.78E-04	3.90E-04	7.80E-04	1.40E-06	1.40E-06
Cadmium[1,2]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chloroform[1,2,3,4]	—	387.35	1.71E-01	3.41E-01	7.48E-01	1.50E+00	2.69E-03	2.69E-03
Chromium (hexavalent)[1,2,4]	0.052	387.35	2.01E-05	4.03E-05	8.82E-05	1.76E-04	3.17E-07	3.17E-07
Chromium		387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper[2,3]	0.190	387.35	7.36E-05	1.47E-04	3.22E-04	6.45E-04	1.16E-06	1.16E-06
Cyanide[2,3]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluorides[2,3]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lead[1]	0.028	387.35	1.08E-05	2.17E-05	4.75E-05	9.50E-05	1.71E-07	1.71E-07
Manganese[2]	0.220	387.35	8.52E-05	1.70E-04	3.73E-04	7.46E-04	1.34E-06	1.34E-06
Mercury[2,3]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel[1,2,3]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium[2]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Silver	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Thallium	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium[3]	0.000	387.35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc[2]	0.430	387.35	1.67E-04	3.33E-04	7.30E-04	1.46E-03	2.62E-06	2.62E-06

Notes:
1. Carcinogenic compound.
2. Chronic REL.
3. Acute REL.
4. These are new compounds added to this analysis.

ATTACHMENT 3

HARP MODEL OUTPUTS

File: C:\HARP\projects\demo\cpptowerEstimate1X.txt

Created by HARP Version 4.3 Build 23.04.05
Uses ISC Version 99155
Uses RTIP (Dated: 04112)
Creation date: 7/21/2007 3:52:07 PM

EXCEPTION REPORT
(there have been no changes or exceptions)

INPUT FILES:
Source-Receptor file:
Averaging period adjustment factors file: not applicable
Emission rates file: none
Site parameters file: C:\HARP\PROJECTS\DEMO\cpptower.sit

GLC DATA SOURCE:
concentrations loaded from file C:\HARP\PROJECTS\DEMO\CPPtower.CHI
chemicals and/or concentrations have been edited by the user
User memo:
CHEMICALS ADDED/DELETED BY USER:
ADDED: H3

Screening mode is OFF

Exposure Duration: 70 year (adult resident)
Analysis Method: Average Point Estimate
Health Effect: Cancer, Chronic and Acute

SITE PARAMETERS

DEPOSITION

Deposition rate (m/s) 0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

HUMAN INGESTION
Fraction of ingested leafy vegetable
from home grown source 0.15
Fraction of ingested exposed vegetable
from home grown source 0.15
Fraction of ingested protected vegetable
from home grown source 0.15
Fraction of ingested root vegetable
from home grown source 0.15

PIGS, CHICKENS AND FISH

HUMAN INGESTION
Fraction of ingested pig
from home grown source 1
Fraction of ingested chicken
from home grown source 1
Fraction of ingested egg
from home grown source 1

ANIMALS' FEED
Fraction of pigs' feed
from home grown crop 0.1
Fraction of chickens' feed
from home grown crop 0.05

SOIL INGESTION
Fraction of pigs' feed
eaten off the ground 0.1
Fraction of chickens' feed
eaten off the ground 0.05

PIG FEED COMPOSITION
Fraction of feed that is
exposed vegetable 0.25
Fraction of feed that is
leafy vegetable 0.25
Fraction of feed that is
protected vegetable 0.25
Fraction of feed that is
root vegetable 0.25

CHICKEN FEED COMPOSITION
Fraction of feed that is
exposed vegetable 0.25
Fraction of feed that is
leafy vegetable 0.25
Fraction of feed that is
protected vegetable 0.25
Fraction of feed that is
root vegetable 0.25

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL GROUND LEVEL CONCENTRATIONS (micrograms/m^3) (*** indicates not a multipathway chemical)

ABBREV	CAS	GLC Avrg	GLC Max	GLC Water	GLC Pasture	GLC Fish
Arsenic	7440382	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Barium	7440393	1.000E+00	1.000E+00	***	***	***
Beryllium	7440417	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Chloroform	67663	1.000E+00	1.000E-01	***	***	***
Chromium	7440473	1.000E+00	1.000E-00	***	***	***
Cr VI	18540299	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Cobalt	7440484	1.000E+00	1.000E+00	***	***	***
Aluminum	7429905	1.000E+00	1.000E+00	***	***	***
Copper	7440508	1.000E+00	1.000E+00	***	***	***
Cyanide cmpds	1073	1.000E+00	1.000E+00	***	***	***
Fluorides&cmpds	2101	1.000E+00	1.000E+00	***	***	***
Lead	7439921	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Manganese	7439965	1.000E+00	1.000E+00	***	***	***
Mercury	7439976	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Nickel	7440020	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Silver	7440224	1.000E+00	1.000E+00	***	***	***
Selenium	7782492	1.000E+00	1.000E+00	***	***	***
Thallium	7440280	1.000E+00	1.000E+00	***	***	***
Vanadium	7440622	1.000E+00	1.000E+00	***	***	***
Zinc	7440666	1.000E+00	1.000E+00	***	***	***
Antimony	7440360	1.000E+00	1.000E+00	***	***	***
NH3	7664417	1.000E+00	1.000E+00	***	***	***

CHEMICAL CROSS-REFERENCE TABLE

CHEM	CAS	ABBREVIATION	POLLUTANT NAME	BACKGROUND (ug/m^3)
0001	7440382	Arsenic	Arsenic	0.000E+00
0002	7440393	Barium	Barium	0.000E+00
0003	7440417	Beryllium	Beryllium	0.000E+00
0004	7440439	Cadmium	Cadmium	0.000E+00
0005	67663	Chloroform	Chloroform	0.000E+00
0006	7440473	Chromium	Chromium	0.000E+00
0007	18540299	Cr(VI)	Chromium, hexavalent (& compounds)	0.000E+00
0008	7440484	Cobalt	Cobalt	0.000E+00
0009	7429905	Aluminum	Aluminum	0.000E+00
0010	7440508	Copper	Copper	0.000E+00
0011	1073	Cyanide cmpds	Cyanide compounds	0.000E+00
0012	2101	Fluorides&cmpds	Fluorides and compounds	0.000E+00
0013	7439921	Lead	Lead	0.000E+00
0014	7439965	Manganese	Manganese	0.000E+00
0015	7439976	Mercury	Mercury	0.000E+00
0016	7440020	Nickel	Nickel	0.000E+00
0017	7440224	Silver	Silver	0.000E+00
0018	7782492	Selenium	Selenium	0.000E+00
0019	7440280	Thallium	Thallium	0.000E+00
0020	7440622	Vanadium	Vanadium (fume or dust)	0.000E+00
0021	7440666	Zinc	Zinc	0.000E+00
0022	7440360	Antimony	Antimony	0.000E+00
0023	7664417	NH3	Ammonia	0.000E+00

EMISSIONS DATA SOURCE:
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC= CO= DEV= PRO= STK= NAME=
SOURCE MULTIPLIER=

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)

AVERAGE DOSE BY PATHWAY (mg/kg-d) FOR CANCER CALCULATIONS

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
0001	2.6[illegible]	[illegible]	2.70E-03	0.00E+00	0.00E+00	0.00E+00	1.43E-03	0.00E+00	0.00E+00	4.34E-08	2.81E-06	5.35E-08
0002	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	2.60E-04	5.13E-05	2.70E-03	0.00E+00	0.00E+00	0.00E+00	1.32E-03	0.00E+00	0.00E+00	2.12E-08	1.38E-06	2.61E-08
0004	2.60E-04	2.49E-06	2.70E-03	0.00E+00	0.00E+00	0.00E+00	7.60E-04	0.00E+00	0.00E+00	2.62E-08	1.31E-06	3.23E-08
0005	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0006	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	2.60E-04	6.15E-05	2.70E-03	0.00E+00	0.00E+00	0.00E+00	1.36E-03	0.00E+00	0.00E+00	1.94E-07	1.27E-05	2.40E-07
0008	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	2.60E-04	8.19E-05	2.70E-03	0.00E+00	0.00E+00	0.00E+00	1.56E-03	0.00E+00	0.00E+00	8.90E-09	5.70E-07	1.10E-08
0014	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	2.60E-04	8.19E-04	2.70E-03	0.00E+00	0.00E+00	0.00E+00	1.03E-02	0.00E+00	0.00E+00	1.60E-06	7.64E-05	1.97E-06
0016	2.60E-04	3.28E-04	2.70E-03	0.00E+00	0.00E+00	0.00E+00	3.14E-03	0.00E+00	0.00E+00	5.80E-08	3.36E-06	7.16E-08
0017	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	2.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AVERAGE CANCER RISK

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL
0001	3.12E-03	4.91E-04	4.05E-03	0.00E+00	0.00E+00	0.00E+00	2.15E-03	0.00E+00	0.00E+00	6.51E-08	4.21E-06	8.03E-08	4.36E-06	6.69E-03	9.81E-03
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	2.16E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-03
0004	3.90E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.90E-03
0005	4.94E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.94E-06
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	1.33E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-01
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	1.09E-05	6.96E-07	2.29E-05	0.00E+00	0.00E+00	0.00E+00	1.33E-05	0.00E+00	0.00E+00	7.57E-11	4.84E-09	9.33E-11	5.01E-09	3.69E-05	4.79E-05
0014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0016	2.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E-04
0017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SUM	1.42E 01	4.92E-04	4.07E 03	0.00E+00	0.00E+00	0.00E+00	2.16E-03	0.00E+00	0.00E+00	6.52E-08	4.22E-06	8.04E-08	4.36E-06	6.73E-03	1.49E-01

