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Project Title:	Compliance - Application for Certification for SMUD's Campbell Soup Cogeneration Project
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Document Title:	Campbell Soup Cogen Authority to Construct SMAQMD Evaluation
Description:	N/A
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AIR QUALITY
MANAGEMENT DISTRICT

AUTHORITY TO CONSTRUCT EVALUATION

APPLICATION NO.: A/C 26874

REVIEW STARTING DATE: 07/7/21

ISSUING ENGINEER: Venk Reddy

I. PROJECT DESCRIPTION:

FACILITY NAME: Sacramento Municipal Utility District Financing Authority DBA Campbell Power Plant

LOCATION: 3215 47th Ave., Sacramento, CA 95824

PROPOSAL: Authority to Construct and Permit to Operate to modify a cooling tower permit (PO 27117) to increase the VOC content in the previously approved recycled water stream entering the cooling tower. The use of recycled water was approved under Sacramento Air Quality application 24808. The recycled water is sewage water that has been treated by the local sewage treatment plant and pumped to this cooling tower through a dedicated pipeline. The VOC is the result of organic compounds that the treatment process did not remove and stay entrained in the water. There is no guarantee that all the entrapped VOC in the water expel in the air, but in an abundance of caution the applicant will take the VOCs contained in the recycled water as being liberated into the atmosphere. At the time of initial permitting the increase of VOC emissions to the air as a result of the recycled water stream was determined to be less than 0.5 lbs/day (42 PPB). Due to changes in the process occurring at the waste water treatment plant (the EchoWater Project), the quantity of VOCs in the water is increasing. The applicant is proposing to increase the VOC emissions resulting from the recycled water to 6.5 lb/day (600 ppb). This project triggers BACT requirements for the increase of VOCs and will be covered under BACT 296. There is no change in flow rate of the recycled water, or total TDS from the cooling tower as a result of this change.

The flow of recycled water could be intermittent and sporadic and may not be available to test during the scheduled testing time. As such, the applicant has asked for some relief in the compliance testing timelines to account for this potential non availability of the recycled water. The testing condition is worded such that testing would not be required if there is no flow of recycled water from the provider. When recycled water is made available, testing will be required within 14 days.

This project will be evaluated under enhanced new source review. This will give EPA 45 days to review the project. Upon completion, the changes described will be incorporated in the facilities Title V operating permit by administrative amendment.

The applicant has undergone a change of ownership effective November 1, 2021. A change of ownership does not change the conditions of a permit unless the underlying rule has changed, but changes the responsible entity. Sac Air Quality issues the same permit with a new reference permit number to the new owner for each piece of equipment that was permitted. The facility was previously known as Sacramento Power Authority or SPA while the new entity is Sacramento Municipal Utility District Financing Authority DBA Campbell Power Plant or Campbell Power Plant.

INTRODUCTION: Sacramento Municipal Utility District Financing Authority DBA Campbell Power Plant is a joint powers authority that operates this facility to produce electrical power for the Sacramento Municipal Utility District. Sacramento Municipal Utility District Financing Authority DBA Campbell Power Plant is seeking an Authority to Construct and a Permit to Operate for a modification of their existing cooling tower at a cogeneration plant located at 3215 47th St., Sacramento. This plant is adjacent to the closed Campbell Soup facility.

The facility is located on 5.8-acres and is a one-on-one combined cycle power block consisting of one combustion gas turbine generator, one duct-fired heat recovery steam generator (HRSG) and one steam turbine generator that collectively produce electricity for the Sacramento Municipal Utility District's (SMUD) power grid. Fuel for the gas turbine and duct burner is pipeline quality natural gas.

Exhaust heat from the combined cycle power block is used in the HRSG to produce steam to drive the facility's steam turbine generator. When operating as a cogeneration facility, a portion of the steam generated by the HRSG can be diverted to a steam host. A three cell mechanical draft cooling tower is used to remove heat from the circulating cooling water in the combined cycle power block.

The cogeneration plant consists of the following components:

Combined Cycle Power System -

1. (1) Siemens V84.2 gas turbine, 1410 MMBTU/hour heat input, natural gas fuel, with a nominal rating of 103 MW.

2. (1) duct burner, 200 MMBTU/hour heat input, natural gas fuel.

3. (1) Heat recovery steam generator.

4. (1) 55.9 MW nominal capacity steam turbine generator.

5. (1) Selective catalytic reduction (SCR) NOx air pollution control system.

6. (1) Oxidation catalyst CO and VOC air pollution control system.

Support Equipment -

7. Cooling tower, GEA Thermal-Dynamic Towers, 3 cell, 45,000 gallons of water/minute, approximately 4,763,000 cfm air flowrate.

Emissions Control Technology

Gas Turbine -

NOx emissions from the gas turbine are controlled with dry low NOx combustor technology and a SCR system.

VOC and CO emissions from the gas turbine are controlled with an oxidation catalyst system.

SO2 and PM10 emissions from the gas turbine are controlled by the use of natural gas fuel. There is no alternate emergency use fuel.

Duct Burner -

NOx emissions from the duct burner are controlled with low NOx burners and a SCR system (same system used for the gas turbine NOx control).

SO2 and PM10 emissions from the duct burner are controlled by the use of natural gas fuel. There is no alternate emergency use fuel.

Steam and Power Generation Process

The applicant, operating as a cogeneration power plant, previously produced process steam for the adjacent Campbell Soup Supply Company (CSSC) food processing facility. However, as of May 9, 2013, CSSC shut down all steam systems as part of their facility closure and ceased steam receipt from the applicant. If a suitable steam host occupies the CSSC site in the future, then Campbell Power Plant may once again operate as a cogeneration power plant by supplying steam to that site.

