

DOCKETED	
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Black Rock Geothermal Project
BRGP Construction Emissions
Table 9. Offsite, Onroad Vehicle Exhaust Emissions
April 2023

Offsite, Onroad Vehicle Exhaust CO₂ Emissions from BRGP Construc

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Onroad Delivery Trucks ^a	0.14	0.14	0.13	0.13	0.06	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.08	0.08	0.08	0.08	0.06	0.06
Material Hauling Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction Worker Commute ^b	1.98	2.45	2.53	2.42	2.22	2.16	1.57	1.45	0.58	0.34	0.20	0.18	0.15	0.12	0.00	0.00	0.00	0.00
Average Daily Offsite, Onroad Emissions (metric tons/day)	2.13	2.59	2.66	2.56	2.28	2.21	1.61	1.49	0.63	0.36	0.21	0.19	0.24	0.20	0.08	0.08	0.06	0.06
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Onroad Delivery Trucks	3.26	3.26	3.07	3.07	1.40	1.03	1.03	1.03	1.03	0.28	0.28	0.28	1.87	1.87	1.76	1.76	1.38	1.38
Material Hauling Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction Worker Commute	45.63	56.29	58.20	55.74	51.10	49.73	36.07	33.34	13.39	7.92	4.65	4.10	3.55	2.73	0.00	0.00	0.00	0.00
Total Monthly Offsite, Onroad Emissions (metric tons/month)	48.89	59.55	61.27	58.81	52.50	50.76	37.10	34.37	14.42	8.20	4.93	4.38	5.42	4.60	1.76	1.76	1.38	1.38
Total Project Offsite, Onroad Emissions (metric tons)																		

Offsite, Onroad Vehicle Exhaust N₂O Emissions from BRGP Construc

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Onroad Delivery Trucks ^a	2.21E-07	2.21E-07	2.08E-07	2.08E-07	9.52E-08	6.98E-08	6.98E-08	6.98E-08	6.98E-08	1.90E-08	1.90E-08	1.90E-08	1.27E-07	1.27E-07	1.19E-07	1.19E-07	9.40E-08	9.40E-08
Material Hauling Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Construction Worker Commute ^b	7.89E-06	9.73E-06	1.01E-05	9.64E-06	8.84E-06	8.60E-06	6.24E-06	5.76E-06	2.32E-06	1.37E-06	8.03E-07	7.09E-07	6.14E-07	4.73E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Daily Offsite, Onroad Emissions (metric tons/day)	8.11E-06	9.95E-06	1.03E-05	9.85E-06	8.93E-06	8.67E-06	6.31E-06	5.83E-06	2.39E-06	1.39E-06	8.22E-07	7.28E-07	7.41E-07	5.99E-07	1.19E-07	1.19E-07	9.40E-08	9.40E-08
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Onroad Delivery Trucks	5.08E-06	5.08E-06	4.79E-06	4.79E-06	2.19E-06	1.61E-06	1.61E-06	1.61E-06	1.61E-06	4.38E-07	4.38E-07	4.38E-07	2.92E-06	2.92E-06	2.75E-06	2.75E-06	2.16E-06	2.16E-06
Material Hauling Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Construction Worker Commute	1.81E-04	2.24E-04	2.31E-04	2.22E-04	2.03E-04	1.98E-04	1.43E-04	1.33E-04	5.33E-05	3.15E-05	1.85E-05	1.63E-05	1.41E-05	1.09E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Monthly Offsite, Onroad Emissions (metric tons/month)	1.87E-04	2.29E-04	2.36E-04	2.26E-04	2.05E-04	1.99E-04	1.45E-04	1.34E-04	5.49E-05	3.20E-05	1.89E-05	1.67E-05	1.70E-05	1.38E-05	2.75E-06	2.75E-06	2.16E-06	2.16E-06
Total Project Offsite, Onroad Emissions (metric tons)																		

Offsite, Onroad Vehicle Exhaust CH₄ Emissions from BRGP Construc

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Onroad Delivery Trucks ^a	7.26E-08	7.26E-08	6.84E-08	6.84E-08	3.13E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08	6.26E-09	6.26E-09	6.26E-09	4.17E-08	4.17E-08	3.92E-08	3.92E-08	3.09E-08	3.09E-08
Material Hauling Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Construction Worker Commute ^b	5.40E-05	6.66E-05	6.88E-05	6.59E-05	6.04E-05	5.88E-05	4.27E-05	3.94E-05	1.58E-05	9.37E-06	5.49E-06	4.85E-06	4.20E-06	3.23E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Average Daily Offsite, Onroad Emissions (metric tons/day)	5.40E-05	6.66E-05	6.89E-05	6.60E-05	6.05E-05	5.88E-05	4.27E-05	3.94E-05	1.59E-05	9.38E-06	5.50E-06	4.85E-06	4.24E-06	3.27E-06	3.92E-08	3.92E-08	3.09E-08	3.09E-08
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Onroad Delivery Trucks	1.67E-06	1.67E-06	1.57E-06	1.57E-06	7.19E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07	1.44E-07	1.44E-07	1.44E-07	9.59E-07	9.59E-07	9.02E-07	9.02E-07	7.10E-07	7.10E-07
Material Hauling Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Construction Worker Commute	1.24E-03	1.53E-03	1.58E-03	1.52E-03	1.39E-03	1.35E-03	9.81E-04	9.07E-04	3.64E-04	2.16E-04	1.26E-04	1.11E-04	9.66E-05	7.43E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total Monthly Offsite, Onroad Emissions (metric tons/month)	1.24E-03	1.53E-03	1.58E-03	1.52E-03	1.39E-03	1.35E-03	9.82E-04	9.07E-04	3.65E-04	2.16E-04	1.26E-04	1.12E-04	9.76E-05	7.53E-05	9.02E-07	9.02E-07	7.10E-07	7.10E-07
Total Project Offsite, Onroad Emissions (metric tons)																		

Notes:
^a Onroad Delivery Trucks include information provided by the Applicant's e
^b Assumed 1 commute per 1 worker; number of workers traveling to both c
^c Working days per month were provided by the Applicant's engineering c
^d PM₁₀ and PM_{2.5} Emissions include emissions from exhaust, paved roads

Onroad Construction Vehicle Activity for BRGP Construction

Vehicle Type
Onroad Delivery Trucks ^b
Material Hauling Trucks ^c
Construction Worker Commute ^d

Notes:
^a Number of work days per month provided by the Applicant's engineering
^b Delivery trucks assumed to be "Vendor Trucks" per Section 4.6.2 of App
^c Roundtrip miles/day for Material Hauling Trucks taken from Section 4.6.2
^d Roundtrip miles/day for Construction Worker Commute taken from Table

Black Rock Geothermal Project
BRGP Construction Emissions
Table 10. Onsite, Onroad Vehicle Idling Emissions
April 2023