INHALATION CONCENTRATION (ug/m^3) AND AVERAGE DOSE BY PATHWAY (mg/(kg-d)) FOR CHRONIC CALCULATIONS

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
0001	1.00E+00	5.88E-04	3.62E-03	0.00E+00	0.00E+00	0.00E+00	1.49E-03	0.00E+00	0.00E+00	4.53E-08	2.93E-06	5.58E-08
0002	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	1.00E+00	2.47E-04	2.82E-03	0.00E+00	0.00E+00	0.00E+00	1.37E-03	0.00E+00	0.00E+00	2.21E-08	1.44E-06	2.72E-08
0004	1.00E+00	2.47E-05	2.82E-03	0.00E+00	0.00E+00	0.00E+00	7.82E-03	0.00E+00	0.00E+00	2.73E-08	1.37E-06	3.36E-08
0005	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0006	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0010	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	1.00E+00	2.47E-03	2.82E-03	0.00E+00	0.00E+00	0.00E+00	1.06E-02	0.00E+00	0.00E+00	1.67E-06	7.97E-05	2.05E-06		
0016	1.00E+00	9.86E-04	1.82E-03	0.00E+00	0.00E+00	0.00E+00	3.28E-03	0.00E+00	0.00E+00	6.05E-08	3.51E-06	7.46E-08		
0017	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0018	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0019	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0020	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0021	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0022	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0023	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		

AVERAGE CHRONIC HI

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX
0001	5.10E+01	3.33E+01	0.00E+00	3.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E+01	0.00E+00	5.10E+01
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E+00	1.43E+02	0.00E+00	0.00E+00	1.43E+02	0.00E+00	0.00E+00	1.43E+02
0004	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.13E+01	0.00E+00	5.00E+01	0.00E+00	0.00E+00	7.13E+01
0005	0.00E+00	0.00E+00	0.00E+00	3.33E-03	0.00E+00	0.00E+00	3.33E-03	0.00E+00	3.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-03
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00	0.00E+00	2.21E-01	5.00E+00
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-01	0.00E+00	0.00E+00	4.17E-01
0011	1.11E-01	1.11E-01	0.00E+00	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-01
0012	0.00E+00	0.00E+00	7.69E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.69E-02	0.00E+00	0.00E+00	7.69E-02
0013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	0.00E+00	5.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00
0015	0.00E+00	1.11E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.32E+01	5.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.32E+01
0016	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-01	0.00E+00	0.00E+00	0.00E+00	2.00E+01	0.00E+00	2.00E-01	2.00E+01
0017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	5.00E-02	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02
0019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	2.86E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.86E-02	0.00E+00	2.86E-02	2.86E-02
0022	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00	0.00E+00	0.00E+00	5.00E+00
0023	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	0.00E+00	0.00E+00	5.00E-03
SUM	5.12E+01	4.96E+01	7.69E-02	3.33E+01	1.11E-01	0.00E+00	2.41E+00	1.96E+02	1.25E+02	0.00E+00	2.23E+02	1.77E+01	2.03E+01	2.23E+02

ACUTE HI

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX
0001	0.00E+00	0.00E+00	0.00E+00	5.26E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.26E+00	0.00E+00	0.00E+00	0.00E+00	5.26E+00
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0004	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0005	0.00E+00	6.67E-03	0.00E+00	6.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.67E-03	0.00E+00	0.00E+00	0.00E+00	6.67E-03
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-02	0.00E+00	0.00E+00	0.00E+00	1.00E-02
0011	0.00E+00	2.94E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E-03
0012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.17E-03
0013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	0.00E+00	0.00E+00	0.00E+00	5.56E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E-01	0.00E+00	0.00E+00	0.00E+00	5.56E-01

0016	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-02
0021	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-04
TOT	0.00E+00	9.61E-03	0.00E+00	5.83E+00	0.00E+00	3.76E-02	0.00E+00	1.67E-02	0.00E+00	5.83E+00	2.14E-01	0.00E+00	0.00E+00	5.83E+00				

File file: . \HARP\projects-demo\risk\EstimateRisk.txt

Created by HARP Version 1.3 Build 24.04.05
Uses ISC Version 99/05
User ERIF Date: 1, 34712)
Creation Date: 2/21/2007 3:55:30 PM

EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file:
   Averaging period adjustment factors file: not applicable
   Emission rates file: none
   Site parameters file: C:\HARP\PROJECTS\DEMO\cpptower.sit

GLC DATA SOURCE:
  Concentrations loaded from file C:\HARP\PROJECTS\DEMO\CPPtower.CML
  chemicals and/or concentrations have been edited by the user
  User memo:
CHEMICALS ADDED/DELETED BY USER:
  ADDED: NH3

Screening mode is OFF

Exposure Duration: 70 year (adult resident)
Analysis Method: High-end Point Estimate
Health Effect: Cancer, Chronic and Acute

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)   0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

   HUMAN INGESTION
   Fraction of ingested leafy vegetable
     from home grown source   0.15
   Fraction of ingested exposed vegetable
     from home grown source   0.15
   Fraction of ingested protected vegetable
     from home grown source   0.15
   Fraction of ingested root vegetable
     from home grown source   0.15

PIGS, CHICKENS AND EGGS

HUMAN INGESTION
Fraction of ingested pig
from home grown source 1
Fraction of ingested chicken
from home grown source 1
Fraction of ingested egg
from home grown source 1

ANIMALS' FEED
Fraction of pigs' feed
from home grown crop 0.1
Fraction of chickens' feed
from home grown crop 0.05

SOIL INGESTION
Fraction of pigs' feed
eaten off the ground 0.1
Fraction of chickens' feed
eaten off the ground 0.05

PIG FEED COMPOSITION
Fraction of feed that is
exposed vegetable 0.25
Fraction of feed that is
leafy vegetable 0.25
Fraction of feed that is
protected vegetable 0.25
Fraction of feed that is
root vegetable 0.25

CHICKEN FEED COMPOSITION
Fraction of feed that is
exposed vegetable 0.25
Fraction of feed that is
leafy vegetable 0.25
Fraction of feed that is
protected vegetable 0.25
Fraction of feed that is
root vegetable 0.25

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL GROUND LEVEL CONCENTRATIONS (micrograms/m^3) (*** indicates not a multipathway chemical)

ABBREV	CAS	GLC Avrg	GLC Max	GLC Water	GLC Pasture	GLC Fish
Arsenic	7440382	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Barium	7440393	1.000E+00	1.000E+00	***	***	***
Beryllium	7440417	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

Cadmium	7440439	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Chloroform	67663	1.000E+00	1.000E+00	***	***	***
Chromium	7440473	1.000E+00	1.000E+00	***	***	***
Cr VI	18540299	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Cobalt	7440484	1.000E+00	1.000E+00	***	***	***
Aluminum	7429905	1.000E+00	1.000E+00	***	***	***
Copper	7440508	1.000E+00	1.000E+00	***	***	***
Cyanide cmpds	1073	1.000E+00	1.000E+00	***	***	***
Fluorides&cmpds	1101	1.000E+00	1.000E+00	***	***	***
Lead	7439921	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Manganese	7439965	1.000E+00	1.000E+00	***	***	***
Mercury	7439976	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Nickel	7440020	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Silver	7440224	1.000E+00	1.000E+00	***	***	***
Selenium	7782492	1.000E+00	1.000E+00	***	***	***
Thallium	7440280	1.000E+00	1.000E+00	***	***	***
Vanadium	7440622	1.000E+00	1.000E+00	***	***	***
Zinc	7440666	1.000E+00	1.000E+00	***	***	***
Antimony	7440360	1.000E+00	1.000E+00	***	***	***
NH3	7664417	1.000E+00	1.000E+00	***	***	***

CHEMICAL CROSS-REFERENCE TABLE

CHEM	CAS	ABBREVIATION	POLLUTANT NAME	BACKGROUND (ug/m^3)
0001	7440382	Arsenic	Arsenic	0.000E+00
0002	7440393	Barium	Barium	0.000E+00
0003	7440417	Beryllium	Beryllium	0.000E+00
0004	7440439	Cadmium	Cadmium	0.000E+00
0005	67663	Chloroform	Chloroform	0.000E+00
0006	7440473	Chromium	Chromium	0.000E+00
0007	18540299	Cr(VI)	Chromium, hexavalent (& compounds)	0.000E+00
0008	7440484	Cobalt	Cobalt	0.000E+00
0009	7429905	Aluminum	Aluminum	0.000E+00
0010	7440508	Copper	Copper	0.000E+00
0011	1073	Cyanide cmpds	Cyanide compounds	0.000E+00
0012	1101	Fluorides&cmpds	Fluorides and compounds	0.000E+00
0013	7439921	Lead	Lead	0.000E+00
0014	7439965	Manganese	Manganese	0.000E+00
0015	7439976	Mercury	Mercury	0.000E+00
0016	7440020	Nickel	Nickel	0.000E+00
0017	7440224	Silver	Silver	0.000E+00
0018	7782492	Selenium	Selenium	0.000E+00
0019	7440280	Thallium	Thallium	0.000E+00
0020	7440622	Vanadium	Vanadium (fume or dust)	0.000E+00
0021	7440666	Zinc	Zinc	0.000E+00
0022	7440360	Antimony	Antimony	0.000E+00
0023	7664417	NH3	Ammonia	0.000E+00

EMISSIONS DATA SOURCE:
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC= CO= DEV= PRO= STK= NAME=
SOURCE MULTIPLIER=

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)