When operated as a cogeneration power plant, steam is extracted from the HRSG during the operation of the combined cycle power block. This process is capable of producing 250,000 pounds per hour of steam supply.

Operation as a combined cycle power plant, Campbell Power Plant's permitted equipment does not require any changes in the fuel consumption rate, criteria or hazardous air pollutant emission limits, method of operation, or SMAQMD Rule 201, Title IV or Title V permit conditions. The only physical change that occurred at the facility was to install a blind flange downstream of the existing shut-off valve serving the steam delivery piping leading to the former CSSC facility. This flange rendered the delivery piping safe should the new CSSC property owner choose to remove the steam piping from their property.

The main subject of this permit application is the modification of the cooling tower permit (PO 27117) to allow a change to the existing VOC emissions from the cooling tower water source. There are no physical changes to the cooling tower or the supply pipeline. Currently the cooling tower's water is from a recycled water mixed with a fresh water source that was authorized in Sac Air Quality application 24808. This request will increase the VOC content of the inlet recycled water being supplied. The source of the water is from the County of Sacramento's Regional Waste Water Treatment Plant. The use of this recycled water will not increase the Total Dissolved Solids (TDS) levels from the currently permitted value, however, there is an expected increase in VOC content as a result of process changes being made. The applicant has requested a permit limit of 6.5 lb/day of VOC.

The applicant has not requested a change in the permitted TDS level of 3,000 PPMW, or the emission of ammonia or chlorine.

Additionally, two other changes are requested which is a change in testing scheduling to prevent testing when there is no flow of recycled water, and an averaging change to better work with the upgraded controls software.

EQUIPMENT DESCRIPTION:

Cooling Tower

Make:	GEA Thermal-Dynamics Towers, Inc
Model:	TD4854-3-4034CF
Rated Capacity:	45,000 gpm
Design:	3-Cell Couterflow
Dimensions:	54' x 48' per cell; 162' x 48'
Drift Eliminator:	Brentwood PVC CDX080
Emission Control:	0.0006%

PROCESS RATE/FUEL USAGE:

The cooling tower has a water circulation rate of 45,000 gallons per minute.

OPERATING SCHEDULE:
The cooling tower will be permitted to operate 24 hours per day 365 days a year.

CONTROL EQUIPMENT EVALUATION:

The cooling tower is equipped with a drift eliminator that has been certified to reduce drift to 0.0006%

II. EMISSIONS CALCULATIONS:

1. **HISTORIC POTENTIAL EMISSIONS:** The equipment is being evaluated as an existing emission unit; therefore its Historic Potential Emissions are as follows (Rule 202, §225):

HISTORIC POTENTIAL EMISSIONS			
Pollutant	**Daily Historic Potential Emissions**	**Quarterly Historic Potential Emissions**	
VOC	0.5 lb/day	44 lb/qtr	Q1
		45 lb/qtr	Q2
		45 lb/qtr	Q3
		45 lb/qtr	Q4
NOx	0 lb/day	0 lb/qtr	
SOx	0 lb/day	0 lb/qtr	
PM10	9.7 lb/day (B)	875 lb/qtr (C)	Q1
		885 lbqtr (C)	Q2
		895 lb/qtr (C)	Q3
		895 lb/qtr (C)	Q4
PM2.5 (A)	9.7 lb/day	875 lb/qtr	Q1
		885 lbqtr	Q2
		895 lb/qtr	Q3
		895 lb/qtr	Q4
CO	0 lb/day	0 lb/qtr	

(A) At the time of the original permitting, PM2.5 was not evaluated. Though the previous permit was issued at a time when PM2.5 was not considered a criteria pollutant and thus was not evaluated, PM2.5 is a subset of PM10 and as a worst case scenario, it will be assumed to be the same.
(B) The calculated value is based on 0.405324 lb/hr * 24 hr = 9.727776 lb/day
(C) At the time of the original permitting, quarterly emissions were calculated based on 9.727776

lb/day and 90 days for Q1, 91 days for Q2, and 92 days for Q3 and Q4.

2. PROPOSED POTENTIAL TO EMIT:

VOC emission are based on the applicant's request of 6.5 lbs/day and 90, 91, 92, and 92 days per Q1, Q2, Q3 and Q4. For calculation purposes the daily limit is 6.4852 lbs/day

PM Emissions are calculated using the following equation:

Cooling Tower Drift Rate = 0.0006%
Water Circulation Rate = 45,000 gal/min
TDS =3,000 ppmw
Density of Water = 8.34 lb/gal
PM(lb/hr) = (45,000 gal/min) (60 min/hr) (8.34 lb/gal) (3,000/1,000,000) (0.0006/100) = 0.405324 lb/hr or 0.41 lb/hr
PM(lb/day) = (PM lb/hr)(24 hr/day)
PM(lb/qtr) = (PM lb/day)(days/qtr)
Where Qtr1 = 90days
Qtr2 = 91 days
Qtr3 = 92 days
Qtr4 = 92 days
All PM emissions are assumed to be PM10 and PM2.5

Pollutant	Emission Factors	Potential to Emit			
		lb/day	lb/quarter		lb/year
VOC	6.5 (A) lbs/day	6.5	584	Q1	2,368
			590	Q2	
			597	Q3	
			597	Q4	
NOx	N/A	N/A	N/A		N/A
SOx	N/A	N/A	N/A		N/A
PM10	0.41 lb/hr	9.7	875	Q1	3,551
			885	Q2	
			895	Q3	
			895	Q4	
PM2.5	0.41 lb/hr	9.7	875	Q1	3,551
			885	Q2	
			895	Q3	
			895	Q4	
CO	N/A	N/A	N/A		N/A
GHG	N/A	N/A	N/A		N/A
Lead	N/A	N/A	N/A		N/A

(A) Based on 900 gpm of water make up, 8.34 lb/gal water density and 600 ppbw VOC. Actual emission rate used for calculations is 6.4852 lb/day.