Onsite, Onroad Vehicle Idling CO Emissions from BRGP Construction																		
Vehicle Type	CO Emissions (lb/day)													2025				
	2024													2025				
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	1.6E-03	2.6E-03	5.7E-03	8.7E-03	1.5E-02	1.5E-02	1.6E-02	2.3E-02	2.7E-02	2.7E-02	3.4E-02	3.8E-02	4.4E-02	4.0E-02	4.0E-02	4.3E-02	4.3E-02	4.0E-02
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.2E-03	6.4E-03	1.7E-02	1.6E-02	1.0E-02	6.4E-03	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	1.6E-03	2.6E-03	5.7E-03	8.7E-03	1.5E-02	1.5E-02	1.6E-02	2.3E-02	2.7E-02	2.7E-02	3.4E-02	4.1E-02	5.1E-02	5.7E-02	5.6E-02	5.3E-02	5.0E-02	4.0E-02
Vehicle Type	CO Emissions (lb/month) ^b													2025				
	2024													2025				
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	3.8E-02	5.9E-02	1.3E-01	2.0E-01	3.4E-01	3.4E-01	3.8E-01	5.2E-01	6.2E-01	6.2E-01	7.8E-01	8.8E-01	1.0E+00	9.2E-01	9.2E-01	9.9E-01	9.9E-01	9.2E-01
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E-02	1.5E-01	3.8E-01	3.7E-01	2.4E-01	1.5E-01	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	3.8E-02	5.9E-02	1.3E-01	2.0E-01	3.4E-01	3.4E-01	3.8E-01	5.2E-01	6.2E-01	6.2E-01	7.8E-01	9.5E-01	1.2E+00	1.3E+00	1.3E+00	1.2E+00	1.1E+00	9.2E-01
Total Project Onsite, Onroad Emissions (tons)	9.7E-03																	

Onsite, Onroad Vehicle Idling VOC Emissions from BRGP Construction																		
Vehicle Type	VOC Emissions (lb/day)													2025				
	2024													2025				
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	1.0E-04	1.6E-04	3.5E-04	5.3E-04	9.1E-04	9.1E-04	1.0E-03	1.4E-03	1.6E-03	1.6E-03	2.1E-03	2.3E-03	2.7E-03	2.5E-03	2.5E-03	2.6E-03	2.6E-03	2.4E-03
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.2E-04	4.4E-04	1.1E-03	1.1E-03	7.0E-04	4.4E-04	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	1.0E-04	1.6E-04	3.5E-04	5.3E-04	9.1E-04	9.1E-04	1.0E-03	1.4E-03	1.6E-03	1.6E-03	2.1E-03	2.5E-03	3.1E-03	3.6E-03	3.5E-03	3.3E-03	3.1E-03	2.4E-03
Vehicle Type	VOC Emissions (lb/month) ^b													2025				
	2024													2025				
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	2.3E-03	3.6E-03	8.0E-03	1.2E-02	2.1E-02	2.1E-02	2.3E-02	3.2E-02	3.8E-02	3.8E-02	4.8E-02	5.4E-02	6.2E-02	5.6E-02	5.6E-02	6.1E-02	6.1E-02	5.6E-02
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.0E-03	1.0E-02	2.6E-02	2.5E-02	1.6E-02	1.0E-02	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	2.3E-03	3.6E-03	8.0E-03	1.2E-02	2.1E-02	2.1E-02	2.3E-02	3.2E-02	3.8E-02	3.8E-02	4.8E-02	5.9E-02	7.2E-02	8.2E-02	8.1E-02	7.7E-02	7.1E-02	5.6E-02
Total Project Onsite, Onroad Emissions (tons)	6.0E-04																	

Onsite, Onroad Vehicle Idling SO _x Emissions from BRGP Construction																		
Vehicle Type	SO _x Emissions (lb/day)													2025				
	2024													2025				
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	3.0E-06	4.7E-06	1.0E-05	1.6E-05	2.7E-05	2.7E-05	3.0E-05	4.1E-05	4.9E-05	4.9E-05	6.2E-05	7.0E-05	8.1E-05	7.3E-05	7.3E-05	7.9E-05	7.9E-05	7.3E-05
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.8E-06	9.5E-06	2.5E-05	2.4E-05	1.5E-05	9.5E-06	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	3.0E-06	4.7E-06	1.0E-05	1.6E-05	2.7E-05	2.7E-05	3.0E-05	4.1E-05	4.9E-05	4.9E-05	6.2E-05	7.4E-05	9.0E-05	9.8E-05	9.7E-05	9.4E-05	8.8E-05	7.3E-05
Vehicle Type	SO _x Emissions (lb/month) ^b													2025				
	2024													2025				
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	6.9E-05	1.1E-04	2.4E-04	3.7E-04	6.3E-04	6.3E-04	6.9E-04	9.5E-04	1.1E-03	1.1E-03	1.4E-03	1.6E-03	1.9E-03	1.7E-03	1.7E-03	1.8E-03	1.8E-03	1.7E-03
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-04	2.2E-04	5.7E-04	5.5E-04	3.5E-04	2.2E-04	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	6.9E-05	1.1E-04	2.4E-04	3.7E-04	6.3E-04	6.3E-04	6.9E-04	9.5E-04	1.1E-03	1.1E-03	1.4E-03	1.7E-03	2.1E-03	2.3E-03	2.2E-03	2.2E-03	2.0E-03	1.7E-03
Total Project Onsite, Onroad Emissions (tons)	1.7E-05																	

Black Rock Geothermal Project
BRGP Construction Emissions
Table 10. Onsite, Onroad Vehicle Idling Emissions
April 2023

Onsite, Onroad Vehicle Idling CO Emissions from BRGP Constructio

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Delivery Trucks ^a	3.6E-02	3.6E-02	3.4E-02	3.4E-02	1.5E-02	1.1E-02	1.1E-02	1.1E-02	1.1E-02	3.1E-03	3.1E-03	3.1E-03	2.1E-02	2.1E-02	1.9E-02	1.9E-02	1.5E-02	1.5E-02
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	3.6E-02	3.6E-02	3.4E-02	3.4E-02	1.5E-02	1.1E-02	1.1E-02	1.1E-02	1.1E-02	3.1E-03	3.1E-03	3.1E-03	2.1E-02	2.1E-02	1.9E-02	1.9E-02	1.5E-02	1.5E-02
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Delivery Trucks ^a	8.2E-01	8.2E-01	7.8E-01	7.8E-01	3.5E-01	2.6E-01	2.6E-01	2.6E-01	2.6E-01	7.1E-02	7.1E-02	7.1E-02	4.7E-01	4.7E-01	4.4E-01	4.4E-01	3.5E-01	3.5E-01
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	8.2E-01	8.2E-01	7.8E-01	7.8E-01	3.5E-01	2.6E-01	2.6E-01	2.6E-01	2.6E-01	7.1E-02	7.1E-02	7.1E-02	4.7E-01	4.7E-01	4.4E-01	4.4E-01	3.5E-01	3.5E-01
Total Project Onsite, Onroad Emissions (tons)																		

Onsite, Onroad Vehicle Idling VOC Emissions from BRGP Construct

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Delivery Trucks ^a	2.2E-03	2.2E-03	2.1E-03	2.1E-03	9.4E-04	6.9E-04	6.9E-04	6.9E-04	6.9E-04	1.9E-04	1.9E-04	1.9E-04	1.3E-03	1.3E-03	1.2E-03	1.2E-03	9.3E-04	9.3E-04
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	2.2E-03	2.2E-03	2.1E-03	2.1E-03	9.4E-04	6.9E-04	6.9E-04	6.9E-04	6.9E-04	1.9E-04	1.9E-04	1.9E-04	1.3E-03	1.3E-03	1.2E-03	1.2E-03	9.3E-04	9.3E-04
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Delivery Trucks ^a	5.0E-02	5.0E-02	4.7E-02	4.7E-02	2.2E-02	1.6E-02	1.6E-02	1.6E-02	1.6E-02	4.3E-03	4.3E-03	4.3E-03	2.9E-02	2.9E-02	2.7E-02	2.7E-02	2.1E-02	2.1E-02
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	5.0E-02	5.0E-02	4.7E-02	4.7E-02	2.2E-02	1.6E-02	1.6E-02	1.6E-02	1.6E-02	4.3E-03	4.3E-03	4.3E-03	2.9E-02	2.9E-02	2.7E-02	2.7E-02	2.1E-02	2.1E-02
Total Project Onsite, Onroad Emissions (tons)																		