HIGH-END EXPOSURE BY PATHWAY (mg/(kg-d)) FOR CANCER CALCULATIONS

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
0001	3.77E-04	6.88E-03	2.70E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-07	9.27E-06	1.60E-07
0002	3.77E-04	1.40E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	3.77E-04	1.39E-03	2.70E-03	0.00E+00	0.00E+00	0.00E+00	4.66E-03	0.00E+00	0.00E+00	7.28E-08	4.57E-06	7.82E-08
0004	3.77E-04	1.39E-03	2.70E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0005	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0006	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0008	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	3.77E-04	1.39E-03	2.70E-03	0.00E+00	0.00E+00	0.00E+00	5.55E-03	0.00E+00	0.00E+00	3.06E-08	1.88E-06	3.29E-08
0014	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	3.77E-04	1.39E-02	2.70E-03	0.00E+00	0.00E+00	0.00E+00	3.57E-02	0.00E+00	0.00E+00	5.49E-06	2.52E-04	5.90E-06
0016	3.77E-04	5.55E-03	2.70E-03	0.00E+00	0.00E+00	0.00E+00	1.09E-02	0.00E+00	0.00E+00	2.00E-07	1.21E-05	2.14E-07
0017	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	3.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HIGH-END CANCER RISK

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL
0001	4.52E-03	8.32E-03	4.05E-03	0.00E+00	0.00E+00	0.00E+00	7.64E-03	0.00E+00	0.00E+00	2.24E-07	1.39E-05	2.41E-07	1.44E-05	2.00E-02	2.45E-02
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	3.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.17E-03
0004	5.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.65E-03
0005	7.16E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.16E-06
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	1.92E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-01
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	1.58E-05	1.18E-05	2.29E-05	0.00E+00	0.00E+00	0.00E+00	4.72E-05	0.00E+00	0.00E+00	2.60E-10	1.60E-08	2.79E-10	1.65E-08	8.20E-05	9.78E-05
0014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0016	3.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SUM	2.06E-01	8.33E-03	4.07E-03	0.00E+00	0.00E+00	0.00E+00	7.68E-03	0.00E+00	0.00E+00	2.24E-07	1.39E-05	2.41E-07	1.44E-05	2.01E-02	2.26E-01

INHALATION CONCENTRATION (ug/m^3) AND HIGH-END DOSE BY PATHWAY (mg/(kg-d)) FOR CHRONIC CALCULATIONS

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
0001	1.00E+00	5.78E-03	2.82E-03	0.00E+00	0.00E+00	0.00E+00	5.31E-03	0.00E+00	0.00E+00	1.56E-07	9.67E-06	1.67E-07
0002	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	1.00E+00	1.45E-03	2.82E-03	0.00E+00	0.00E+00	0.00E+00	4.86E-03	0.00E+00	0.00E+00	7.59E-08	4.76E-06	8.15E-08
0004	1.00E+00	1.45E-04	2.82E-03	0.00E+00	0.00E+00	0.00E+00	2.74E-02	0.00E+00	0.00E+00	9.38E-08	4.52E-06	1.01E-07
0005	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0006	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0007	1.00E+00	1.45E-03	2.82E-03	0.00E+00	1.79E-03	7.91E-02	4.60E-03	0.00E+00	0.00E+00	6.57E-07	4.36E-05	7.49E-07		
0008	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E+00		
0009	1.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E+00	0.00E-00	0.00E-00	2.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00		
0010	1.00E+00	0.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00		
0011	1.00E-00	0.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00		
0012	1.00E+00	0.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00		
0013	1.00E+00	1.45E-03	2.82E-03	0.00E-00	0.00E+00	0.00E-00	7.79E-03	0.00E+00	0.00E+00	3.19E-08	2.96E-06	3.43E-08		
0014	1.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E-00		
0015	1.00E+00	1.45E-03	2.82E-03	0.00E+00	0.00E+00	0.00E-00	3.72E-02	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E+00		
0016	1.00E+00	5.78E-03	2.82E-03	0.00E+00	0.00E+00	0.00E+00	1.13E-02	0.00E+00	0.00E+00	2.08E-07	1.16E-05	2.23E-07		
0017	1.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0018	1.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0019	1.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0020	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0021	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0022	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0023	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		

HIGH-END CHRONIC HI

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX
0001	7.97E+01	3.33E-01	0.00E+00	2.33E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.64E+01	0.00E+00	7.97E+01
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.57E+00	1.43E+02	0.00E+00	0.00E+00	1.43E+02	0.00E+00	0.00E+00	1.43E+02
0004	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E+02	0.00E+00	5.00E+01	0.00E+00	0.00E+00	1.11E+02
0005	0.00E+00	0.00E+00	0.00E+00	3.33E-03	0.00E+00	0.00E+00	3.33E-03	0.00E+00	3.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-03
0006	0.00E+00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	0.00E+00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00	0.00E+00	4.55E-01	5.00E+00
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	1.11E-01	1.11E-01	0.00E+00	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-01
0012	0.00E+00	0.00E+00	7.69E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.69E-02	0.00E+00	0.00E+00	7.69E-02
0013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	0.00E+00	5.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00
0015	0.00E+00	1.11E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E+02	1.83E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E+02
0016	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.99E-01	0.00E+00	0.00E+00	0.00E+00	2.00E+01	0.00E+00	2.00E+01	2.00E+01
0017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	5.00E-02	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02
0019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	2.86E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.86E-02	0.00E+00	2.86E-02	2.86E-02
0022	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00	0.00E+00	0.00E+00	5.00E+00
0023	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	0.00E+00	0.00E+00	5.00E-03
SUM	7.99E+01	4.96E+01	7.69E-02	3.33E-01	1.11E-01	0.00E+00	5.02E+00	3.25E+02	2.93E+02	0.00E+00	2.23E+02	4.64E+01	2.05E+01	3.25E+02

ACUTE HI

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	RRPRO	RESP	SKIN	BLOOD	MAX
0001	0.00E+00	0.00E+00	0.00E+00	5.26E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.26E+00	0.00E+00	0.00E+00	0.00E+00	5.26E+00
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	0.00E+00	0.00E-00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0004	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0005	0.00E+00	6.67E-03	0.00E+00	6.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.67E-03	0.00E+00	0.00E+00	0.00E+00	6.67E-03
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	0.00E+00	2.94E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-02	0.00E+00	0.00E+00	1.00E-02
0012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.17E-03
0013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	0.00E+00	0.00E+00	0.00E+00	5.56E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E-01	0.00E+00	0.00E+00	0.00E+00	5.56E-01

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	1.67E 01	[illegible]	[illegible]	1.67E 01	0.00E+00	[illegible]
0307	0 [illegible]	0.00E+00	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0318	0 00E+00	0 00E+00	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
[illegible]	0 00E+00	0.00E+00	0.00E+00	[illegible]	0.00E+00	0 00E-00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E-00	0.00E+00	0 00E+00	0.00E+00
0320	0 00E+00	0 00E+00	[illegible]	[illegible]	0.00E+00	0.00E+00	3.33E-02	0.00E+00	0.00E+00	0.00E+00	[illegible]	3.33E-02	0.00E-00	0.00E+00	3.33E-02
0321	0 00E+00	0.00E-00	0.00E+00	0.00E+00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0 00E-00	0.00E+00	0 00E+00	0.00E-00	0.00E+00	0.00E+00
0322	0.00E-00	0.00E-00	0.00E+00	0.00E+00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E-00	0.00E-00	0.00E-00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0323	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-04	0.00E+00	0.00E+00	0.00E+00	0 00E-00	3.13E-04	0.00E+00	0.00E+00	3.13E-04
SUM	0.00E+00	9.61E-03	0.00E+00	5.83E+00	0.00E-00	3.78E-02	0.00E+00	1.67E 01	0.00E+00	5.83E+00	2.14E-01	0 00E+00	0.00E+00	5.83E+00

This file: C:\HARP\projects\demo\PointEstimateRisk.txt

Created by HARP Version 1.3 Build 23.04.05
Uses ISC Version 39155
Uses RPIF (Dated: 041121)
Creation date: 3/21/2007 3:58:18 PM

EXCEPTION REPORT
(there have been no changes or exceptions)

INPUT FILES:
Source-Receptor file:
Averaging period adjustment factors file: not applicable
Emission rates file: none
Site parameters file: C:\HARP\PROJECTS\DEMO\cpptower.sit

GLC DATA SOURCE:
concentrations loaded from file C:\HARP\PROJECTS\DEMO\CPPtower.CML
chemicals and/or concentrations have been edited by the user
User memo:
CHEMICALS ADDED/DELETED BY USER:
ADDED: NH3

Screening mode is OFF

Exposure Duration: Standard work schedule (49 wks/yr, 5 days/wk, 8 hrs/day, 40 yrs)
Analysis Method: Point estimate
Health Effect: Cancer, Chronic and Acute

SITE PARAMETERS

DEPOSITION

Deposition rate (m/s) 0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

HUMAN INGESTION
Fraction of ingested leafy vegetable
from home grown source 0.15
Fraction of ingested exposed vegetable
from home grown source 0.15
Fraction of ingested protected vegetable
from home grown source 0.15
Fraction of ingested root vegetable
from home grown source 0.15

12. CHICKEN AND EGGS

HUMAN INGESTION
Fraction of ingested pig
from home grown source 1
Fraction of ingested chicken
from home grown source 1
Fraction of ingested egg
from home grown source 1

ANIMALS' FEED
Fraction of pigs' feed
from home grown crop 0.1
Fraction of chickens' feed
from home grown crop 0.05

SOIL INGESTION
Fraction of pigs' feed
eaten off the ground 0.1
Fraction of chickens' feed
eaten off the ground 0.05

PIG FEED COMPOSITION
Fraction of feed that is
exposed vegetable 0.25
Fraction of feed that is
leafy vegetable 0.25
Fraction of feed that is
protected vegetable 0.25
Fraction of feed that is
root vegetable 0.25

CHICKEN FEED COMPOSITION
Fraction of feed that is
exposed vegetable 0.25
Fraction of feed that is
leafy vegetable 0.25
Fraction of feed that is
protected vegetable 0.25
Fraction of feed that is
root vegetable 0.25