Toxic Emissions

Ammonia emissions are not expected to change as a result of this change.

Ammonia was calculated based on the following

Inlet Flow = 900 gal/min
PPMW of Ammonia =45 ppmw
Ammonia available for stripping = 5%
Density of Water = 8.34 lb/gal
Lb/hr= (900 gal/min) (60 min/hr) (8.34 lb/gal) (45/1,000,000)(0.05) = 1.01331 lb/hr or 1.01 lb/hr
Lb/day = 1.01331 lb/hr * 24 hr/day = 24.3 lb/day
Lb/Qtr1 = 1.01331 lb/hr * 90 days * 24 hours = 2,189 lb/Qtr1
Lb/Qtr2 = 1.01331 lb/hr * 91 days * 24 hours = 2,213 lb/Qtr2
Lb/Qtr3 = 1.01331 lb/hr * 92 days * 24 hours = 2,237 lb/Qtr3
Lb/Qtr4 = 1.01331 lb/hr * 92 days * 24 hours = 2,237 lb/Qtr3

Pollutant	Potential to Emit						
	lb/hr	lb/day	lb/Q1	lb/Q2	lb/Q3	lb/Q4	lb/yr
Ammonia	1.01	24.3	2,189	2,213	2,237	2,237	8,877

Allowable HAP emissions for the facility:

Equipment	Maximum Allowable Emissions tons/year
	Total HAPs TPY
Combined emissions from the gas turbine HRSG Duct Burner	8.1
Cooling Tower	7.4E-1
Total	**8.8**

A complete list of toxic and HAP emissions from the cooling tower can be found in Section III.3

The combined mass emissions from the following equipment are shown below and reflect the increase in VOC emissions from the cooling tower.

Pollutant	Maximum Allowable Emissions (A) Combined Emissions from: Gas Turbine and Duct Burner and Cooling Tower				
	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter	Total lb/year
VOC	9,376	9,488	13,861	9,565	42,290
NOx	24,209	24,545	26,321	24,725	99,800
SO2	1,814	1,836	1,944	1,853	7,447
PM10	11,015	10,160	12,294	11,619	45,088

Pollutant	Maximum Allowable Emissions (A) Combined Emissions from: Gas Turbine and Duct Burner and Cooling Tower				
	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter	Total lb/year
CO	21,265	21,601	22,803	21,708	87,377

(A) Including start-ups, shutdowns and short term excursions

III. COMPLIANCE WITH RULES AND REGULATIONS:

1. **H&S § 42301.6 (AB 3205) COMPLIANCE:** The cooling tower is not located within 1,000 feet from the outer boundary of a school site. Therefore the school public noticing requirements of H&S Code § 42301.6 do not apply.

2. **NSR COMPLIANCE:**

Rule 202 - New Source Review

Section 301 - Best Available Control Technology

BACT is triggered for any pollutant for which the emission increase ($BACT_{EI}$) calculated pursuant to Rule 202, Section 411.1 exceeds the levels specified below. For purposes of this calculation, the difference is done using tenths, then the difference is rounded to an integer using standard rounding convention (round up if greater than or equal to 0.5):

BACT is triggered if:

$$BACT_{EI} > BACT_{TL}$$

Where:

$BACT_{EI}$ = Emissions Increase = (DPE – DHPE)
DPE = Daily Potential Emissions (from Section II.2)
DHPE = Daily Historic Potential Emissions (from Section II.1)

$BACT_{TL}$ =

Pollutant	$BACT_{TL}$
VOC	0 lb/day
NOx	0 lb/day
SOx	0 lb/day
CO	550 lb/day
PM_{10}	0 lb/day
$PM_{2.5}$	0 lb/day
Lead	3.3 lb/day

Determination of BACT Applicability:

Pollutant	DPE (lb/day)	DHPE	$BACT_{EI}$ (lb/day)	$BACT_{TL}$ (lb/day)	Is BACT Required?
VOC	6.5	0.5	6.0	>0	Yes
NOx	0	0	0	>0	No
SOx	0	0	0	>0	No
PM10	9.7	9.7	0	>0	No
PM2.5	9.7	9.7	0	>0	No
CO	0	0	0	>550	No
Lead	0	0	0	>3.3	No

Section 302 - Offsets

The current facility emissions are as follows (From P/O 27117):

Pollutant	Maximum Allowable Emissions (A) Combined Emissions from: Gas Turbine and Duct Burner				
	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter	Total lb/year
VOC	8,792	8,898	13,264	8,968	39,922
NOx	24,209	24,545	26,321	24,725	99,800
SO2	1,814	1,836	1,944	1,853	7,447
PM10	11,015	10,160	12,294	11,619	45,088
CO	21,265	21,601	22,803	21,708	87,377

The total VOC emissions from the cooling tower are shown below.

Pollutant	Proposed Maximum Quarterly Emissions(A)				
	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter	Total lb/year
VOC	584	590	597	597	2,368

There is no change in PM10 emissions as a result of this permitting action.

