February 25, 2009

DOCKET	
08-AFC-11	
DATE	FEB 25 2009
RECD.	FEB 26 2009

sierra research

1801 J Street
Sacramento, CA 95811
Tel: (916) 444-6666
Fax: (916) 444-8373

Ann Arbor, MI
Tel: (734) 761-6666
Fax: (734) 761-6755

Memo to: Courtney Graham
Yolo Solano Air Quality Management District

Copy to: California Energy Commission Staff
Docket 08-AFC-11

From: Steve Hill

Subject: CPV Vaca Station Application—Revised HAP Emission Tables

On January 12, you requested that we review the emission table describing emissions of non-criteria pollutants from the Auxiliary Boiler. We have reviewed that table and are making the corrections shown in the revised Table 6.1C-3 (attached). The corrections are due to a spreadsheet formula error that resulted in an underestimate of the annual emissions. Hourly emission calculations were not affected by the error.

You also requested quantification of emissions of metals from the auxiliary boiler, based on emission factors contained in AP-42. We have made the calculations, and have presented them in the attached Table 6.1C-3A. We disagree, however, with the use of AP-42 to quantify metals emissions from this source, for the reasons discussed below.

- All of the AP-42 factors for metals have very low ratings (D and E for all metals except copper and nickel). This is because each emission factor is based on very few (no more than three) boiler tests.

- Metals are not naturally present in the fuel in natural gas combustion devices; they are not generated by combustion, either, as are many of the organic pollutants. Any metals that are emitted come from fuel contamination by such sources as compressor lubricating oils.

- The California Air Toxics Emission Factor (CATEF) database does not include emission factors for metals from natural gas combustion. This is not surprising, however, because the CATEF emission factors were developed in 1996, and the AP-42 factors for metals from natural gas combustion were not published until 1998. It is worth noting, however, how metals from natural gas combustion are treated in the AB 2588 Emission Inventory Criteria and Guidelines Report (adopted May 30, 1996; amended August 27, 2007)—the reporting guidelines require facilities to report of metals emissions above the threshold, but do not require even the largest users of natural gas to test for metals emissions.

- As a result of the low number of tests and the fact that metals from natural gas combustion come from fuel contamination (a highly variable contributor), the AP-42 factors are extremely unreliable, and are unlikely to represent the emissions from any specific source. As a result, we disagree with using the AP-42 emission factors for metals from natural gas combustion for individual risk assessments.

For the above reasons, we do not propose to revise the HAP tables or the modeling to include metals emissions; however, we are providing the calculations that you requested in Table 6.1C-3A.

Please do not hesitate to contact me if you have any questions.

Table 6.1C-3 (revised 2/24/09)

Auxiliary Boiler

Annual and Maximum Hourly Non-Criteria Pollutant Emissions

Pollutant	Emission Factor lb/MM Cu Ft	Boiler Max firing rate MM Cu Ft/hr	Boiler Fuel Use MM Cu Ft/yr	Boiler Emissions lbs/hr	Boiler Emissions tons/yr	Hourly Emission Rate g/sec	Annual Emission Rate g/sec
Acetaldehyde		0.036	138	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acrolein		0.036	138	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	2.1E-03	0.036	138	7.52E-05	~~5.19E-06~~ 1.45E-04	9.48E-06	~~1.49E-07~~ 4.17E-06
Formaldehyde	7.5E-02	0.036	138	2.69E-03	~~1.85E-04~~ 5.17E-03	3.39E-04	~~5.33E-06~~ 1.49E-04
Hexane	1.8E+00	0.036	138	6.45E-02	~~4.45E-03~~ 1.24E-01	8.12E-03	~~1.28E-04~~ 3.57E-03
Naphthalene	6.1E-04	0.036	138	2.19E-05	~~1.41E-06~~ 4.21E-05	2.75E-06	~~4.33E-08~~ 1.21E-06
PAHs – Total	1.0E-04	0.036	138	3.58E-06	~~2.47E-07~~ 6.90E-06	4.51E-07	~~7.11E-09~~ 1.98E-07
Benzo(a)anthracene							
Benzo(a)pyrene							
Benzo(b)fluoranthene							
Benzo(k)fluoranthene							
Chrysene							
Dibenzo(a,h)anthrancene							
Indeno(1,2,3-cd)pyrene							
Toluene	3.4E-03	0.036	138	1.22E-04	~~8.40E-06~~ 2.34E-04	1.53E-05	~~2.42E-07~~ 6.74E-06
Xylene		0.036	138	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HAP Total =				**0.0674**	**~~0.0048~~ 0.1297**		

Table 6.1C-3A

Auxiliary Boiler

Annual and Maximum Hourly Non-Criteria Pollutants (metals), using AP-42 emisson factors

Pollutant	Emission Factor lb/MM Cu Ft	Boiler Max firing rate MM Cu Ft/hr	Boiler Fuel Use MM Cu Ft/yr	Boiler Emissions lbs/hr	Boiler Emissions tons/yr	Hourly Emission Rate g/sec	Annual Emission Rate g/sec
Arsenic	2.0E-04	0.036	138	7.16E-06	1.38E-05	9.03E-07	3.97E-07
Barium	4.4E-03	0.036	138	1.58E-04	3.03E-04	1.99E-05	8.73E-06
Beryllium	1.2E-05	0.036	138	4.30E-07	8.27E-07	5.42E-08	2.38E-08
Cadmium	1.1E-03	0.036	138	3.94E-05	7.59E-05	4.96E-06	2.18E-06
Chromium	1.4E-03	0.036	138	5.01E-05	9.65E-05	6.32E-06	2.78E-06
Cobalt	8.4E-05	0.036	138	3.01E-06	5.79E-06	3.79E-07	1.67E-07
Copper	8.5E-04	0.036	138	3.04E-05	5.86E-05	3.84E-06	1.69E-06
Manganese	3.8E-04	0.036	138	1.36E-05	2.62E-05	1.72E-06	7.54E-07
Mercury	2.6E-04	0.036	138	9.31E-06	1.79E-05	1.17E-06	5.16E-07
Molybdenum	1.1E-03	0.036	138	3.94E-05	7.59E-05	4.96E-06	2.18E-06
Nickel	2.1E-03	0.036	138	7.52E-05	1.45E-04	9.48E-06	4.17E-06
Selenium	2.4E-05	0.036	138	8.60E-07	1.65E-06	1.08E-07	4.76E-08
Vanadium	2.3E-03	0.036	138	8.24E-05	1.59E-04	1.04E-05	4.56E-06
Zinc	2.9E-02	0.036	138	1.04E-03	2.00E-03	1.31E-04	5.75E-05
Metals Total =				**0.0014**	**0.0027**		

Metals emission factors from AP-42 Table 1.4-4