

memorandum

date September 19, 2019

to Matt Fagundes, Project Manager

cc File

from Jyothi Iyer, Air Quality Analyst

subject **Review of the HRA conducted by TRC Solutions for the Vierra Reinforcement Project**

This memo summarizes ESA’s review of the Health Risk Assessment (HRA) dated December 13, 2018, conducted by TRC Solutions on behalf of PG&E for the Vierra Reinforcement Project (project). ESA agrees with the general methodology used in the HRA, which is consistent with the 2015 Office of Environmental Health Hazard Assessment (OEHHA) guidelines. However, there were some discrepancies as noted below.

Review of the PG&E HRA

Page 3 of the PG&E HRA states that construction activities not occurring at the substation, including material haul truck trips and worker commute trips, were excluded from the HRA “because they occur off-site or over the entire travel distance and would not be expected to significantly contribute to localized impacts of DPM.” While the HRA does not specify if diesel particulate matter (DMP) emissions from vendor truck trips were included, it can be assumed that they were not due to the same reasons stated above.

The following table summarizes DPM emissions in the form of PM-10 exhaust from on-site construction. These numbers were extracted from the CalEEMod output included as part of the PG&E HRA.

Construction Phases	PM-10 Exhaust (tons/year)
	On-site Equipment
Phase 1 - Site Preparation	0.00009
Phase 5A - Substation Expansion	0.00814
Phase 2 - Traffic Control	0
Phase 5B - Substation Expansion	0.0242
Phase 5D - Substation Expansion	0
Phase 5C - Substation Expansion	0
Phase 6 - Vierra Substation	0.0019
Total tons/year	0.03433

Total pounds/year	68.66
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The emission rate used in the PG&E HRA is 69.2 pounds per year, 0.54 pounds per year greater than what is identified above based on the CalEEMod output.

The dispersion modeling presented in the PG&E HRA was conducted using 69.2 pounds per year of PM-10 exhaust emissions, and identified an estimated maximum annual concentration of 0.0551 µg/m³. Based on an emission rate of 68.66 pounds per year as calculated above, the maximum annual concentration would be 0.0547 µg/m³.

ESA Revisions to Update HRA

ESA made further revisions to update the HRA findings to reflect the following:

- Mass emissions were remodeled using CalEEMod version 2016.3.2 to adjust the construction calendar year to 2020 to be consistent with the project description and the regional air quality analysis prepared subsequent to preparation of the PG&E HRA. The PG&E HRA incorrectly used a construction model year of 2022.
- Emissions were remodeled for the duration of Phase 5A, Substation Expansion, to be 50 days. The PG&E HRA used a duration of 40 days for Phase 5A. This revision was made to ensure consistency with the phase duration assumptions used for the revised mass emissions that were estimated for the regional air quality analysis prepared subsequent to preparation of the PG&E HRA.
- The daily usage hours for several pieces of equipment were refined for the CalEEMod modeling as identified by PG&E in its HRA to more accurately represent onsite average equipment use hours.
- Two pieces of equipment were changed in the modeling for Phase 5A. The PG&E HRA modeling included two plate compactors that are 8 horsepower each. ESA revised the modeling for Phase 5A to instead include two rollers that are 80 horsepower each, operating for the same 4.5 hours per day as assumed in the PG&E HRA. This revision was made to ensure consistency with the equipment assumptions for Phase 5A used for the revised mass emissions that were estimated for the regional air quality analysis prepared subsequent to preparation of the PG&E HRA.

The revised PM-10 mass emission rates, exposure assessment, and health risk based on ESA’s revisions are shown below:

PM-10 exhaust emission rate from on-site construction equipment (pounds per year)	109.74
Maximum annual concentration (mg/m ³)	0.0874
Unmitigated Cancer Risk – 3 rd trimester Residential Receptor (in a million)	1.0
Unmitigated Cancer Risk – Infant (0 to 2 years) Residential Receptor (in a million)	12.2
Unmitigated Cancer Risk – Child (2 to 9 years) Residential Receptor (in a million)	1.3

Unmitigated Cancer Risk – Adult Residential Receptor (in a million)	0.3
Non-Carcinogens - Chronic: Hazard Index	0.0175

As shown above, the cancer risk for an infant residential receptor would exceed the significance threshold of 10 in one million. It was estimated that using Tier 4 Final equipment for all construction equipment greater than 180 horsepower would mitigate the risk to below the significance threshold. The horsepower cut-off level for Tier 4 equipment was arrived at by assuming the largest construction equipment to use Tier 4 engines until the estimated cancer risk value dipped below 10 in one million. Based on the construction equipment data used for the analysis, this would amount to approximately 59 percent of the construction equipment horsepower-hours needing to be met using equipment meeting the Tier 4 Final standards as summarized in the table below.

Mitigated Scenario – Percentage of Tier 4 Final Equipment Needed

Phases	Amt.	Hours/day	hp-hr	Mitigation
<i>Phase 1 - Site Preparation</i>				
Other Construction Equipment	1	10	90	---
Other Construction Equipment	1	10	200	---
<i>Phase 5A - Substation Expansion</i>				
Crane	1	0.75	173.25	Tier 4 F
Excavator	2	8	800	---
Excavator	1	3	474	---
Grader	1	1.5	280.5	Tier 4 F
Off-Highway Truck	2	1.8	1447.2	Tier 4 F
Roller	2	4.5	720	---
Rubber tired dozers	1	1.5	370.5	Tier 4 F
Scrapers	1	1.5	550.5	Tier 4 F
<i>Phase 2 - Traffic Control</i>				
Excavator	0	7	0	---
<i>Phase 5B - Substation Expansion</i>				
Aerial Lift	3	3.3	623.7	---
Air Compressor	2	2	312	---
Forklift	2	3.3	587.4	---
Generator set	1	4	336	---
Skid Steer Loader	2	4	520	---
Tractor/Loader/Backhoe	2	4	776	---
<i>Phase 5D - Substattion Expansion</i>				
Excavator	0	7	0	---
<i>Phase 5C - Substation Expansion</i>				
Excavator	0	7	0	---
<i>Phase 6 - Vierra Substation</i>				
Tractor/Loaders/backhoe	1	8	776	---
Off highway trucks	2	2	1608	Tier 4 F

Cranes	2	10	4620	Tier 4 F
Total horsepower-hours			15,265.05	
Tier 4 Final horsepower-hours			9,049.95	
Tier 4 as Percent of Total			59%	

The mitigated emission rate, exposure and health risk estimates are shown below.

Mitigated PM-10 exhaust emission rate from on-site construction equipment (pounds per year)	86.68
Mitigated Maximum annual concentration (mg/m ³)	0.069
Mitigated Cancer Risk – 3 rd trimester Residential Receptor (in a million)	0.8
Mitigated Cancer Risk – Infant (0 to 2 years) Residential Receptor (in a million)	9.6
Mitigated Cancer Risk – Child (2 to 9 years) Residential Receptor (in a million)	1.1
Mitigated Cancer Risk – Adult Residential Receptor (in a million)	0.2