Since the facility wide total of VOCs exceeds the offset threshold of 5,000 lbs per quarter, the project VOC emissions will have to be offset prior to the start of operation.

A portion of these offsets were submitted as part of the application 24808 for the initial introduction of the recycled water. The offset requirements for this project are show in the table below.

Description	Maximum Allowable Emissions Combined Emissions Cooling Tower			
	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter
24808 PTE for VOC (A)	44	45	45	45
26874 PTE for VOC	584	590	597	597
Offset Requirement	**540**	**545**	**552**	**552**

(A) The VOC emissions were offset as part of the permitting action of 24808

Campbell Power Plant has proposed to use VOC emission offsets from one or more of the following SMUD owned ERC certificates: ERC 04-00917 and ERC 04-00920, generated from the shutdown of compound application processes at Campbell Soup Company, previously located at 6200 Franklin Boulevard, Sacramento. The following amounts of VOC credits are available for use on this project:

Pollutant	Certificate Number	Credits Available for Use (lbs/qtr)			
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
VOC	04-00917	2,349	1,287	2,747	3,651
VOC	04-00920	458	354	1,603	59

Pursuant to Rule 202, Section 303.1, the following offset ratios will apply to determine the quantity of offsets that are required to be surrendered.

Location of Emission Offset	**Credit Certificate #**	**Emission Offset Ratio**
		Volatile organic compounds or Nitrogen oxides
Within 15-mile radius and within Sacramento Valley Air Basin	04-00917/04-00920	1.2 to 1.0

The applicant has identified enough VOC emission reduction credits to fully offset the amount needed for each calendar quarter.

Section 308 –CEQA

Under Rule 202 (Section 308), the Air Pollution Control Officer shall deny an Authority to Construct or Permit to Operate if the Air Pollution Control Officer finds that the project which is the subject of an application would not comply with the California Environmental Quality Act or CEQA. The California Energy Commission (CEC) has sole licensing authority of thermal power plants greater than 50 MW. The CEC licensing process has been determined to be CEQA equivalent. As a CEC approved project, all subsequent modifications go through the CEC amendment process. Because the original project underwent review/approval by the CEC, the CEC will be responsible for the CEQA review of this project.

The applicant submitted a Petition to Amend to the CEC requesting approval of the proposed changes discussed in this SMAQMD permit application. The CEC's evaluation process includes a CEQA-like component where the CEC is the Lead Enforcement Agency (LEA). Normally under this process, the SMAQMD issues a preliminary and final determination of compliance (PDOC/FDOC) for a requested permit change. Once the PDOC

is issued, the PDOC will undergo a public notice. The District will then prepare the FDOC. The CEC staff will utilize this and will finish their analysis and bring the amendment to the Commission for approval. The FDOC will be finalized concurrent with the CEC approval of the amendment. Once the CEC approves the amendment, the CEQA process is complete, and the FDOC acts like an authority to construct.

Section 406 – Submittal of BACT Determinations: The new BACT developed for this project will be submitted to CARB within 30 days of the determination.

Rule 203 – Prevention of Significant Deterioration
A source or modification triggers PSD if:

- Its potential to emit any one pollutant is greater than or equal to 100 tons/year if it is one of the 28 selected industrial categories in 42 U.S.C. Section 7479 (1), or greater than or equal to 250 tons/year for all other categories; or
- It is part of a major stationary source and the project's net emissions increase for any pollutant will be greater than the significance levels listed below:

Pollutant	**Level of Significance (Tons/Yr)**
CO	100
NOx	40
Sox	40
PM	25
PM10	15
PM2.5	10 (PM2.5) or 40 (SO2) or 40(NO)
Ozone	40 of NOx or VOCs
Lead	0.6
Fluorides	3
Sulfuric acid mist	7
H_2S	10
Total reduced sulfur (including H_2S)	10
Reduced sulfur compounds (including H_2S)	10
Greenhouse Gases (CO2e)	75,000

For the purposes of Rule 203 major source applicability, the facility is a fossil fuel fired steam electric plant greater than 250 MMBTU/hr heat input and as such is subject to the 100 TPY major source threshold. The facility's potential to emit prior to the modification of this cooling tower is the following

Pollutant	Annual Emissions (TPY)
VOC	20
NOx	50
SOx	4
CO	44
PM10	23
PM2.5	23

The increase in potential to emit of the cooling tower is the following:

Pollutant	Annual Emissions (TPY)
VOC	1

NOx	0
SOx	0
CO	0
PM10	0
PM2.5	0

Since the potential to emit of the source prior to the modification of the cooling tower is less than the PSD major source threshold (100 TPY) and since the potential to emit from the cooling tower, alone, does not exceed the PSD major source threshold, PSD is not triggered.

RULE 207 – Title V Federal Operating Permit Program

The facility has a Title V permit. Per Rule 214, Section 101.1, the applicant has requested that this application be reviewed through the Enhanced New Source Review process. Consequently, the review of this application is subject to Rule 207, Section 305 and Sections 401 through 408. The Enhanced New Source Review process will allow the District to administratively amend the facility's Title V permit to reflect these changes at a later date.

Section 305 – Title V Permit Content

All the requirements and standards specified in this section are incorporated in the existing Title V Permit and as applicable will be included in A/C 26874.

Section 401 through 408 – Administrative Requirements

This permit action will be processed using SMAQMD Rule 214 Section 404 Enhanced New Source Review. The procedural requirements in SMAQMD Rule 207 Sections 401 through 408 will be used. A public notice will be published in the Sacramento Bee requesting comments within a 30 day review period. The U.S. EPA Region 9 will have a 45 day review period.