Onsite, Onroad Vehicle Idling SO_x Emissions from BRGP Constructi

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Delivery Trucks ^a	6.5E-05	6.5E-05	6.2E-05	6.2E-05	2.8E-05	2.1E-05	2.1E-05	2.1E-05	2.1E-05	5.6E-06	5.6E-06	5.6E-06	3.8E-05	3.8E-05	3.5E-05	3.5E-05	2.8E-05	2.8E-05
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	6.5E-05	6.5E-05	6.2E-05	6.2E-05	2.8E-05	2.1E-05	2.1E-05	2.1E-05	2.1E-05	5.6E-06	5.6E-06	5.6E-06	3.8E-05	3.8E-05	3.5E-05	3.5E-05	2.8E-05	2.8E-05
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
Delivery Trucks ^a	1.5E-03	1.5E-03	1.4E-03	1.4E-03	6.5E-04	4.8E-04	4.8E-04	4.8E-04	4.8E-04	1.3E-04	1.3E-04	1.3E-04	8.6E-04	8.6E-04	8.1E-04	8.1E-04	6.4E-04	6.4E-04
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	1.5E-03	1.5E-03	1.4E-03	1.4E-03	6.5E-04	4.8E-04	4.8E-04	4.8E-04	4.8E-04	1.3E-04	1.3E-04	1.3E-04	8.6E-04	8.6E-04	8.1E-04	8.1E-04	6.4E-04	6.4E-04
Total Project Onsite, Onroad Emissions (tons)																		

Black Rock Geothermal Project
BRGP Construction Emissions
Table 10. Onsite, Onroad Vehicle Idling Emissions
April 2023

Onsite, Onroad Vehicle Idling NO _x Emissions from BRGP Construction																		
Vehicle Type	NO _x Emissions (lb/day)																	
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	1.8E-03	2.8E-03	6.2E-03	9.6E-03	1.6E-02	1.6E-02	1.8E-02	2.5E-02	2.9E-02	2.9E-02	3.7E-02	4.2E-02	4.9E-02	4.4E-02	4.4E-02	4.8E-02	4.8E-02	4.4E-02
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.6E-03	5.2E-03	1.3E-02	1.3E-02	8.3E-03	5.2E-03	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	1.8E-03	2.8E-03	6.2E-03	9.6E-03	1.6E-02	1.6E-02	1.8E-02	2.5E-02	2.9E-02	2.9E-02	3.7E-02	4.4E-02	5.4E-02	5.8E-02	5.7E-02	5.6E-02	5.3E-02	4.4E-02
Vehicle Type	NO _x Emissions (lb/month) ^b																	
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	4.2E-02	6.5E-02	1.4E-01	2.2E-01	3.8E-01	3.8E-01	4.2E-01	5.7E-01	6.8E-01	6.8E-01	8.6E-01	9.6E-01	1.1E+00	1.0E+00	1.0E+00	1.1E+00	1.1E+00	1.0E+00
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.9E-02	1.2E-01	3.1E-01	3.0E-01	1.9E-01	1.2E-01	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	4.2E-02	6.5E-02	1.4E-01	2.2E-01	3.8E-01	3.8E-01	4.2E-01	5.7E-01	6.8E-01	6.8E-01	8.6E-01	1.0E+00	1.2E+00	1.3E+00	1.3E+00	1.3E+00	1.2E+00	1.0E+00
Total Project Onsite, Onroad Emissions (tons)	1.0E-02																	

Onsite, Onroad Vehicle Idling PM ₁₀ Emissions from BRGP Construction																		
Vehicle Type	PM ₁₀ Emissions (lb/day)																	
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	2.4E-06	3.8E-06	8.3E-06	1.3E-05	2.2E-05	2.2E-05	2.4E-05	3.3E-05	3.9E-05	3.9E-05	5.0E-05	5.6E-05	6.5E-05	5.9E-05	5.9E-05	6.4E-05	6.4E-05	5.9E-05
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-06	2.2E-06	5.7E-06	5.5E-06	3.5E-06	2.2E-06	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	2.4E-06	3.8E-06	8.3E-06	1.3E-05	2.2E-05	2.2E-05	2.4E-05	3.3E-05	3.9E-05	3.9E-05	5.0E-05	5.7E-05	6.7E-05	6.5E-05	6.5E-05	6.7E-05	6.6E-05	5.9E-05
Vehicle Type	PM ₁₀ Emissions (lb/month) ^b																	
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	5.6E-05	8.7E-05	1.9E-04	3.0E-04	5.1E-04	5.1E-04	5.6E-04	7.7E-04	9.1E-04	9.1E-04	1.2E-03	1.3E-03	1.5E-03	1.4E-03	1.4E-03	1.5E-03	1.5E-03	1.4E-03
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.5E-05	5.0E-05	1.3E-04	1.3E-04	8.1E-05	5.0E-05	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	5.6E-05	8.7E-05	1.9E-04	3.0E-04	5.1E-04	5.1E-04	5.6E-04	7.7E-04	9.1E-04	9.1E-04	1.2E-03	1.3E-03	1.5E-03	1.5E-03	1.5E-03	1.5E-03	1.5E-03	1.4E-03
Total Project Onsite, Onroad Emissions (tons)	1.4E-05																	

Onsite, Onroad Vehicle Idling PM _{2.5} Emissions from BRGP Construction																		
Vehicle Type	PM _{2.5} Emissions (lb/day)																	
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	2.3E-06	3.6E-06	8.0E-06	1.2E-05	2.1E-05	2.1E-05	2.3E-05	3.2E-05	3.8E-05	3.8E-05	4.8E-05	5.4E-05	6.2E-05	5.7E-05	5.7E-05	6.1E-05	6.1E-05	5.6E-05
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.0E-06	2.1E-06	5.5E-06	5.2E-06	3.4E-06	2.1E-06	0.0E+00
Total Daily Onsite, Onroad Emissions (lb/day)	2.3E-06	3.6E-06	8.0E-06	1.2E-05	2.1E-05	2.1E-05	2.3E-05	3.2E-05	3.8E-05	3.8E-05	4.8E-05	5.5E-05	6.4E-05	6.2E-05	6.2E-05	6.4E-05	6.3E-05	5.6E-05
Vehicle Type	PM _{2.5} Emissions (lb/month) ^b																	
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	5.3E-05	8.3E-05	1.8E-04	2.8E-04	4.8E-04	4.8E-04	5.3E-04	7.3E-04	8.7E-04	8.7E-04	1.1E-03	1.2E-03	1.4E-03	1.3E-03	1.3E-03	1.4E-03	1.4E-03	1.3E-03
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.4E-05	4.8E-05	1.3E-04	1.2E-04	7.7E-05	4.8E-05	0.0E+00
Total Monthly Oniste, Onroad Emissions (lb/month)	5.3E-05	8.3E-05	1.8E-04	2.8E-04	4.8E-04	4.8E-04	5.3E-04	7.3E-04	8.7E-04	8.7E-04	1.1E-03	1.3E-03	1.5E-03	1.4E-03	1.4E-03	1.5E-03	1.4E-03	1.3E-03
Total Project Onsite, Onroad Emissions (tons)	1.3E-05																	