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL GROUND LEVEL CONCENTRATIONS (micrograms/m^3) (*** indicates not a multipathway chemical)

ABBRRV	CAS	GLC Avrg	GLC Max	GLC Water	GLC Pasture	GLC Fish
Arsenic	7440382	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Barium	7440393	1.000E+00	1.000E+00	***	***	***
Beryllium	7440417	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

Cadmium	7440439	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Chloroform	67663	1.000E+00	1.000E+00	***	***	***
Chromium	7440473	1.000E+00	1.000E+00	***	***	***
Cr(VI)	18540299	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Cobalt	7440484	1.000E+00	1.000E+00	***	***	***
Aluminum	7429905	1.000E+00	1.000E+00	***	***	***
Copper	7440508	1.000E+00	1.000E+00	***	***	***
Cyanide cmpds	1073	1.000E+00	1.000E+00	***	***	***
Fluorides&cmpds	2101	1.000E+00	1.000E+00	***	***	***
Lead	7439921	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Manganese	7439965	1.000E+00	1.000E+00	***	***	***
Mercury	7439976	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Nickel	7440020	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Silver	7440224	1.000E+00	1.000E+00	***	***	***
Selenium	7782492	1.000E+00	1.000E+00	***	***	***
Thallium	7440280	1.000E+00	1.000E+00	***	***	***
Vanadium	7440622	1.000E+00	1.000E+00	***	***	***
Zinc	7440666	1.000E+00	1.000E+00	***	***	***
Antimony	7440360	1.000E+00	1.000E+00	***	***	***
NH3	7664417	1.000E+00	1.000E+00	***	***	***

CHEMICAL CROSS-REFERENCE TABLE

CHEM	CAS	ABBREVIATION	POLLUTANT NAME	BACKGROUND (ug/m^3)
0001	7440382	Arsenic	Arsenic	0.000E+00
0002	7440393	Barium	Barium	0.000E+00
0003	7440417	Beryllium	Beryllium	0.000E+00
0004	7440439	Cadmium	Cadmium	0.000E+00
0005	67663	Chloroform	Chloroform	0.000E+00
0006	7440473	Chromium	Chromium	0.000E+00
0007	18540299	Cr(VI)	Chromium, hexavalent (& compounds)	0.000E+00
0008	7440484	Cobalt	Cobalt	0.000E+00
0009	7429905	Aluminum	Aluminum	0.000E+00
0010	7440508	Copper	Copper	0.000E+00
0011	1073	Cyanide cmpds	Cyanide compounds	0.000E+00
0012	2101	Fluorides&cmpds	Fluorides and compounds	0.000E+00
0013	7439921	Lead	Lead	0.000E+00
0014	7439965	Manganese	Manganese	0.000E+00
0015	7439976	Mercury	Mercury	0.000E+00
0016	7440020	Nickel	Nickel	0.000E+00
0017	7440224	Silver	Silver	0.000E+00
0018	7782492	Selenium	Selenium	0.000E+00
0019	7440280	Thallium	Thallium	0.000E+00
0020	7440622	Vanadium	Vanadium (fume or dust)	0.000E+00
0021	7440666	Zinc	Zinc	0.000E+00
0022	7440360	Antimony	Antimony	0.000E+00
0023	7664417	NH3	Ammonia	0.000E+00

EMISSIONS DATA SOURCE:
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC= CO= DEV= PRO= STK= NAME=
SOURCE MULTIPLIER=

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)

AVERAGE DOSE BY PATHWAY (mg/(kg-d)) FOR CANCER CALCULATIONS

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0002	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	5.72E-05	5.26E-04	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0 00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0004	5.72E-05	5.26E-04	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0005	5.72E-05	5.26E-04	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0 00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0006	5.72E-05	5.26E-04	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	5.72E-05	5.26E-04	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0008	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	5.72E-05	5.26E-04	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	5.72E-05	5.26E-03	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0016	5.72E-05	2.11E-03	8.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0017	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	5.72E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AVERAGE CANCER RISK

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL
0001	6.86E-04	3.16E-03	1.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.49E-03	5.16E-03
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	4.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0004	8.57E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.57E-04
0005	1.09E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-06
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	2.91E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-02
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	2.40E-06	4.47E-06	7.56E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-05	1.44E-05
0015	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0016	5.20E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.20E-05
0017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SUM	3.12E 02	3.16E 03	1.34E 03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.50E 03	3.57E-02

INHALATION CONCENTRATION (ug/m^3) AND AVERAGE DOSE BY PATHWAY (mg/(kg-d)) FOR CHRONIC CALCULATIONS

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
0001	1.00E+00	5.49E-03	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0002	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	1.00E+00	1.37E-03	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0004	1.00E+00	1.37E-04	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0005	1.00E+00	0 00E+00	0.00E+00	0.00E+00	0.00E+00	0 00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0006	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0007	1.00E+00	1.37E-03	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0008	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0011	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0012	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0013	1.00E+00	1.37E-03	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	1.00E+00	1.37E-03	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0016	1.00E+00	5.49E-03	2.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0017	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0019	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0022	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0023	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AVERAGE CHRONIC HI

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX
0001	5.94E+01	3.33E-01	0.00E+00	3.33E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-01	0.00E+00	5.94E+01
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+00	1.43E+02	0.00E+00	0.00E+00	1.43E+02	0.00E+00	0.00E+00	0.00E+00	1.43E+02
0004	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.49E+01	0.00E+00	5.00E+01	0.00E+00	0.00E+00	0.00E+00	5.49E+01
0005	0.00E+00	0.00E+00	0.00E+00	3.33E-03	0.00E+00	0.00E+00	3.33E-03	0.00E+00	3.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-03
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.17E-03
0011	1.11E-01	1.11E-01	0.00E+00	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-01
0012	0.00E+00	0.00E+00	7.69E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.69E-02	0.00E+00	0.00E+00	7.69E-02
0013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	0.00E+00	5.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00
0015	0.00E+00	2.11E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.35E+01	5.35E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.35E+01
0016	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-01	0.00E+00	0.00E+00	0.00E+00	2.00E+01	0.00E+00	2.00E+01	2.00E+01
0017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0018	5.00E-02	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02
0019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0021	2.86E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.86E-02	0.00E+00	2.86E-02	2.86E-02
0022	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00	0.00E+00	0.00E+00	5.00E+00
0023	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	0.00E+00	0.00E+00	5.00E-03
SUM	5.95E+01	4.96E+01	7.69E-02	3.33E+01	1.11E-01	0.00E+00	2.05E+00	1.96E+02	1.08E+02	0.00E+00	2.23E+02	2.60E+01	2.02E+01	2.23E+02

ACUTE HI

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX
0001	0.00E+00	0.00E+00	0.00E+00	5.26E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.26E+00	0.00E+00	0.00E+00	0.00E+00	5.26E+00
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0004	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0005	0.00E+00	6.67E-03	0.00E+00	6.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.67E-03	0.00E+00	0.00E+00	0.00E+00	6.67E-03
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-02	0.00E+00	0.00E+00	1.00E-02
0011	0.00E+00	2.94E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E-03
0012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.17E-03
0013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0015	0.00E+00	0.00E+00	0.00E+00	5.56E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.56E-01	0.00E+00	0.00E+00	0.00E+00	5.56E-01

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.50E+00	0.00E-01	[illegible]	[illegible]	[illegible]	0.00E+00	1.87E-01	0.00E+00	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	[illegible]
0019	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	[illegible]
0020	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	3.33E-02	[illegible]	[illegible]	[illegible]	[illegible]	3.33E-02	[illegible]	[illegible]
0021	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	0.00E+00	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	[illegible]
0022	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	[illegible]
0023	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	0.00E+00	3.13E-04	[illegible]	[illegible]	[illegible]	[illegible]	3.13E-04	[illegible]	[illegible]
SUM	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	3.78E-02	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.00E+00	[illegible]	[illegible]

ATTACHMENT 4

HRA CALCULATIONS

Table 4-1
Cancer Risk Assessment for Cooling Towers

		Residential (70-yr) Exposure				Residential (70-yr) Exposure				Worker Exposure			
Compound	Annual Average Emissions Per Cooling Tower Cell, g/s	Average Point Est Unit Risk (per ug/m3 per g/s)	Average Point Est Cancer Risk Model Input (each cell, per ug/m3)	Modeled Contribution to Cancer Risk Single Tower	Modeled Contribution to Cancer Risk both Towers	High-End Point Est Unit Risk (per ug/m3 per g/s)	High-End Point Est Cancer Risk Model Input (each cell, per ug/m3)	Modeled Contribution to Cancer Risk Single Tower	Modeled Contribution to Cancer Risk both Towers	Point Est Method Unit Risk (per ug/m3 per g/s)	Point Est Method Cancer Risk Model Input (each cell, per ug/m3)	Modeled Contribution to Cancer Risk Single Tower	Modeled Contribution to Cancer Risk both Towers
Arsenic	0.00E+00	9.61E-03	0.00E+00	0.00E+00	0.00E+00	2.45E-02	0.00E+00	0.00E+00	0.00E+00	5.16E-03	0.00E+00	0.00E+00	0.00E+00
Beryllium	0.00E+00	2.18E-03	0.00E+00	0.00E+00	0.00E+00	3.17E-03	0.00E+00	0.00E+00	0.00E+00	4.60E-04	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.00E+00	3.90E-03	0.00E+00	0.00E+00	0.00E+00	5.65E-03	0.00E+00	0.00E+00	0.00E+00	8.57E-04	0.00E+00	0.00E+00	0.00E+00
Chloroform	2.69E-03	4.94E-06	1.33E-08	5.46E-06	1.03E-07	7.16E-06	1.93E-06	7.80E-08	1.49E-07	1.09E-06	2.93E-09	1.20E-06	2.27E-08
Chromium (hexavalent)	3.17E-07	1.33E-01	4.22E-08	1.73E-07	3.26E-07	1.92E-01	6.09E-08	2.50E-07	4.71E-07	2.91E-02	9.23E-09	3.79E-08	7.14E-08
Lead	1.71E-07	4.79E-05	8.18E-12	3.36E-11	6.33E-11	9.78E-05	1.67E-11	6.86E-11	1.29E-10	1.44E-05	2.46E-12	1.01E-11	1.90E-11
Nickel	0.00E+00	2.36E-04	0.00E+00	0.00E+00	0.00E+00	3.43E-04	0.00E+00	0.00E+00	0.00E+00	5.20E-05	0.00E+00	0.00E+00	0.00E+00
			5.55E-08 per ug/m3	2.28E-07 Risk	4.29E-07 Risk		8.02E-08 per ug/m3	3.29E-07 Risk	6.20E-07 Risk		1.22E-08 per ug/m3	4.99E-08 Risk	9.41E-08 Risk