The use of the Enhanced New Source Review process will allow this permit action to be incorporated into the facility's Title V permit through a Title V administrative permit amendment (see SMAQMD Rule 207 Section 202.5).

Prior to initial operation under this A/C, the applicant must submit a Title V application for an administrative amendment, and the following permit conditions will be listed on the A/C as follows:

S3. This Authority to Construct has been reviewed through an Enhanced New Source Review process in accordance with the procedural requirements of Section 401 through 408 of Rule 207 Title V – Federal Operating Permit Program.
[Basis: SMAQMD Rule 202, Section 404]

S4. The applicant must submit to the Air Pollution Control Officer an application to modify the Title V permit with an Administrative Title V Permit Amendment no later than 12 months after commencing operation with modifications authorized by this Authority to Construct.
[Basis: SMAQMD Rule 207, Section 301.2]

RULE 214 – Federal New Source Review

This rule applies to either new major stationary sources, or modifications to existing major

stationary sources. The modification of the cooling tower to the facility which is considered an existing major stationary source makes this modification subject to this rule.

Section 302 – Offsets
See discussion in Rule 202, Section 302 above.

Section 306 - Ambient Air Quality Standards
Section 306 prohibits a new or modified stationary source from interfering with the attainment or maintenance of an applicable ambient air quality standard. An ambient air quality impact analysis may be required for a new major source or modification as requested by the Air Pollution Control Officer. The proposed cooling tower recycled water project is neither a new major source nor a major modification the results of which are not expected to exceed any Ambient Air Quality Standard. Therefore, an ambient air quality impacts analysis will not be required.

Section 404 – Enhanced New Source Review
The applicant has requested enhanced new source review. Therefore, this review will be subject to District Rule 207 Section 305 and Sections 401 through 408.

Rule 217 – Public Notice Requirements for Permits

Sections 401-402 – CARB, EPA, and Public Notification: The public noticing requirements of Rule 217 do not apply if:

- Offsets are not required pursuant to Rule 202, Section 302.
- A visibility analysis is not required pursuant to Rule 214, Section 413.
- The increase in potential to emit for the project, calculated as per Section 403 of Rule 217, is below the following limits:

Pollutant	lb/qtr
VOC	5,000
NOx	5,000
SOx	9,200
PM10	7,300
PM2.5	10 TPY
CO	49,500

Analysis:

- In accordance with Rule 202, Section 302 and determined in Sections II.6 and II.7, offsets are required.
- This permit action is subject to Rule 214 but this modification calculated in accordance with Section 411.5 is not considered a major modification, thus the visibility analysis required by Section 413 of Rule 214 is not applicable.
- As shown below, the increase in potential to emit does not exceed the notification exemption thresholds for all pollutants.

Increase in Potential to emit – Worst Case Quarterly number					
Pollutant	Potential to Emit for the Project		Increase in PTE	Notification Threshold	Notification Required?
	Pre-Application	Post-Application			
VOC	45	597 lb/qtr	552 lb/qtr	≥ 5,000	No
NOx	0	0 lb/qtr	0 lb/qtr	≥ 5,000	No
SOx	0	0 lb/qtr	0 lb/qtr	≥ 9,200	No

PM10	892 lb/qtr	892 lb/qtr	0 lb/qtr	≥ 7,300	No
PM2.5	2 TPY	2 TPY	0 TPY	≥ 10 TPY	No
CO	0	0 lb/qtr	0 lb/qtr	≥ 49,500	No

Since the first criteria is not satisfied (i.e. offsets are required), this project is subject to public noticing requirements of Rule 217

3. PROHIBITORY RULE COMPLIANCE:

Rule 401 - Ringelmann Chart
The permit will include conditions requiring that the cooling tower comply with the Ringelmann No. 1 or 20% opacity standard and in the District's experience, a properly maintained cooling tower is able to meet the requirement. The equipment will be inspected prior to the issuance of the permit to operate and on a regular basis thereafter to ensure continuous compliance.

Rule 402 – Nuisance

The District regulates emissions of toxic substances through this rule. The District's Health Risk action levels are summarized below.

Non-Cancer Health Risk (Acute and Chronic):

Hazard Index (HI)*	Action Required
HI < 1	Health risk is within acceptable range
HI ≥ 1	Consult OEHHA for further guidance

Hazard Index = Ground Concentration/Reference Exposure Level (REL)

Cancer Risk:

Excess Cancer Risk	Action Required
≤ 0.1 per million	Exempt from further toxic review.
> 0.1 per million but ≤ 1 per million	No significant risk; No action required. Health Risk is included in facility-wide cumulative risk.
> 1 per million but ≤ 10 per million	Acceptable risk; Provide T-BACT
> 10 per million but ≤ 100 per million	Permit denied unless the APCO makes a finding that not approving the project may result in a greater negative impact to the public than approving the project.
> 100 per million	Denial of permit.

To determine the emission rate the applicant proposes to scale up the emissions (6.5/0.5=13), except for chloroform, which was set at 300 ppb and bromodichloromethane which was set at 100 ppb based on the recommendations from Regional San, the supplier of the recycled water to the cooling tower. Toluene was revised per more recent testing.