Black Rock Geothermal Project
BRGP Construction Emissions
Table 10. Onsite, Onroad Vehicle Idling Emissions
April 2023

Onsite, Onroad Vehicle Idling NO_x Emissions from BRGP Constructi

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	3.9E-02	3.9E-02	3.7E-02	3.7E-02	1.7E-02	1.2E-02	1.2E-02	1.2E-02	1.2E-02	3.4E-03	3.4E-03	3.4E-03	2.3E-02	2.3E-02	2.1E-02	2.1E-02	1.7E-02	1.7E-02
Delivery Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material Hauling Trucks ^a	Total Daily Onsite, Onroad Emissions (lb/day)																	
	3.9E-02	3.9E-02	3.7E-02	3.7E-02	1.7E-02	1.2E-02	1.2E-02	1.2E-02	1.2E-02	3.4E-03	3.4E-03	3.4E-03	2.3E-02	2.3E-02	2.1E-02	2.1E-02	1.7E-02	1.7E-02
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	9.1E-01	9.1E-01	8.5E-01	8.5E-01	3.9E-01	2.9E-01	2.9E-01	2.9E-01	2.9E-01	7.8E-02	7.8E-02	7.8E-02	5.2E-01	5.2E-01	4.9E-01	4.9E-01	3.9E-01	3.9E-01
Delivery Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material Hauling Trucks ^a	Total Monthly Oniste, Onroad Emissions (lb/month)																	
	9.1E-01	9.1E-01	8.5E-01	8.5E-01	3.9E-01	2.9E-01	2.9E-01	2.9E-01	2.9E-01	7.8E-02	7.8E-02	7.8E-02	5.2E-01	5.2E-01	4.9E-01	4.9E-01	3.9E-01	3.9E-01
Total Project Onsite, Onroad Emissions (tons)																		

Onsite, Onroad Vehicle Idling PM₁₀ Emissions from BRGP Construct

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	5.3E-05	5.3E-05	5.0E-05	5.0E-05	2.3E-05	1.7E-05	1.7E-05	1.7E-05	1.7E-05	4.5E-06	4.5E-06	4.5E-06	3.0E-05	3.0E-05	2.8E-05	2.8E-05	2.2E-05	2.2E-05
Delivery Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material Hauling Trucks ^a	Total Daily Onsite, Onroad Emissions (lb/day)																	
	5.3E-05	5.3E-05	5.0E-05	5.0E-05	2.3E-05	1.7E-05	1.7E-05	1.7E-05	1.7E-05	4.5E-06	4.5E-06	4.5E-06	3.0E-05	3.0E-05	2.8E-05	2.8E-05	2.2E-05	2.2E-05
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	1.2E-03	1.2E-03	1.1E-03	1.1E-03	5.2E-04	3.8E-04	3.8E-04	3.8E-04	3.8E-04	1.0E-04	1.0E-04	1.0E-04	7.0E-04	7.0E-04	6.6E-04	6.6E-04	5.2E-04	5.2E-04
Delivery Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material Hauling Trucks ^a	Total Monthly Oniste, Onroad Emissions (lb/month)																	
	1.2E-03	1.2E-03	1.1E-03	1.1E-03	5.2E-04	3.8E-04	3.8E-04	3.8E-04	3.8E-04	1.0E-04	1.0E-04	1.0E-04	7.0E-04	7.0E-04	6.6E-04	6.6E-04	5.2E-04	5.2E-04
Total Project Onsite, Onroad Emissions (tons)																		

Onsite, Onroad Vehicle Idling PM_{2.5} Emissions from BRGP Construc

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	5.0E-05	5.0E-05	4.8E-05	4.8E-05	2.2E-05	1.6E-05	1.6E-05	1.6E-05	1.6E-05	4.4E-06	4.4E-06	4.4E-06	2.9E-05	2.9E-05	2.7E-05	2.7E-05	2.1E-05	2.1E-05
Delivery Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material Hauling Trucks ^a	Total Daily Onsite, Onroad Emissions (lb/day)																	
	5.0E-05	5.0E-05	4.8E-05	4.8E-05	2.2E-05	1.6E-05	1.6E-05	1.6E-05	1.6E-05	4.4E-06	4.4E-06	4.4E-06	2.9E-05	2.9E-05	2.7E-05	2.7E-05	2.1E-05	2.1E-05
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	1.2E-03	1.2E-03	1.1E-03	1.1E-03	5.0E-04	3.7E-04	3.7E-04	3.7E-04	3.7E-04	1.0E-04	1.0E-04	1.0E-04	6.7E-04	6.7E-04	6.3E-04	6.3E-04	4.9E-04	4.9E-04
Delivery Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material Hauling Trucks ^a	Total Monthly Oniste, Onroad Emissions (lb/month)																	
	1.2E-03	1.2E-03	1.1E-03	1.1E-03	5.0E-04	3.7E-04	3.7E-04	3.7E-04	3.7E-04	1.0E-04	1.0E-04	1.0E-04	6.7E-04	6.7E-04	6.3E-04	6.3E-04	4.9E-04	4.9E-04
Total Project Onsite, Onroad Emissions (tons)																		

Black Rock Geothermal Project
BRGP Construction Emissions
Table 10. Onsite, Onroad Vehicle Idling Emissions
April 2023

Onsite, Onroad Vehicle Idling CO₂ Emissions from BRGP Construction

Vehicle Type	CO ₂ Emissions (metric tons/day)												2025					
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	1.4E-04	2.2E-04	4.9E-04	7.6E-04	1.3E-03	1.3E-03	1.4E-03	2.0E-03	2.3E-03	2.3E-03	2.9E-03	3.3E-03	3.8E-03	3.5E-03	3.5E-03	3.8E-03	3.8E-03	3.5E-03
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.3E-04	4.5E-04	1.2E-03	1.1E-03	7.2E-04	4.5E-04	0.0E+00
Total Daily Onsite, Onroad Emissions (metric tons/day)	1.4E-04	2.2E-04	4.9E-04	7.6E-04	1.3E-03	1.3E-03	1.4E-03	2.0E-03	2.3E-03	2.3E-03	2.9E-03	3.5E-03	4.3E-03	4.7E-03	4.6E-03	4.5E-03	4.2E-03	3.5E-03
Vehicle Type	CO ₂ Emissions (metric tons/month) ^b												2025					
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	3.3E-03	5.1E-03	1.1E-02	1.7E-02	3.0E-02	3.0E-02	3.3E-02	4.5E-02	5.3E-02	5.3E-02	6.8E-02	7.6E-02	8.8E-02	8.0E-02	8.0E-02	8.6E-02	8.6E-02	8.0E-02
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.2E-03	1.0E-02	2.7E-02	2.6E-02	1.7E-02	1.0E-02	0.0E+00
Total Monthly Onsite, Onroad Emissions (metric tons/month)	3.3E-03	5.1E-03	1.1E-02	1.7E-02	3.0E-02	3.0E-02	3.3E-02	4.5E-02	5.3E-02	5.3E-02	6.8E-02	8.1E-02	9.9E-02	1.1E-01	1.1E-01	1.0E-01	9.7E-02	8.0E-02
Total Project Oniste, Onroad Emissions (metric tons)	1.66																	