Table 4-2
Acute and Chronic Risk Modeling Results for Cooling Towers

Compound	Max Hourly Emissions per Cell g/s	HARP Acute HI (per ug/m3 per g/s)	Acute HHI Model Input (per ug/m3)	Modeled Contribution to Acute HHI Single Tower	Modeled Contribution to Acute HHI both Towers	Annual Average Emissions per Cell, g/s	Chronic HI - HARP OEHHA (per ug/m3 per g/s)	Chronic HHI Model Input (per ug/m3)	Modeled Contribution to Chronic HHI single Tower	Modeled Contribution to Chronic HHI both Towers
Ammonia[2,3]	6.10E-06	3.13E-04	1.91E-09	2.80E-07	5.71E-07	6.10E-06	5.00E-03	3.05E-08	1.25E-07	2.36E-07
Antimony[2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic[1,2,3]	0.00E+00	5.26E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.97E+01	0.00E+00	0.00E+00	0.00E+00
Beryllium[1,2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+02	0.00E+00	0.00E+00	0.00E+00
Cadmium[1,2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E+02	0.00E+00	0.00E+00	0.00E+00
Chloroform[1,2,3]	2.69E-03	6.67E-03	1.79E-05	2.63E-03	5.37E-03	2.69E-03	3.33E-03	8.95E-06	3.67E-05	6.93E-05
Chromium (hexavalent)[1,2]	3.17E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.17E-07	5.00E+00	1.59E-06	6.51E-06	1.23E-05
Copper[2,3]	1.16E-06	1.00E-02	1.16E-08	1.70E-06	3.47E-06	1.16E-06	4.17E-01	4.83E-07	1.98E-06	3.74E-06
Cyanide[2,3]	0.00E+00	2.84E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00
Fluorides[2,3]	0.00E+00	4.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.69E-02	0.00E+00	0.00E+00	0.00E+00
Manganese[2]	1.34E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-06	5.00E+00	6.71E-06	2.75E-05	5.19E-05
Mercury[2,3]	0.00E+00	5.56E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E+02	0.00E+00	0.00E+00	0.00E+00
Nickel[1,2,3]	0.00E+00	1.67E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E+01	0.00E+00	0.00E+00	0.00E+00
Selenium[2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	0.00E+00	0.00E+00	0.00E+00
Vanadium[3]	0.00E+00	3.33E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc[3]	2.62E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-06	2.86E-02	7.50E-08	3.08E-07	5.80E-07
		Total =	1.79E-05	2.63E-03	5.37E-03		Total =	1.78E-05	7.32E-05	1.38E-04

ATTACHMENT 5

PROPOSED CHANGES TO CONDITIONS OF CERTIFICATION

AQ-18 Emissions of NOx, CO, ROC, SOx, and PM_{10} from Phase 1 of the CPP facility including start-ups and shut-downs shall not exceed the following limits.

Pollutant	Maximum Allowable Emissions (lbs/day)			
	CTG #1	CTG #2	Cooling Tower	Total
NOx	523.7	523.7	NA	1,047.4
CO	3,051.7	3,051.7	NA	6,103.3
ROC	117.3	117.3	NA	234.6
SOx	31.4	31.4	NA	62.9
PM_{10}	216.0	216.0	~~3.6~~ 7.4	~~435.6~~ 439.4

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQ-19 Emissions of NOx, CO, ROC, SOx, and PM10 from Phase 1 of the CPP facility including start-ups and shut-downs shall not exceed the following limits.

Pollutant	Maximum allowable emissions				
	Qtr 1 (lbs./quarter)	Qtr 2 (lbs./quarter)	Qtr 3 (lbs./quarter)	Qtr 4 (lbs./quarter)	Total (lbs./year)
NOx	62,021	62,643	63,265	63,265	251,194
CO	147,929	148,687	149,444	149,444	595,505
ROC	14,807	14,958	15,110	15,110	59,986
SOx	5,405	5,465	5,525	5,525	21,922
PM10	~~39,204~~ 39,550	~~39,640~~ 39,989	~~40,075~~ 40,428	~~40,075~~ 40,428	~~158,994~~ 160,395

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQ-24 The total dissolved solids content of the circulating cooling water shall not exceed ~~470~~ **800** ppmw, averaged over any consecutive three-hour period.

Verification: The project owner shall include information on the date, time, and duration of any violation of this permit condition in the quarterly and annual compliance reports.

ATTACHMENT 6

SMAQMD AUTHORITY TO CONSTRUCT

NO. 20185

ISSUED JUNE 12, 2007

777 12TH STREET, 3RD FLOOR

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

SACRAMENTO, CA 95814-1908

COPY

AUTHORITY TO CONSTRUCT

A/C NO.: 20185

ISSUED BY: BRIAN F. KREBS

DATE ISSUED: JUNE 12, 2007

DATE EXPIRES: JUNE 12, 2009

ISSUED TO: SACRAMENTO MUNICIPAL UTILITY DISTRICT FINANCING AUTHORITY (SFA) COSUMNES POWER PLANT

LOCATION: 14295 CLAY EAST ROAD, HERALD, CA 95638

DESCRIPTION: MODIFICATION OF CONDITIONS TO INCREASE THE TDS LEVEL OF THE CIRCULATING WATER OF COOLING TOWER PERMIT (P/O 16010).

AUTHORITY TO CONSTRUCT CONDITIONS

GENERAL

1. THE EQUIPMENT SHALL BE PROPERLY MAINTAINED

2. THE AIR POLLUTION CONTROL OFFICER AND/OR AUTHORIZED REPRESENTATIVES UPON THE PRESENTATION OF CREDENTIALS SHALL BE PERMITTED
   A. TO ENTER UPON THE PREMISES WHERE THE SOURCE IS LOCATED OR IN WHICH ANY RECORDS ARE REQUIRED TO BE KEPT UNDER THE TERMS AND CONDITIONS OF THIS PERMIT TO OPERATE, AND
   B. AT REASONABLE TIMES TO HAVE ACCESS TO AND COPY ANY RECORDS REQUIRED TO BE KEPT UNDER TERMS AND CONDITIONS OF THIS PERMIT TO OPERATE, AND
   C. TO INSPECT ANY EQUIPMENT, OPERATION OR METHOD REQUIRED IN THIS PERMIT TO OPERATE, AND
   D. TO SAMPLE EMISSIONS FROM THE SOURCE OR REQUIRE SAMPLES TO BE TAKEN

3. THIS PERMIT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26, PART 4, CHAPTER 3 OF THE CALIFORNIA HEALTH AND SAFETY CODE OR THE RULES AND REGULATIONS OF THE AIR QUALITY MANAGEMENT DISTRICT

4. A LEGIBLE COPY OF THIS PERMIT SHALL BE MAINTAINED ON THE PREMISES WITH THE EQUIPMENT

5. MALFUNCTION - THE AIR POLLUTION CONTROL OFFICER SHALL BE NOTIFIED OF ANY BREAKDOWN OF THE EMISSIONS MONITORING EQUIPMENT, ANY EQUIPMENT, OR ANY PROCESS WHICH RESULTS IN AN INCREASE IN EMISSIONS ABOVE THE ALLOWABLE EMISSIONS LIMITS STATED AS A CONDITION OF THIS PERMIT OR ANY APPLICABLE STATE OR FEDERAL REGULATION OR WHICH AFFECTS THE ABILITY FOR THE EMISSIONS TO BE ACCURATELY DETERMINED. SUCH BREAKDOWNS SHALL BE REPORTED TO THE DISTRICT IN ACCORDANCE WITH THE PROCEDURES AND REPORTING TIMES SPECIFIED IN RULE 602 - BREAKDOWN CONDITIONS: EMERGENCY VARIANCE.

6. SEVERABILITY - IF ANY PROVISION, CLAUSE, SENTENCE, PARAGRAPH, SECTION, OR PART OF THESE CONDITIONS FOR ANY REASON IS JUDGED TO BE UNCONSTITUTIONAL OR INVALID, SUCH JUDGMENT SHALL NOT AFFECT OR INVALIDATE THE REMAINDER OF THESE CONDITIONS

THIS IS NOT A PERMIT TO OPERATE

777 12TH STREET, 3RD FLOOR SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT SACRAMENTO, CA 95814-1908

AUTHORITY TO CONSTRUCT

A/C NO.: 20185

EMISSIONS LIMITATIONS

7 THE EQUIPMENT SHALL NOT DISCHARGE INTO THE ATMOSPHERE ANY VISIBLE AIR CONTAMINANT OTHER THAN UNCOMBINED WATER VAPOR, FOR A PERIOD OR PERIODS AGGREGATING MORE THAN THREE MINUTES IN ANY ONE HOUR, WHICH IS RINGELMANN NO. 1 OR GREATER.