The following emissions were considered as part of the health risk assessment

Stripping Emissions (B)		**Make-up GPM**	**lb/gal**	**PPB**	**PPM**	**lb/hr**	**Lb/year**
NH3 (A)		900	8.34		40	18.01	157,806
Bromodichloromethane		900	8.34	100		4.5E-02	395
Chloroethane*		900	8.34	10.01		4.5E-03	39
Chloroform*		900	8.34	300		1.4E-01	1,184
Chloromethane*		900	8.34	15.6		7.0E-03	62
Ethylbenzene		900	8.34	1.69		7.6E-04	7
Toluene*		900	8.34	40.3		1.8E-02	159
Total Xylenes*		900	8.34	6.89		3.1E-03	27
Drift Loss Emissions (no change)		**Tower Circ Rate**	**lb/gal**	**% Drift**	**PPM**	**lb/hr**	**Lb/year**
Iron	Fe	45000	8.34	0.0006	0.04	5.40E-06	5E-02
Copper	Cu	45000	8.34	0.0006	0.01	1.35E-06	1E-1
Zinc	Zn	45000	8.34	0.0006	0.03	4.05E-06	4E-1
Sodium	Na	45000	8.34	0.0006	102	1.38E-02	120
Potassium	K	45000	8.34	0.0006	16	2.16E-03	19
Chloride	Cl	45000	8.34	0.0006	132	1.78E-02	156
Sulfate	SO4	45000	8.34	0.0006	52	7.03E-03	62
Nitrate	NO3	45000	8.34	0.0006	4	5.40E-04	5
Ortho−Phosphate	PO4	45000	8.34	0.0006	8.7	1.18E-03	10
Silica	SiO2	45000	8.34	0.0006	48	6.49E-03	57
Aluminum	Al	45000	8.34	0.0006	0.05	6.76E-06	6E-02
Boron	B	45000	8.34	0.0006	0.32	4.32E-05	4E-01
Barium	Ba	45000	8.34	0.0006	0.02	2.70E-06	2E-02
Cadmium*	Cd	45000	8.34	0.0006	0.005	6.76E-07	1E-02
Cobalt*	Co	45000	8.34	0.0006	0.005	6.76E-07	1E-2
Chromium*	Cr	45000	8.34	0.0006	0.005	6.76E-07	1E-02
Lithium	Li	45000	8.34	0.0006	0.005	6.76E-07	1E-02
Manganese	Mn	45000	8.34	0.0006	0.05	6.76E-06	6E-02
Molybdenum	Mo	45000	8.34	0.0006	4.1	5.54E-04	5
Nickel*	Ni	45000	8.34	0.0006	0.005	6.76E-07	1E-01
Lead*	Pb	45000	8.34	0.0006	0.005	6.76E-07	1E-01
Strontium	Sr	45000	8.34	0.0006	0.24	3.24E-05	3
Vanadium	V	45000	8.34	0.0006	0.025	3.38E-06	3E-02
Arsenic*	As	45000	8.34	0.0006	0.05	6.76E-06	6E-02
Titanium	Ti	45000	8.34	0.0006	0.025	3.38E-06	3E-02
Silver	Ag	45000	8.34	0.0006	0.05	6.76E-06	6E-2
Fluoride	F	45000	8.34	0.0006	0.82	1.11E-04	1

* Denotes HAP

(A) The ammonia emissions were conservatively estimated with an emission concentration of 40 ppmw with the assumption that all of the ammonia would be volatilized for the purposes of the HRA assessment. Upon further analysis, the quantity of ammonia emissions were refined based on a pH of 7.5. Almost all the ammonia at a pH of 7.5 is in the ionic form (NH4+) and cannot be stripped into the atmosphere. The value used in the HRA assessment is higher than the projected ammonia emissions.

(B) Stripping emissions were adjusted by multiplying the current emission rate evaluated in P/O 24808 by 13 to take into account the added VOCs. Chloroform was increased to 300 ppb and bromodichloromethane was set to 100 ppb. Toluene was revised per more recent testing.

HARP2 and AERMOD was used to determine the acute chronic hazard index and the cancer risk for the modified tower. This risk is added to the risk analysis done in 1994 to obtain the totals.

Risk component	1994 HRA	Modified Cooling Tower	Total
Cancer Risk - Residential	1.158E-07	1.10E-07	2.258E-7 or 0.2258 per 1 million
Cancer Risk - Workplace	1.158E-07	1.39E-08	1.297E-7 or 0.1297 per 1 million
Acute Hazard Index	0.1693	0.250	0.4193
Chronic Hazard Index	0.0111	8.86E-03	0.01996

The health risk is considered acceptable since the Cancer risk is less than 1 in a million for the project and less than 10 in a million for the facility and the acute and chronic hazard indices are each less than 1.

4. NSPS COMPLIANCE:

The list of all adopted New Source Performance Standards as listed in 40 CFR 60 (https://www.epa.gov/stationary-sources-air-pollution/new-source-performance-standards)were reviewed to determine if the proposed project is subject to one or more of these regulations. There are currently no NSPSs that apply to this source category.

5. 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 prohibit use of any chromium containing water treatment chemicals and this will be verified during the initial inspection.

6. ATCM COMPLIANCE: The list of all adopted Airborne Toxic Control Measures (http://www.arb.ca.gov/toxics/atcm/atcm.htm) was reviewed to determine if the proposed project is subject to one or more of these regulations.

Airborne Toxic Control Measure For Chromate Treated Cooling Towers (Title 17, CCR Sections 93103):

Under Section 93103 (c) the applicant is prohibited from adding hexavalent chromium containing compounds to the cooling tower circulation water and must keep the hexavalent chromium concentration in the cooling tower circulating water less than 0.15 milligrams hexavalent chromium per liter of circulating water.