Onsite, Onroad Vehicle Idling CH₄ Emissions from BRGP Construction

Vehicle Type	CH ₄ Emissions (metric tons/day)												2025					
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	2.1E-09	3.3E-09	7.3E-09	1.1E-08	1.9E-08	1.9E-08	2.1E-08	2.9E-08	3.4E-08	3.4E-08	4.4E-08	4.9E-08	5.7E-08	5.2E-08	5.2E-08	5.6E-08	5.6E-08	5.1E-08
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.6E-09	9.2E-09	2.4E-08	2.3E-08	1.5E-08	9.2E-09	0.0E+00
Total Daily Onsite, Onroad Emissions (metric tons/day)	2.1E-09	3.3E-09	7.3E-09	1.1E-08	1.9E-08	1.9E-08	2.1E-08	2.9E-08	3.4E-08	3.4E-08	4.4E-08	5.4E-08	6.6E-08	7.6E-08	7.5E-08	7.0E-08	6.5E-08	5.1E-08
Vehicle Type	CH ₄ Emissions (metric tons/month) ^b												2025					
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	4.9E-08	7.6E-08	1.7E-07	2.6E-07	4.4E-07	4.4E-07	4.9E-07	6.7E-07	7.9E-07	7.9E-07	1.0E-06	1.1E-06	1.3E-06	1.2E-06	1.2E-06	1.3E-06	1.3E-06	1.2E-06
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-07	2.1E-07	5.5E-07	5.3E-07	3.4E-07	2.1E-07	0.0E+00
Total Monthly Onsite, Onroad Emissions (metric tons/month)	4.9E-08	7.6E-08	1.7E-07	2.6E-07	4.4E-07	4.4E-07	4.9E-07	6.7E-07	7.9E-07	7.9E-07	1.0E-06	1.2E-06	1.5E-06	1.7E-06	1.7E-06	1.6E-06	1.5E-06	1.2E-06
Total Project Oniste, Onroad Emissions (metric tons)	2.5E-05																	

Onsite, Onroad Vehicle Idling N₂O Emissions from BRGP Construction

Vehicle Type	N ₂ O Emissions (metric tons/day)												2025					
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	2.9E-10	4.6E-10	1.0E-09	1.6E-09	2.7E-09	2.7E-09	2.9E-09	4.0E-09	4.8E-09	4.8E-09	6.0E-09	6.8E-09	7.9E-09	7.1E-09	7.1E-09	7.7E-09	7.7E-09	7.1E-09
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.1E-10	1.4E-09	3.7E-09	3.5E-09	2.3E-09	1.4E-09	0.0E+00
Total Daily Onsite, Onroad Emissions (metric tons/day)	2.9E-10	4.6E-10	1.0E-09	1.6E-09	2.7E-09	2.7E-09	2.9E-09	4.0E-09	4.8E-09	4.8E-09	6.0E-09	7.5E-09	9.3E-09	1.1E-08	1.1E-08	9.9E-09	9.1E-09	7.1E-09
Vehicle Type	N ₂ O Emissions (metric tons/month) ^b												2025					
	2024												2025					
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Delivery Trucks ^a	6.7E-09	1.1E-08	2.3E-08	3.6E-08	6.1E-08	6.1E-08	6.7E-08	9.3E-08	1.1E-07	1.1E-07	1.4E-07	1.6E-07	1.8E-07	1.6E-07	1.6E-07	1.8E-07	1.8E-07	1.6E-07
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.6E-08	3.3E-08	8.5E-08	8.1E-08	5.2E-08	3.3E-08	0.0E+00
Total Monthly Onsite, Onroad Emissions (metric tons/month)	6.7E-09	1.1E-08	2.3E-08	3.6E-08	6.1E-08	6.1E-08	6.7E-08	9.3E-08	1.1E-07	1.1E-07	1.4E-07	1.7E-07	2.1E-07	2.5E-07	2.5E-07	2.3E-07	2.1E-07	1.6E-07
Total Project Oniste, Onroad Emissions (metric tons)	3.5E-06																	

Notes:

^a It is assumed that, upon traveling to the site, haul trucks and delivery trucks can idle up to 5 minutes for loading/unloading before leaving the site. This equates to: 0.083 idle-hrs/day.

^b Per information provided by the Applicant's engineering contractor, it is assumed that there are 23 working days per month.

Black Rock Geothermal Project
BRGP Construction Emissions
Table 10. Onsite, Onroad Vehicle Idling Emissions
April 2023

Onsite, Onroad Vehicle Idling CO₂ Emissions from BRGP Constructi

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	3.1E-03	3.1E-03	2.9E-03	2.9E-03	1.3E-03	9.8E-04	9.8E-04	9.8E-04	9.8E-04	2.7E-04	2.7E-04	2.7E-04	1.8E-03	1.8E-03	1.7E-03	1.7E-03	1.3E-03	1.3E-03
Delivery Trucks ^a	3.1E-03	3.1E-03	2.9E-03	2.9E-03	1.3E-03	9.8E-04	9.8E-04	9.8E-04	9.8E-04	2.7E-04	2.7E-04	2.7E-04	1.8E-03	1.8E-03	1.7E-03	1.7E-03	1.3E-03	1.3E-03
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Daily Onsite, Onroad Emissions (metric tons/day)	3.1E-03	3.1E-03	2.9E-03	2.9E-03	1.3E-03	9.8E-04	9.8E-04	9.8E-04	9.8E-04	2.7E-04	2.7E-04	2.7E-04	1.8E-03	1.8E-03	1.7E-03	1.7E-03	1.3E-03	1.3E-03
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	7.2E-02	7.2E-02	6.7E-02	6.7E-02	3.1E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	6.2E-03	6.2E-03	6.2E-03	4.1E-02	4.1E-02	3.9E-02	3.9E-02	3.0E-02	3.0E-02
Delivery Trucks ^a	7.2E-02	7.2E-02	6.7E-02	6.7E-02	3.1E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	6.2E-03	6.2E-03	6.2E-03	4.1E-02	4.1E-02	3.9E-02	3.9E-02	3.0E-02	3.0E-02
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Monthly Onsite, Onroad Emissions (metric tons/month)	7.2E-02	7.2E-02	6.7E-02	6.7E-02	3.1E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	6.2E-03	6.2E-03	6.2E-03	4.1E-02	4.1E-02	3.9E-02	3.9E-02	3.0E-02	3.0E-02
Total Project Oniste, Onroad Emissions (metric tons)																		