8 EMISSIONS FROM THE COOLING TOWER SHALL NOT EXCEED THE FOLLOWING LIMITS AVERAGED OVER A THREE HOUR PERIOD.

POLLUTANT	MAXIMUM ALLOWABLE EMISSIONS (LB/HOUR)
PM10	0.31 (A)

(A) BASED ON A WATER CIRCULATION RATE OF 155,000 GAL/MIN, COOLING TOWER DRIFT RATE OF 0.0005%, AND A TDS LEVEL OF 500 PPMw.

9 EMISSIONS OF PM10 FROM THE CPP FACILITY INCLUDING START-UPS AND SHUT-DOWNS SHALL NOT EXCEED THE FOLLOWING LIMITS

POLLUTANT	MAXIMUM ALLOWABLE EMISSIONS (LB/DAY)			
	CTG #2	CTG #3	COOLING TOWER	TOTAL
PM10	216.0	216.0	7.4	439.4

10. EMISSIONS OF PM10 FROM THE CPP FACILITY INCLUDING START-UPS AND SHUT DOWNS SHALL NOT EXCEED THE FOLLOWING LIMITS

POLLUTANT	MAXIMUM ALLOWABLE EMISSIONS				
	QTR 1 (LB/QUARTER)	QTR 2 (LB/QUARTER)	QTR 3 (LB/QUARTER)	QTR 4 (LB/QUARTER)	TOTAL (LB/YEAR)
PM10	39,550	39,959	40,428	40,428	160,365

11 THE TOTAL DISSOLVED SOLIDS CONTENT OF THE CIRCULATING COOLING WATER SHALL NOT EXCEED 500 PPMw, AVERAGED OVER ANY CONSECUTIVE THREE-HOUR PERIOD.

EQUIPMENT OPERATION

12 THE COOLING TOWERS SHALL NOT USE ANY CHROMIUM-CONTAINING WATER TREATMENT CHEMICALS.

MONITORING SYSTEMS

13 THE CPP SHALL OPERATE A CONTINUOUS MONITORING SYSTEM THAT HAS BEEN APPROVED BY THE AIR POLLUTION CONTROL OFFICER THAT EITHER MEASURES OR CALCULATES AND RECORDS THE FOLLOWING

PARAMETER TO BE MONITORED	UNITS
TOTAL DISSOLVED SOLIDS CONTENT OF THE CIRCULATING WATER IN THE COOLING TOWERS	PPMw

THIS IS NOT A PERMIT TO OPERATE

777 12TH STREET, 3RD FLOOR SACRAMENTO METROPOLITAN SACRAMENTO, CA 95814-1908

AIR QUALITY
MANAGEMENT DISTRICT

AUTHORITY TO CONSTRUCT

A/C NO.: 20185

RECORD KEEPING

14 THE FOLLOWING RECORD SHALL BE CONTINUOUSLY MAINTAINED ON SITE FOR THE MOST RECENT FIVE-YEAR PERIOD AND SHALL BE MADE AVAILABLE TO THE AIR POLLUTION CONTROL OFFICER UPON REQUEST. QUARTERLY AND YEARLY RECORDS SHALL BE MADE AVAILABLE FOR INSPECTION WITHIN 30 DAYS OF THE END OF THE PREVIOUS QUARTER OR YEAR RESPECTIVELY

FREQUENCY	INFORMATION TO BE RECORDED
HOURLY	A. TOTAL DISSOLVED SOLIDS CONTENT OF THE CIRCULATING WATER IN THE COOLING TOWERS IN PPM_w. B. COOLING TOWER HOURLY PM10 MASS EMISSION RATE. THE HOURLY EMISSIONS SHALL BE CALCULATED BASED ON THE COOLING WATER CIRCULATION RATE MULTIPLIED BY THE COOLING TOWER DRIFT RATE, DENSITY OF WATER, AND THE MEASURED TDS LEVEL.
DAILY	TOTAL FACILITY PM10 DAILY MASS EMISSIONS.
QUARTERLY	TOTAL FACILITY PM10 QUARTERLY MASS EMISSIONS

EMISSION OFFSETS

15 THE FOLLOWING TABLE DEPICTS THE PM10 EMISSION INCREASE THAT WILL REQUIRE TO BE OFFSET

POLLUTANT	QTR1 LB/QTR	QTR2 LB/QTR	QTR3 LB/QTR	QTR4 LB/QTR
PM10	340	349	353	353

15. THE APPLICANT SHALL PROVIDE THE DISTRICT PRIOR TO COMMENCING OPERATION UNDER THIS PERMIT, EMISSION REDUCTION CREDIT CERTIFICATES IN SUFFICIENT QUANTITY TO OFFSET THE EMISSIONS INCREASE SPECIFIED IN CONDITION NO. 15 BY THE USE OF THE FOLLOWING CALCULATION PROCEDURE.

$$QTR_q = \frac{P_{q\le 15}}{1.2} + \frac{P_{q>15}}{1.5}$$

PQ = EMISSION OFFSET CREDIT FOR POLLUTANT IN LB/QUARTER
Q = QUARTER (1, 2, 3, OR 4)
QTR = THIS IS THE QUARTERLY LIMIT SPECIFIED IN CONDITION 15
<=15 = THOSE EMISSION REDUCTION CREDIT CERTIFICATES WHOSE POINT OF ORIGIN WAS WITHIN 15 MILES OF THE CPP PROJECT
>15 = THOSE EMISSION REDUCTION CREDIT CERTIFICATES WHOSE POINT OF ORIGIN WAS GREATER THAN 15 MILES BUT LESS THAN 50 FROM THE CPP PROJECT.

THIS IS NOT A PERMIT TO OPERATE

777 12TH STREET, 3RD FLOOR

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

SACRAMENTO, CA 95814-1908

AUTHORITY TO CONSTRUCT

A/C NO.: 20185

17 ERC 04-C0909 IS EXPECTED TO BE SURRENDERED IN ACCORDANCE WITH CONDITION NO 16

	FACE VALUE OF CERTIFICATES SURRENDERED					VALUE APPLIED TO THE EMISSION LIABILITY			
FROM ERC 909	QTR1	QTR2	QTR3	QTR4	OFFSET RATIO	QTR1	QTR2	QTR3	QTR4
ERC'S SURRENDERED	519	524	530	530	1.5	346	349	353	353
ERC'S REMAINDER	1276	1271	1265	1265					
						PM10 LIABILITY OF THE PROJECT			
ERC 909	1795	1795	1795	1795		346	349	353	353

YOUR APPLICATION FOR THIS AIR QUALITY AUTHORITY TO CONSTRUCT WAS EVALUATED FOR COMPLIANCE WITH SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT (AQMD), STATE AND FEDERAL AIR QUALITY RULES THE FOLLOWING LISTED RULES ARE THOSE THAT ARE MOST APPLICABLE TO THE OPERATION OF YOUR EQUIPMENT OTHER RULES MAY ALSO BE APPLICABLE

AQMD RULE NO	RULE TITLE
201	GENERAL PERMIT REQUIREMENTS
202	NEW SOURCE REVIEW
401	RINGELMANN CHART
402	NUISANCE

IN ADDITION, THE CONDITIONS ON THIS AUTHORITY TO CONSTRUCT MAY REFLECT SOME, BUT NOT ALL, REQUIREMENTS OF THESE RULES. THERE MAY BE OTHER CONDITIONS THAT ARE APPLICABLE TO THE OPERATION OF YOUR EQUIPMENT. FUTURE CHANGES IN PROHIBITORY RULES MAY ESTABLISH MORE STRINGENT REQUIREMENTS WHICH MAY SUPERSEDE THE CONDITIONS LISTED HERE

FOR FURTHER INFORMATION PLEASE CONSULT YOUR AQMD RULEBOOK OR CONTACT THE AQMD FOR ASSISTANCE.

THIS IS NOT A PERMIT TO OPERATE

777 12th Street, 3rd Floor SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT Sacramento, CA 95814-1908

AUTHORITY TO CONSTRUCT EVALUATION

APPLICATION NO.:	20185
DATE:	May 1, 2007
EVALUATED BY:	Brian Krebs

A. FACILITY NAME: Sacramento Municipal Utility District Financing Authority (SFA) Cosumnes Power Plant

B. LOCATION: 14295 Clay East Road, Herald, CA 95638

C. PROPOSAL: SFA is requesting a modification of their cooling tower permit (P/O 16010) to accommodate an expected increase in the total dissolved solids content of the circulating cooling water.

D. INTRODUCTION:

The Cosumnes Power Plant consists of two combustion gas turbines, their respective selective catalytic reduction emission control systems, and an eight cell cooling tower. The original application was evaluated and a Determination of Compliance/Authority to Construct was issued in October 21, 2002. In that original application, the applicant had proposed a 9 cell cooling tower with a nominal water circulation rate of 125,867 gallons per minute and a total dissolved solids (TDS) concentration of 470 ppmw. As part of that application, the source was required to monitor their TDS concentration through the use of a conductivity meter and using a correlation factor between conductivity and TDS.

An inspection was conducted after the plant was built. The District asked the applicant to submit information regarding the capacity of the "as built" water circulation pumps as the flow rate is directly proportional to the particulate emission rate and to verify the conductivity to TDS correlation factor used in their CEMS. The applicant responded that the "as built" water circulation pumps had a flow rate of 155,000 gallons per minute. They also presented a separate laboratory analysis that indicated that the conductivity to TDS correlation factor was higher than what was the recommendation of the manufacturer of the conductivity meter. Subsequent to that, the applicant began to use the new corrected conductivity to TDS correlation factor for reporting their TDS concentration and ultimately their cooling tower particulate emissions. As for the larger water circulating pumps, the District issued the Permit to Operate with a corresponding reduction in the allowable TDS content (down to 382 ppmw) in order to account for the higher circulating water flow rate so that the emissions would not increase.