The applicant has tested the recycled water and has found chromium levels below detection limits. It is not expected that the recycled water would have any chromium. The applicant does not add hexavalent chrome containing compounds to the cooling tower. In contact with ARB (Nicholas Berger 916-327-1516) on 2/5/16, the use of recycled water has not raised any issues in regards to this ATCM.

RECOMMENDATION: This project will comply with all applicable District rules and regulations. An authority to construct for the modification of the cooling tower for the replacement of potable water with non-potable recycled water should be issued to Sacramento Municipal Utility District Financing Authority DBA Campbell Power Plant with the following conditions.

***Refer to conditions in Authority to Construct No.* 26874**

REVIEWED BY: *Steve Mosunic* **DATE:** 11/08/2021

APPROVED BY: *Brian F Krebs* **DATE:** 01-04-2022


MEIR 1.1E-1 in a million Cancer
MEIW 1.39E-2 in a million cancer
Chronic 8.86E-3
Acute 2.5E-1
Google Earth
© 2021 Google
1000 ft
N

APPENDIX E: HARP HRA MODELING DATA

1.1.1 Spatial Averaging

Spatial averaging was not used to determine risk values for receptors. Instead, the most conservative, representative value for each receptor was chosen. This methodology results in higher risk values than spatial averaging and is therefore a more conservative approach.

1.1.2 Meteorological and Elevation Data

Five years of pre-processed meteorological data supplied by ARB for 2014 through 2018 were used for this model. The surface station and upper air data are from the Sacramento Executive Airport (WBAN 23232). Terrain data were obtained from the Multi-Resolution Land Characteristics Consortium (MRLC) in the form of National Elevation Dataset (NED) files at 1/3 arc second resolution.

1.1.3 Model Options

Air dispersion modeling is performed with US-EPA AERMOD through the EPA-approved BREEZE user interface. All modeling exercises were conducted using the latest version of EPA AERMOD (v19191). Modeling was performed utilizing all regulatory defaults as defined by EPA. Selected outputs were for the 1st high 1-hr and 1st high annual average period values.

The emission sources considered in this analysis were evaluated in terms of their proximity to nearby structures. The purpose of this evaluation was to determine if stack discharge might become caught in the turbulent wakes of these structures. Wind blowing around a building creates zones of turbulence that are greater than if the building was absent. Plumes entrained in the zones of turbulence experience enhanced plume growth and restricted plume rise. AERMOD incorporates the Plume Rise Model Enhancements (PRIME) algorithms using dimensions from the U.S. EPA's Building Profile Input Program (BPIP) for estimating for plumes affected by building wakes. The site layout was used to digitize buildings and structures to be included in the downwash analysis.

Direction-specific building dimensions and the dominant downwash structure parameters were determined using the *BREEZE®* BPIPP software, developed by Trinity Consultants, Inc. This software incorporates the algorithms of the U.S. EPA-sanctioned Building Profile Input Program with PRIME enhancement (BPIP-PRIME), version 04274.[1]

1.1.4 Receptor Placement

The following receptor placements were used for this HRA.

- Fence-line – Fence-line receptors were defined at 20-meter spacing along the property border. The fence-line boundary receptors are identified as Receptors 1267-1307.
- Nearby Residences and Workers (Discrete Grid) - The modeling discrete receptor grid uses a 5 tiered-density grid with 50 m spacing out to 500 m from the facility center point, 100 m spacing to 1,000 m from the facility center point, 250 m spacing to 2,500 m from the facility center point, 500 m spacing to 5,000 from the facility center point, and 1,000 m spacing to 10,000 m from the facility center point. This multi-density grid approach allows for precise identification of maximum impacts near the facility

[1] U S. Environmental Protection Agency, User's Guide to the Building Profile Input Program, Research Triangle Park, NC, EPA-454/R-93-038.

boundary (where impacts are greatest) while reducing the computational load for excess receptors far away from the facility (where impacts are lowest).

- Census Block Receptors – In accordance with SMAQMD Guidance, no cancer burden calculation is needed in this HRA because no receptors have a cancer risk of 10 in 1 million or greater. Therefore, no census block receptors were included.
- Onsite Receptors – No onsite receptors were identified.

1.1.5 Receptors Evaluated for Multipathway Analysis

A summary of receptor pathways is shown in Table A-1.

Table A-1. Multipathway Analysis Receptor Summary

Pathway	Residential Receptors	Worker Receptors	Sensitive Receptors
Soil	X	X	X
Dermal	X	X	X
Mother's Milk	X		X
Drinking Water			
Fish			
Homegrown Produce	X		X
Beef			
Dairy Cows			
Pigs			
Chicken	X		X
Eggs	X		X

1.1.6 Multipathway and Exposure Parameters

In accordance with SMAQMD Guidance, default HARP2 values were used for the pathways identified in Section 1.1.6 of this report. Specific justifications for certain default selections are outlined below:

Home Grown Produce

"Households that farm" fractions were used because they are more conservative than "Households that garden".

Chickens/Eggs

- "Households that raise/hunt" fractions were used because there are no obvious animal farms in the area surrounding the facility.
- The fraction of drinking water from contaminated sources is zero for both chickens and eggs because there are no obvious surface water sources in the area surrounding the facility for the animals to consume, therefore the chickens are likely to drink from municipal water sources.

1.1.7 Health Values and HARP Version Used in Risk Analysis

For this HRA, Trinity used the last version of HARP – Air Dispersion and Risk Tool (v19121). This version of HARP utilized a health.mdb file updated on September 9, 2019.