Onsite, Onroad Vehicle Idling CH₄ Emissions from BRGP Constructi

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	4.6E-08	4.6E-08	4.3E-08	4.3E-08	2.0E-08	1.5E-08	1.5E-08	1.5E-08	1.5E-08	4.0E-09	4.0E-09	4.0E-09	2.7E-08	2.7E-08	2.5E-08	2.5E-08	2.0E-08	2.0E-08
Delivery Trucks ^a	4.6E-08	4.6E-08	4.3E-08	4.3E-08	2.0E-08	1.5E-08	1.5E-08	1.5E-08	1.5E-08	4.0E-09	4.0E-09	4.0E-09	2.7E-08	2.7E-08	2.5E-08	2.5E-08	2.0E-08	2.0E-08
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Daily Onsite, Onroad Emissions (metric tons/day)	4.6E-08	4.6E-08	4.3E-08	4.3E-08	2.0E-08	1.5E-08	1.5E-08	1.5E-08	1.5E-08	4.0E-09	4.0E-09	4.0E-09	2.7E-08	2.7E-08	2.5E-08	2.5E-08	2.0E-08	2.0E-08
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	1.1E-06	1.1E-06	1.0E-06	1.0E-06	4.6E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	9.1E-08	9.1E-08	9.1E-08	6.1E-07	6.1E-07	5.7E-07	5.7E-07	4.5E-07	4.5E-07
Delivery Trucks ^a	1.1E-06	1.1E-06	1.0E-06	1.0E-06	4.6E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	9.1E-08	9.1E-08	9.1E-08	6.1E-07	6.1E-07	5.7E-07	5.7E-07	4.5E-07	4.5E-07
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Monthly Onsite, Onroad Emissions (metric tons/month)	1.1E-06	1.1E-06	1.0E-06	1.0E-06	4.6E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	9.1E-08	9.1E-08	9.1E-08	6.1E-07	6.1E-07	5.7E-07	5.7E-07	4.5E-07	4.5E-07
Total Project Oniste, Onroad Emissions (metric tons)																		

Onsite, Onroad Vehicle Idling N₂O Emissions from BRGP Constructi

Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	6.4E-09	6.4E-09	6.0E-09	6.0E-09	2.7E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	5.5E-10	5.5E-10	5.5E-10	3.7E-09	3.7E-09	3.4E-09	3.4E-09	2.7E-09	2.7E-09
Delivery Trucks ^a	6.4E-09	6.4E-09	6.0E-09	6.0E-09	2.7E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	5.5E-10	5.5E-10	5.5E-10	3.7E-09	3.7E-09	3.4E-09	3.4E-09	2.7E-09	2.7E-09
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Daily Onsite, Onroad Emissions (metric tons/day)	6.4E-09	6.4E-09	6.0E-09	6.0E-09	2.7E-09	2.0E-09	2.0E-09	2.0E-09	2.0E-09	5.5E-10	5.5E-10	5.5E-10	3.7E-09	3.7E-09	3.4E-09	3.4E-09	2.7E-09	2.7E-09
Vehicle Type	2026																	
	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	1.5E-07	1.5E-07	1.4E-07	1.4E-07	6.3E-08	4.6E-08	4.6E-08	4.6E-08	4.6E-08	1.3E-08	1.3E-08	1.3E-08	8.4E-08	8.4E-08	7.9E-08	7.9E-08	6.2E-08	6.2E-08
Delivery Trucks ^a	1.5E-07	1.5E-07	1.4E-07	1.4E-07	6.3E-08	4.6E-08	4.6E-08	4.6E-08	4.6E-08	1.3E-08	1.3E-08	1.3E-08	8.4E-08	8.4E-08	7.9E-08	7.9E-08	6.2E-08	6.2E-08
Material Hauling Trucks ^a	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total Monthly Onsite, Onroad Emissions (metric tons/month)	1.5E-07	1.5E-07	1.4E-07	1.4E-07	6.3E-08	4.6E-08	4.6E-08	4.6E-08	4.6E-08	1.3E-08	1.3E-08	1.3E-08	8.4E-08	8.4E-08	7.9E-08	7.9E-08	6.2E-08	6.2E-08
Total Project Oniste, Onroad Emissions (metric tons)																		

Notes:
^a It is assumed that, upon traveling to the site, haul trucks and delivery trucks will be idling.
^b Per information provided by the Applicant's engineering contractor, it is assumed that the idling emissions for the trucks are negligible.

Black Rock Geothermal Project

BRGP Construction Emissions

Table 11. Equations Used to Calculate Criteria Pollutant and GHG Emissions

April 2023

Equations Used to Calculate Emissions from BRGP Construction

Emission Source	Pollutants	Equations	Variables
Construction Equipment Exhaust	CO, VOC, NO _x , SO _x , PM ₁₀ , and PM _{2.5}	$E_m = EF \times N \times Hp \times L \times H / 453.6$	E _m = Monthly Emissions (lb/month) EF = Emission factor (g/bhp-hr) N = Number of pieces of equipment Hp = Average horsepower L = Average load factor H = Hours per month 453.6 = Conversion from g to lb
		$E_d = E_m / D$	E _d = Daily Emissions (lb/day) E _m = Monthly Emissions (lb/month) D = Number of construction days per month
		$E_t = \Sigma E_m / 2,000$	E _t = Total Project Emissions (tons) E _m = Monthly Emissions (lb/month) 2,000 = Conversion from lb to tons
	CO ₂ , CH ₄ and N ₂ O	$E_m = EF \times N \times Hp \times L \times H / 1000 \times 0.001$	E _m = Monthly Emissions (metric tons/month) EF = Emission factor (g/bhp-hr) N = Number of pieces of equipment Hp = Average horsepower L = Average load factor H = Hours per month 1,000 = Conversion from g to kg 0.001 = Conversion from kg to metric tons
		$E_d = E_m / D$	E _d = Daily Emissions (metric tons/day) E _m = Emissions (metric tons/month) D = Number of construction days per month
		$E_t = \Sigma E_m$	E _m = Emissions (metric tons/month) E _t = Total Project Emissions (metric tons)
	CO, VOC, NO _x , SO _x , PM ₁₀ , and PM _{2.5}	$E_d = N \times VMT \times EF / 453.6$	E _d = Daily Emissions (lb/day) N = Number of vehicles VMT = Vehicle miles traveled per day (miles/day) EF = EMFAC2021 emission factor (g/mile). Paved and unpaved road fugitive PM ₁₀ and PM _{2.5} emission factors calculated per Section 5.1.4 of Appendix C of the CalEEMod User's Guide (ICF 2022). 453.6 = Conversion from g to lb
		$E_m = E_d \times D$	E _m = Monthly Emissions (lb/month) E _d = Daily Emissions (lb/day) D = Number of construction days per month
		$E_t = \Sigma E_m / 2,000$	E _t = Total Project Emissions (tons) E _m = Monthly Emissions (lb/month) 2,000 = Conversion from lb to tons
	CO ₂ , CH ₄ , and N ₂ O	$E_d = N \times VMT \times EF / 1000 \times 0.001$	E _d = Daily Emissions (metric tons/day) N = Number of vehicles VMT = Vehicle miles traveled per day (miles/day) EF = EMFAC2021 emission factor (g/mile). 1,000 = Conversion from g to kg 0.001 = Conversion from kg to metric tons
		$E_m = E_d \times D$	E _m = Monthly Emissions (metric tons/month) E _d = Daily Emissions (metric tons/day) D = Number of construction days per month
		$E_t = \Sigma E_m / 2,000$	E _t = Total Project Emissions (metric tons) E _m = Monthly Emissions (metric tons/month)
Vehicle Idling	CO, VOC, NO _x , SO _x , PM ₁₀ , and PM _{2.5}	$E_d = N \times I \times EF / 453.6$	E _d = Daily Emissions (lb/day) N = Number of vehicles I = Idle time per vehicle per day (idle-hr/day) EF = EMFAC2021 emission factor (g/idle-hr) 453.6 = Conversion from g to lb
		$E_m = E_d \times D$	E _m = Monthly Emissions (lb/month) E _d = Daily Emissions (lb/day) D = Number of construction days per month
		$E_t = \Sigma E_m / 2,000$	E _t = Total Project Emissions (tons) E _m = Monthly Emissions (lb/month) 2,000 = Conversion from lb to tons
	N ₂ O, CO ₂ and CH ₄	$E_d = N \times I \times EF / 1,000 \times 0.001$	E _d = Daily Emissions (metric tons/day) N = Number of vehicles I = Idle time per vehicle per day (idle-hr/day) EF = EMFAC2021 emission factor (g/idle-hr) 1,000 = Conversion from g to kg 0.001 = Conversion from kg to metric tons
		$E_m = E_d \times D$	E _m = Monthly Emissions (metric tons/month) E _d = Daily Emissions (metric tons/day) D = Number of construction days per month
		$E_t = \Sigma E_m$	E _t = Total Project Emissions (metric tons) E _m = Monthly Emissions (metric tons/month)