The applicant is now proposing to modify their permit to allow for an increase in the maximum TDS concentration from 382 to 800 ppmw. They indicate that the change is necessary due to higher than expected maximum TDS concentrations.

E. EQUIPMENT DESCRIPTION:

COOLING TOWER - eight-cell, counterflow, mechanical-draft, 0.0005% drift elimator, with three pumps in parallel (only two operate at any one time, 155,000 gallons per minute water circulation rate

F. PROCESS RATE/FUEL USAGE:
The cooling tower has a water circulation rate of 155,000 gallons per minute.

G. OPERATING SCHEDULE:
The cooling tower has and will be permitted to operate 24 hours per day, 365 days per year. The plant itself is designed to operate between 25 and 100 percent of base load to support dispatch service in response to customer demands for electricity. The plant is expected to have an annual availability of between 92 and 98%.

H. CONTROL EQUIPMENT EVALUATION:
The cooling tower is equipped with a drift eliminator that has been certified to reduce drift to 0.0005%.

I. EMISSIONS CALCULATIONS:

1) HISTORIC POTENTIAL TO EMIT:

Cooling Tower's Maximum Continuous Emissions

Period	NOx Lb/Qtr	CO Lb/Qtr	ROC Lb/Qtr	SOx Lb/Qtr	PM10 (A) Lb/Qtr
Qtr 1	N/A	N/A	N/A	N/A	324
Qtr 2	NA	NA	NA	NA	328
Qtr 3	NA	NA	NA	NA	331
Qtr 4	NA	NA	NA	NA	331

(A) Emissions are based on a water circulation rate of 155,000 gpm, water density of 8.33 lb/gal, a TDS concentration of 382 ppmw and operating 24 hr/day

2) PROPOSED POTENTIAL TO EMIT:

Cooling Tower's Maximum Continuous Emissions

Period	NOx Lb/Qtr	CO Lb/Qtr	ROC Lb/Qtr	SOx Lb/Qtr	PM10 (A) Lb/Qtr
Qtr 1	N/A	N/A	N/A	N/A	670
Qtr 2	NA	NA	NA	NA	677
Qtr 3	NA	NA	NA	NA	684
Qtr 4	NA	NA	NA	NA	684

(A) Emissions are based on a water circulation rate of 155,000 gpm, water density of 8.33 lb/gal, a TDS concentration of 800 ppmw and operating 24 hours/day.

3) CALCULATION OF BACT TRIGGER:

NEI (BACT) = Net Emissions Increase
= Proposed Potential to Emit - Historic Potential to Emit
MPE = Maximum Potential Emissions on a 24-Hour Day Operation

Pollutant	NEI (BACT) lb/quarter	Is NEI (BACT) >0?	MPE lb/day	BACT Trigger Level lb/day	Is BACT Required?
ROC	0	No	NA	≥10	No
NOx	0	No	NA	≥10	No
Sox	0	No	NA	≥10	No
PM10	353	Yes	7.4	≥10	No
CO	0	No	NA	≥550	No

4) CALCULATION OF OFFSET TRIGGER FOR ROC AND NOx:

Permit No.	Emissions Unit	Cumulative Emission Increase for this Stationary Source lb/quarter	
		ROC	NOx
P/O 16006	CTG Unit 2	7,555	31,632
A/C 16007	CTG Unit 3	7,555	31,632
P/O 16012	APC SCR Unit 2	0	0
P/O 16013	APC SCR Unit 3	0	0
A/C 20185	Cooling Tower	0	0
Total		15,110	63,264
Offset Trigger Level		≥5,000	≥5,000

5) CALCULATION OF OFFSET TRIGGER FOR SOx, PM10 AND CO:

Permit No.	Emissions Unit	Cumulative Emission Increase for This Stationary Source Since January 1, 1977 lb/quarter		
		SOx	PM10	CO
P/O 16006	CTG Unit 2	2,763	19872	74,722
A/C 16007	CTG Unit 3	2,763	19872	74,722
P/O 16012	APC SCR Unit 2	0	0	0
P/O 16013	APC SCR Unit 3	0	0	0
A/C 20185	Cooling Tower	0	684	0
Total		5,526	40,428	149,444
Offset Trigger Level		≥13,650	≥7,500	≥49,500

6) CALCULATION OF EMISSION OFFSETS FOR ROC AND NOx:
Though emission offsets are triggered for NOx and ROC, no offsets are required since the net emission increase is zero.

7) CALCULATION OF EMISSION OFFSETS FOR SOx, PM10 AND CO:
Emission offsets are not triggered for SOx. Though emission offsets are triggered for CO, no offsets are required since the net emission increase is zero. The cumulative emission increase for PM10 is in excess of the offset trigger level. Therefore emission offsets are required. In accordance with Rule 202 Section 418.1(b), the amount of PM10 emission offset liability for this modification is calculated by subtracting the historic potential emissions from the proposed emissions (see Appendix A).

	Quarter 1 Lb/qtr	Quarter 2 Lb/qtr	Quarter 3 Lb/qtr	Quarter 4 Lb/qtr	Annual TPY
Proposed Emissions	670	677	684	684	1.36
Historic Potential Emissions	324	328	331	331	0.66
PM10 Emission Offset Liability	346	349	353	353	0.70

J. COMPLIANCE WITH RULES AND REGULATIONS:

1) H&S Code § 42301.6 (AB 3205) COMPLIANCE:

The facility is not located within 1,000 feet from a school.

2) NSR COMPLIANCE:

Rule 202 - New Source Review

Section 112 - Exemption - Notification Requirements Since the cooling tower modification will result in the requirement for the applicant to offset the PM10 emission increase, this exemption to the notification sections 405, 406, 407, and 409.2 will not apply.

Section 301 - Best Available Control Technology The proposed potential to emit from the cooling tower does not meet or exceed the BACT thresholds for the affected pollutants as specified in Section 301.1 and below. Therefore, BACT will not be required.

Section 302 - Offset Though the cumulative emissions increase for NOx, ROC, and CO are in excess of the levels listed below, offsets will not be required as this modification does not result in any emission increase for these pollutants. For SOx, the cumulative emissions increase is less than the levels listed below thus no SOx offsets will be required. Lastly, since the PM10 cumulative emissions increase for this stationary source exceed the level listed below and this modification results in a PM10 emission increase, PM10 offsets will be required..

Pollutant	lb/qtr
ROC	5,000
NOx	5,000
SOx	13,650
PM10	7,500
CO	49,500

Proposed PM10 Emission Offset Source

Source: The Chinet Company
Credit#: 04-00909
Location. 8450 Gerber Rd., Sacramento
Distance Chinet company is located approximately 17.3 miles NW of the Cosumnes Power Plant.
Ratio: 1.5 to 1.0
Description. The original credits were generated from the shutdown of Dryer #4, P/O 2060. The credits were based on actual emissions over the two year period 1992 and 1993. The NOx offsets were originally discounted to 30 ppm as this was a near term control measure at the time. Particulate emissions, the subject of this application, were not adjusted as they were from combustion of natural gas which required no further discounting.

Amount:

Pollutant	Lb/Qtr1	Lb/Qtr2	Lb/Qtr3	Lb/Qtr4
PM10	1795	1795	1795	1795

Emission Liability and Credit

	Face Value of Certificates Surrendered					Value Applied to the Emission Liability			
	QTR1	QTR2	QTR3	QTR4	Offset Ratio	QTR1	QTR2	QTR3	QTR4
ERC Applied	519	524	530	530	1.5	346	349	353	353
ERC Remainder	1276	1271	1265	1265					
						PM10 Liability of the Project			
ERC 909	1795	1795	1795	1795		346	349	353	353

Section 307 – Denial, Failure to Meet CEQA The SMAQMD utilizes *Guide to Air Quality Assessment in Sacramento County, SMAQMD, July 2004* as guide during the initial study phase of a proposed project to determine the level of review necessary under CEQA.

a ROG and NOx – the maximum daily emissions for the cooling tower modification are 0 lb/day for NOx and ROC These levels are below the trigger levels of 65 lb/day.
b Other pollutants – the project does not result in operational emissions that could lead to violations of any applicable state Ambient Air Quality Standards.
c. Toxic Air Contaminants – The cooling tower does not exceed a cancer of risk of 1 in one million nor an acute or chronic hazard index of 1.
d Cumulative TACs - The project is not located near any sources identified in the AB2588 program which result in a cumulative risk greater than 10 in one million.

d. Cumulative TACs – The project is not located near any sources identified in the AB2588 program which result in a cumulative risk greater than 10 in one million. As the project does not exceed any of the criteria above, the project does not require further CEQA review.

3) PSD COMPLIANCE:

During the original permitting of the Cosumnes Power Plant The source is non major for particulate as well as the District is considered non attainment for PM10 thus PSD is not applicable..

4) PROHIBITORY RULES COMPLIANCE:

Rule 401 – Ringelmann Chart
The cooling tower is expected to comply with the Ringelmann No 1 or 20% opacity requirement of this rule.

Rule 402 - Public Nuisance
Air dispersion modeling was performed in conjunction with the cooling tower modification application. The analysis did not indicate any new violations of the PM10 ambient air quality standards. In addition a screening Health Risk Assessment was performed by the applicant utilizing the HARP model. Along with the new emission rates and risk assessment software, two new compounds (hexavalent chromium and chloroform.) were included in the analysis. Hexavalent chromium was included due to one water analysis that identified this compound in the raw water supply at the detection limit. As for chloroform, this compound was included based on a study undertaken as part of the NESHAP program that identified this substance in industrial process cooling towers. As a result of these changes, the cancer risk from this modification has gone from approximately 0.1 to 0.3 in a million. However even with this increase, the entire facility remains below 1 in a million. Therefore, the project is not expected to create a public nuisance

5) NSPS COMPLIANCE:

Not applicable

6) NESHAP COMPLIANCE:

40 CFR Part 63 Subpart Q - National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling towers

This source does not emit 10 tons per year of any one hazardous pollutant nor 25 tons per year of any combination of hazardous pollutants. Therefore, this NESHAP is not applicable. Nonetheless, this source is conditioned to not use any chromium containing water treatment chemicals and this was verified during the initial inspection

K. RECOMMENDATIONS:

This equipment should comply with all applicable District rules and regulations. An authority to construct for the modification of conditions on the CPP cooling tower should be issued with the following conditions.