1.1.8 Summary of Results

Table A-2 below presents a summary of the results including the following:

- Summary of Maximum Cancer Health Risk Impacts (Worker and Resident)
- Summary of the Maximally Exposed Individual Resident and Worker (MEIR and MEIW)
- Summary of Maximum Chronic Non-cancer Health Risk Impacts (Resident)
- Summary of Maximum Acute Non-cancer Health Risk Impacts (Resident)
- Summary of Maximum 8-hour Chronic Non-cancer Health Risk Impacts (Worker)

Table A-2. HRA Results Summary

HRA results for (HARP2)	**5-Year Combined Run**	
Receptor Description	**Receptor No.**	**Risk Value**
Cancer Risk - PMI	228	2.24E-07
Chronic HHI - PMI	228	8.86E-03
Cancer Risk – Resident (MEIR)	481	1.10E-07
Cancer Risk – Worker (MEIW)	246	1.39E-08
Acute - PMI	101	2.50E-01
8 Hour Chronic - PMI	228	3.29E-05

The following HARP input and output files are included electronically.

- Input file with risk scenario and site specific information (*HRAInput.hra)
- Supplemental input file with GLCs (*GLCList.csv)
- AERMOD Plotfiles (*.plt and *txt)
- Output log file (*output.txt)
- Output file with cancer risk details (*CancerRisk.csv)
- Output file with chronic non-cancer risk details (*NCCHronicRisk.csv)
- Output file with acute non-cancer risk details (*NCAcuteRisk.csv)
- Output file with 8-hour chronic non-cancer risk details (*NCAcuteRisk.csv) (worker only)

SPA Cooling Tower Stack Parameters

	Velocity		Height		Diameter		Exhaust Temp	
	ft/sec	m/sec	feet	meters	feet	meters	F	K
Per Cell (3 cells)	27.9	8.50	43.5	13.3	40	12.2	85	302.6

		Source
Overall Dimensions		
Length (ft) =	162	1996 Manual, Pg. 40
Width (ft) =	48	
Fan Shroud Dimensions		1996 Manual, Pg. 44
Diameter (ft) =	40	
Height (ft) =	10	

*HARP - HRACalc v19044 2/11/2021 11:16:20 AM - Cancer Risk - Input File: C:\Users\skeane\Desktop\v0.4\ETHOS HRA V0.4\hra\Resident_HRAInput.hra

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO	INH_RISK	SOIL_RISK	DERMAL_R	MMILK_RI	WATER_RI	FISH_RISK	CROP_RISK	BEEF_RISK	DAIRY_RISI	PIG_RISK	CHICKEN_F	EGG_RISK
228	ALL		633219.6	4263923	2.24E-07	30YrCance	1.91E-07	1.96E-08	7.98E-10	2.01E-13	0.00E+00	0.00E+00	1.26E-08	0.00E+00	0.00E+00	0.00E+00	1.16E-13	2.80E-13
481	ALL		633519.6	4264123	1.10E-07	30YrCance	9.38E-08	9.62E-09	3.92E-10	9.87E-14	0.00E+00	0.00E+00	6.19E-09	0.00E+00	0.00E+00	0.00E+00	5.69E-14	1.38E-13

*HARP - HRACalc v19044 2/11/2021 11:16:20 AM - Chronic Risk - Input File: C:\Users\skeane\Desktop\v0.4\ETHOS HRA V0.4\hra\Resident_HRAInput.hra

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	ODOR	GENERAL	MAXHI
228	ALL		633219.6	4263923	NonCancer	2.65E-03	2.66E-03	0.00E+00	3.47E-05	3.03E-05	2.69E-03	8.86E-03	2.65E-03	2.98E-07	3.26E-06	2.56E-08	3.24E-06	0.00E+00	0.00E+00	8.86E-03

*HARP - HRACalc v19044 2/11/2021 11:14:49 AM - Cancer Risk - Input File: C:\Users\skeane\Desktop\v0.4\ETHOS HRA V0.4\hra\Worker_HRAInput.hra

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO	INH_RISK	SOIL_RISK	DERMAL_R	MMILK_RI	WATER_RI	FISH_RISK	CROP_RISK	BEEF_RISK	DAIRY_RISI	PIG_RISK	CHICKEN_F	EGG_RISK
246	ALL		633269.6	4263923	1.39E-08	25YrCance	1.28E-08	7.91E-10	3.16E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*HARP - HRACalc v19044 2/11/2021 11:16:20 AM - Acute Risk - Input File: C:\Users\skeane\Desktop\v0.4\ETHOS HRA V0.4\hra\Resident_HRAInput.hra

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE\	RESP	SKIN	EYE	BONE/TEET	ENDO	BLOOD	ODOR	GENERAL	MAXHI
101	ALL		632869.6	4263823	NonCancer	1.30E-03	3.58E-02	1.29E-04	0.00E+00	0.00E+00	3.58E-02	2.50E-01	0.00E+00	2.15E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E-01

*HARP - HRACalc v19044 2/11/2021 11:19:06 AM - Chronic 8Hr Risk - Input File: C:\Users\skeane\Desktop\v0.4\ETHOS HRA V0.4\hra\Worker8hr_HRAInput.hra

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DEVEL	RESP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL	MAXHI
228	ALL		633219.6	4263923.1	NonCancer8HrChronic	3.02E-05	3.29E-05	7.56E-07	0.00E+00	0.00E+00	3.02E-05	3.10E-05	3.02E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.29E-05