Black Rock Geothermal Project

BRGP Construction Emissions

Table 11. Equations Used to Calculate Criteria Pollutant and GHG Emissions

April 2023

Equations Used to Calculate Emissions from BRGP Construction

Emission Source	Pollutants	Equations	Variables
Fugitive PM ₁₀ and PM _{2.5} from Truck Dumping/Loading	PM ₁₀ and PM _{2.5}	$E_d = V \times 1.2641662 \times EF / D$	E_d = Daily Emissions (lb/day)
			V = Volume of material dumped (cubic yards/month)
			1.2641662 = Conversion from cubic yards to tons
		$E_m = E_d \times D$	EF = Fugitive PM ₁₀ and PM _{2.5} emission factors (lb/ton), calculated per Section 4.4.2 of Appendix C of the <i>CalEEMod User's Guide</i> (ICF 2022).
			D = Number of construction days per month
			E_m = Monthly Emissions (lb/month)
		$E_t = \Sigma E_m / 2,000$	E_d = Daily Emissions (lb/day)
			D = Number of construction days per month
			E_m = Monthly Emissions (lb/month)
Fugitive PM ₁₀ and PM _{2.5} from Grading	PM ₁₀ and PM _{2.5}	$E_d = EF \times A / W \times 43,560 / 5,280 / D$	E_t = Total Project Emissions (tons)
			2,000 = Conversion from lb to tons
			E_d = Daily Emissions (lb/day)
		$E_m = E_d \times D$	EF = Fugitive PM ₁₀ and PM _{2.5} emission factors (lb/mile), calculated per Section 4.4.1 of Appendix C of the <i>CalEEMod User's Guide</i> (ICF 2022).
			A = Graded area (acres/month)
			W = Grading equipment blade width (ft)
		$E_t = \Sigma E_m / 2,000$	43,560 = Conversion factor from square feet to acres
			5,280 = Conversion factor from feet to miles
			D = Number of construction days per month
Paving	VOC	$E_d = A / M / D \times EF$	E_m = Monthly Emissions (lb/month)
			E_d = Daily Emissions (lb/day)
			D = Number of construction days per month
		$E_m = E_d \times D$	M = Number of paving construction months
			E_m = Monthly Emissions (lb/month)
			E_d = Daily Emissions (lb/day)
		$E_t = \Sigma E_m / 2,000$	D = Number of construction days per month
			E_t = Total Project Emissions (tons)
			E_m = Monthly Emissions (lb/month)
			2,000 = Conversion from lb to tons

Black Rock Geothermal Project

BRGP Construction Emissions

Table 12. Vehicle Criteria Pollutant Emission Factors

April 2023

Vehicle Exhaust Emission Factors for BRGP Construction

Vehicle Type	Location of Vehicle Operation	Vehicle Class ^a	2024 Exhaust Emission Factors (g/mile) ^{b, c, d}									Paved Road Emission Factors (g/mile) ^e	
			CO	ROG	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	PM ₁₀	PM _{2.5}
Delivery Truck	Onroad, Offsite	Heavy/Medium-duty Diesel	0.087	0.013	0.011	1.126	0.078	0.033	1201.756	0.001	0.002	0.300	0.075
Pickup Truck	Onsite, Offroad	Light-duty truck	3.494	0.109	0.006	0.211	0.019	0.010	569.125	0.024	0.001	N/A	N/A
Haul Trucks	Onroad, Offsite	Heavy-duty Diesel	0.094	0.010	0.014	1.239	0.104	0.043	1434.237	0.000	0.003	0.300	0.075
Construction Worker Commute	Onroad	Light-duty Auto/Truck	2.147	0.032	0.003	0.130	0.015	0.006	306.828	0.008	0.001	0.300	0.075

Vehicle Idling Emission Factors for BRGP Construction

Vehicle Type	Location of Vehicle Operation	Vehicle Class ^a	2024 Idle Emission Factors (g/idle-hour) ^{b, c, d}								
			CO	ROG	SO _x	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Delivery Truck	Onroad, Offsite	Heavy/Medium-duty Diesel	22.402	1.369	0.041	24.638	0.033	0.032	4289.736	0.064	0.009
Haul Truck	Onroad, Offsite	Heavy-duty Diesel	34.770	2.368	0.052	28.143	0.012	0.011	5422.300	0.110	0.017

Notes:

- ^a The vehicle classes are represented as follows:
- Light-duty Truck: Assumed to be 50% LDT1 Gas and 50% LDT2 Gas values, based on an understanding of the vehicle type.
 - Heavy-duty Diesel: Assumed to be 100% HHDT DSL values, per Section 4.6.4 of Appendix C of the *CalEEMod User's Guide* (ICF 2022).
 - Heavy/Medium-duty Diesel: Assumed to be 50% HHDT DSL and 50% MHDT DSL values, per Section 4.6.4 of Appendix C of the *CalEEMod User's Guide* (ICF 2022).
 - Light-duty Auto/Truck: Assumed to be 25% LDA Gas, 50% LDT1 Gas, and 25% LDT2 Gas values, per Section 4.6.4 of Appendix C of the *CalEEMod User's Guide* (ICF 2022) and assuming workers typically drive gasoline-fueled vehicles.

^b Exhaust and idling emission factors from EMFAC2021 for Imperial County, calendar year 2024. A speed of 40 mph was assumed for all delivery trucks, haul trucks, and worker commutes. A speed of 15 mph was assumed for onsite pickup trucks. An average temperature of 78°F and humidity of 40% were used per Table B-1 of *CT-EMFAC: A Computer Model to Estimate Transportation Project Emissions* (UC Davis 2007).

^c Although construction will occur bewteen 2024 and 2026, 2024 emission factors were used, as appropriate, to provide a more conservative emissions estimate.

^d ROG and VOC are assumed to be equivalent.

^e Paved road emission factors calculated using CalEEMod methodology, as described below.

Derivation of Paved Road Emission Factors

Vehicles on Paved Roads

Parameter	PM ₁₀	PM _{2.5}
Average Weight ^a	2.4	2.4
k ^a	1.0	0.25
sL ^a	0.1	0.1
Emission Factor (g/mile) ^b	0.300	0.075

Notes:

^a Average Weight, sL, and k taken as the CalEEMod statewide defaults from Section 5.1.4 of Appendix C of the *CalEEMod User's Guide* (ICF 2022).

^b Emission factor calculated using the following equation from Section 5.1.4 of Appendix C of the *CalEEMod User's Guide* (ICF 2022):

Emission Factor (g/mile) = k (g/mile) x [sL (g/m²)]^{0.91} x [Average Weight (tons)]^{1.02}

Precipitation days were not accounted for in the calculations to be conservative.