L. CONDITIONS:

Refer to conditions in Authority to Construct No. 20185.

PREPARED BY: Brian Krebs DATE: May 1, 2007

REVIEWED BY: _____ DATE: 5/8/07

COPY

APPENDIX A

EMISSION CALCULATIONS

Cooling Tower PM10 Emissions								
Cooling Tower Drift Rate (%) =					0.0005			
Total Water Circulation Rate (gallons/min) =					155000			
Density of Water (lb/gal) =					8.33			
TDS pre modification (ppm) =					382			
TDS post modification (ppm) =					600			
Daily hours of operation =					24			
Quarterly hours of operation =					2190			
Annual hour of operation =					8760			
PM10 pre modification =	lb/hr	0.15						
	lb/day	3.6						
		qtr1	qtr2	qtr3	qtr4			
	hours	2160	2184	2208	2208	lb/yr	TPY	
	lb/qtr	324	328	331	331	1314	0.66	
PM10 post modification =	lb/hr	0.31						
	lb/day	7.4						
		qtr1	qtr2	qtr3	qtr4			
	hours	2160	2184	2208	2208	lb/yr	TPY	
	lb/qtr	670	677	684	684	2716	1.36	
PM10 Offset liability =		qtr1	qtr2	qtr3	qtr4	lb/yr	TPY	
	lb/qtr	346	349	353	353	1401	0.70	
PM10 Offset Required =		qtr1	qtr2	qtr3	qtr4	lb/yr	TPY	
@ 1.5 to 1.0 distance ratio	lb/qtr	519	524	530	530	2102	1.05	

APPENDIX B

MODELING ANALYSIS SUMMARY

	Model	Fre	Pol	Average	Group	Rank	Conc	East(X)	North(Y)	Elev		Time	Met File	Sources	Groups	Rec	
1	SCST3	test85DR_	OTHER	ANNUA_	CT	1ST	0 03383	664924.7	4245734		63.1	1 YRS	SACOAK8	16	3	6445	
2	SCST3	test85DR_	OTHER	ANNUAL	CTN	1ST	0 01793	664894.7	4245764		63.4	1 YRS	SACOAK8	16	3	6445	
3	SCST3	test85DR_	OTHER	ANNUAL	CTS	1ST	0.01686	664964.7	4245554		62.2	1 YRS	SACOAK8	16	3	6445	
4	ISCST3	test85DR_	OTHER	24-HR	CT	1ST	0 23116	664314.7	4243864		67.1	85022124	SACOAK8	16	3	6445	
5	ISCST3	test85DR_	OTHER	24-HR	CTN	1ST	0.12375	664584.7	4244054		62.9	85022124	SACOAK8	16	3	6445	
6	ISCST3	test85DR_	OTHER	24-HR	CTS	1ST	0 13942	664524.7	4244084		62.2	85042624	SACOAK8	16	3	6445	
7	ISCST3	test86DR_	OTHER	ANNUAL	CT	1ST	0 03511	664864.7	4245704		63.4	1 YRS	SACOAK8	16	3	6445	
8	ISCST3	test86DR_	OTHER	ANNUAL	CTN	1ST	0 01785	664834.7	4245764		62.6	1 YRS	SACOAK8	16	3	6445	
9	ISCST3	test86DR_	OTHER	ANNUAL	CTS	1ST	0 0151	664924.7	4245734		63.1	1 YRS	SACOAK8	16	3	6445	
10	ISCST3	test86DR_	OTHER	24-HR	CT	1ST	0 20641	664614.7	4243864		67.1	86100224	SACOAK8	16	3	6445	
11	ISCST3	test86DR_	OTHER	24-HR	CTN	1ST	0.12287	664714.7	4245554		60.9	86070624	SACOAK8	16	3	6445	
12	ISCST3	test86DR_	OTHER	24-HR	CTS	1ST	0 13593	664654.7	4244054		63.9	86100124	SACOAK8	16	3	6445	
13	ISCST3	test87DR_	OTHER	ANNUAL	CT	1ST	0.03701	664954.7	4245614		62.2	1 YRS	SACOAK8	16	3	6445	
14	ISCST3	test87DR_	OTHER	ANNUAL	CTN	1ST	0.01963	664924.7	4245704		62.4	1 YRS	SACOAK8	16	3	6445	
15	ISCST3	test87DR_	OTHER	ANNUAL	CTS	1ST	0.01686	664984.7	4245344		62.8	1 YRS	SACOAK8	16	3	6445	
16	ISCST3	test87DR_	OTHER	24-HR	CT	1ST	0.30115	665384.7	4242864		73	87100624	SACOAK8	16	3	6445	
17	ISCST3	test87DR_	OTHER	24-HR	CTN	1ST	0 16504	665114.7	4243114		70	87100624	SACOAK8	16	3	6445	
18	ISCST3	test87DR_	OTHER	24-HR	CTS	1ST	0.16756	665114.7	4242864		70	87100524	SACOAK8	16	3	6445	
19	ISCST3	test88DR_	OTHER	ANNUAL	CT	1ST	0 03329	664924.7	4245734		63.1	1 YRS	SACOAK8	16	3	6445	
20	ISCST3	test88DR_	OTHER	ANNUAL	CTN	1ST	0 01779	664894.7	4245764		63.4	1 YRS	SACOAK8	16	3	6445	
21	ISCST3	test88DR_	OTHER	ANNUAL	CTS	1ST	0 01673	664964.7	4245554		62.2	1 YRS	SACOAK8	16	3	6445	
22	ISCST3	test88DR_	OTHER	24-HR	CT	1ST	0 28163	664614.7	4243864		67.1	88021624	SACOAK8	16	3	6445	
23	ISCST3	test88DR_	OTHER	24-HR	CTN	1ST	0 14539	664684.7	4244054		62.9	88021624	SACOAK8	16	3	6445	
24	ISCST3	test88DR_	OTHER	24-HR	CTS	1ST	0 16118	664624.7	4244084		62.2	88032724	SACOAK8	16	3	6445	
25	ISCST3	test89DR_	OTHER	ANNUAL	CT	1ST	0 03294	664894.7	4245764		63.4	1 YRS	SACOAK8	16	3	6445	
26	ISCST3	test89DR_	OTHER	ANNUAL	CTN	1ST	0 01741	664834.7	4245764		62.6	1 YRS	SACOAK8	16	3	6445	
27	ISCST3	test89DR_	OTHER	ANNUAL	CTS	1ST	0.01591	664984.7	4245554		62.2	1 YRS	SACOAK8	16	3	6445	
28	ISCST3	test89DR_	OTHER	24-HR	CT	1ST	0 23762	664864.7	4243114		70	89092224	SACOAK8	16	3	6445	
29	SCST3	test89DR_	OTHER	24-HR	CTN	1ST	0.12664	664884.7	4243384		68.6	89092224	SACOAK8	16	3	6445	
30	ISCST3	test89DR_	OTHER	24-HR	CTS	1ST	0 12359	664654.7	4244054		63.9	89062024	SACOAK8	16	3	6445	

3	ISCST3	test85DR_	OTHER	ANNUA_	CTS	1ST	0.017	664964.7	4245554		62.2	1 YRS	SACOAK8	16	3	6445	
9	ISCST3	test86DR_	OTHER	ANNUAL	CTS	1ST	0.016	664924.7	4245734		63.1	1 YRS	SACOAK8	16	3	6445	
15	ISCST3	test87DR_	OTHER	ANNUAL	CTS	1ST	0.019	664964.7	4245344		62.8	1 YRS	SACOAK8	16	3	6445	
21	ISCST3	test88DR_	OTHER	ANNUAL	CTS	1ST	0.017	664984.7	4245554		62.2	1 YRS	SACOAK8	16	3	6445	
27	ISCST3	test89DR_	OTHER	ANNUAL	CTS	1ST	0.016	664984.7	4245554		62.2	1 YRS	SACOAK8	16	3	6445	

6	ISCST3	test85DR_	OTHER	24-HR	CTS	1ST	0 139	664624.7	4244084		62.2	85042624	SACOAK8	16	3	6445	
12	ISCST3	test86DR_	OTHER	24-HR	CTS	1ST	0.135	664654.7	4244054		63.9	86100124	SACOAK8	16	3	6445	
18	ISCST3	test87DR_	OTHER	24-HR	CTS	1ST	0 168	665114.7	4242864		70	87100524	SACOAK8	16	3	6445	
24	ISCST3	test88DR_	OTHER	24-HR	CTS	1ST	0 161	664624.7	4244084		62.2	88032724	SACOAK8	16	3	6445	
30	ISCST3	test89DR_	OTHER	24-HR	CTS	1ST	0 124	664654.7	4244054		63.9	89062024	SACOAK8	16	3	6445	

PROOF OF SERVICE

I d eclare that on November 7, 2007, I submitted SFA's PETITION FOR POST CERTIFICATION LICENSE AMENDMENT | Docket No. 01-AFC-19C by personally hand delivering an original and 15 copies to the following address:

California Energy Commission
Dockets Office, MS-4
Docket No. 01-AFC-19C
1516 Ninth Street
Sacramento, CA 95814-5512

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated: November 7, 2007

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