Black Rock Geothermal Project

BRGP Construction Emissions

Table 13. Construction Equipment Criteria Pollutant Emission Factors

April 2023

Construction Equipment Emission Factors for BRGP Construction

Equipment ^a	Equipment Type	Fuel	Year	Hours per Month ^b	Horsepower ^c	Load Factor ^c	2024 Emission Factors (g/bhp-hr) ^{d, e}								
							CO	VOC	NO _x	SO ₂	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Onsite															
Excavator	Excavators	Diesel	2024	460	36	0.38	4.100	0.090	2.750	0.005	0.010	0.010	587.317	0.024	0.005
Backhoe	Tractors/Loaders/Backhoes	Diesel	2024	460	84	0.37	3.700	0.050	0.260	0.005	0.010	0.010	529.933	0.021	0.004
10 Wheel Dump Truck ^f	Off-Highway Trucks	Diesel	2024	460	376	0.38	1.195	0.183	1.236	0.005	0.044	0.041	527.763	0.021	0.004
Dozer	Rubber Tired Dozers	Diesel	2024	460	367	0.40	2.600	0.050	0.260	0.005	0.010	0.010	532.203	0.022	0.004
Front End Loader	Rubber Tired Loaders	Diesel	2024	460	150	0.36	3.700	0.050	0.260	0.005	0.010	0.010	526.332	0.021	0.004
150 Ton Hydraulic Crane	Cranes	Diesel	2024	460	367	0.29	2.600	0.050	0.260	0.005	0.010	0.010	527.532	0.021	0.004
75 Ton Hydraulic Crane	Cranes	Diesel	2024	460	367	0.29	2.600	0.050	0.260	0.005	0.010	0.010	527.532	0.021	0.004
35 Ton Hydraulic Crane	Cranes	Diesel	2024	460	367	0.29	2.600	0.050	0.260	0.005	0.010	0.010	527.532	0.021	0.004
Pile Driver	Other Construction Equipment	Diesel	2024	460	82	0.42	3.700	0.050	0.260	0.005	0.010	0.010	528.454	0.021	0.004
Fork Lift	Forklifts	Diesel	2024	460	82	0.20	3.700	0.050	0.260	0.005	0.010	0.010	527.040	0.021	0.004
Grader	Graders	Diesel	2024	460	148	0.41	3.700	0.050	0.260	0.005	0.010	0.010	530.170	0.022	0.004
Drill Rigs	Bore/Drill Rigs	Diesel	2024	460	83	0.50	3.700	0.050	0.260	0.005	0.010	0.010	521.434	0.021	0.004
Drilling Diesel Generator (Kenai)	Generator Sets	Diesel	2024	230	1482	0.74	2.610	0.382	0.500	0.007	0.149	0.149	568.327	0.023	0.005
Drilling Rental Generator	Generator Sets	Diesel	2024	230	314	0.74	2.610	0.298	0.298	0.007	0.014	0.014	568.327	0.023	0.005
Drilling Pump	Pumps	Diesel	2024	230	74	0.74	3.729	0.280	3.224	0.007	0.095	0.095	568.309	0.023	0.005
Drilling Forklift	Rough Terrain Forklifts	Diesel	2024	230	96	0.40	3.700	0.050	0.260	0.005	0.010	0.010	528.511	0.021	0.004
Drilling Manlift	Aerial Lifts	Diesel	2024	230	46	0.31	4.100	0.090	2.750	0.005	0.010	0.010	586.903	0.024	0.005
Drilling Backhoe	Tractors/Loaders/Backhoes	Diesel	2024	230	84	0.37	3.700	0.050	0.260	0.005	0.010	0.010	529.933	0.021	0.004
Drilling Light Tower	Other General Industrial Equipment	Diesel	2024	230	35	0.34	4.100	0.090	2.750	0.005	0.010	0.010	588.151	0.024	0.005
Pavers	Pavers	Diesel	2024	230	81	0.42	3.700	0.050	0.260	0.005	0.010	0.010	526.332	0.021	0.004
Paving Equipment	Paving Equipment	Diesel	2024	230	89	0.36	3.700	0.050	0.260	0.005	0.010	0.010	528.115	0.021	0.004
Paving Rollers	Rollers	Diesel	2024	230	36	0.38	4.100	0.090	2.750	0.005	0.010	0.010	586.798	0.024	0.005
Paving Tractor/Loader/Backhoe	Tractors/Loaders/Backhoes	Diesel	2024	230	84	0.37	3.700	0.050	0.260	0.005	0.010	0.010	529.933	0.021	0.004
Electrical Generators	Generator Sets	Diesel	2024	460	14	0.74	2.881	0.546	4.373	0.008	0.180	0.166	568.315	0.023	0.005
Concrete Pump Trucks ^f	Off-Highway Trucks	Diesel	2024	460	376	0.38	1.195	0.183	1.236	0.005	0.044	0.041	527.763	0.021	0.004
Diesel Welders	Welders	Diesel	2024	460	46	0.45	4.100	0.090	2.750	0.007	0.010	0.010	568.290	0.023	0.005
Compactor	Plate Compactors	Diesel	2024	460	8	0.43	3.470	0.547	4.143	0.009	0.162	0.149	568.353	0.023	0.005
Stake Truck ^f	Off-Highway Trucks	Diesel	2024	460	376	0.38	1.195	0.183	1.236	0.005	0.044	0.041	527.763	0.021	0.004
Water Truck (shared between 3 projects) ^f	Off-Highway Trucks	Diesel	2024	460	376	0.38	1.195	0.183	1.236	0.005	0.044	0.041	527.763	0.021	0.004
Air Compressor	Air Compressors	Diesel	2024	460	37	0.48	4.100	0.090	2.750	0.007	0.010	0.010	568.361	0.023	0.005
Light Towers	Other General Industrial Equipment	Diesel	2024	460	35	0.34	4.100	0.090	2.750	0.005	0.010	0.010	588.151	0.024	0.005
Heavy Lift Lattice boom Main Crane	Cranes	Diesel	2024	460	367	0.29	2.600	0.050	0.260	0.005	0.010	0.010	527.532	0.021	0.004
Heavy Lift Lattice boom Tail Crane	Cranes	Diesel	2024	460	367	0.29	2.600	0.050	0.260	0.005	0.010	0.010	527.532	0.021	0.004
Heavy lift Gantry Crane	Cranes	Diesel	2024	460	367	0.29	2.600	0.050	0.260	0.005	0.010	0.010	527.532	0.021	0.004

Notes:

^a Assumed all equipment is fired with diesel fuel.

^b Hours per month calculated based on the following schedule:

Work hours per day: 20

Work days per month: 23

^c Unless color coded as being provided by the Applicant's engineering contractor, construction equipment horsepowers and load factors taken from Table G-12 of Appendix G of the *CalEEMod User's Guide* (ICF 2022).

^d Unless color coded as being provided by the Applicant's engineering contractor or Tier 4-compliant, construction equipment emission factors taken from Table G-11 of Appendix G of the *CalEEMod User's Guide* (ICF 2022). Construction equipment emission factors for Tier 4-compliant equipment taken from Table G-13 of Appendix G of the *CalEEMod User's Guide* (ICF 2022).

^e Although construction will occur bewteen 2024 and 2026, 2024 emission factors were used for all calculations to provide a more conservative emissions estimate.

^f Horsepower, load factor, and emission factors for Off-Highway Trucks were assumed representative of Water, Stake, Dump, and Concrete Trucks.

Default CalEEMOD value for highest available horsepower bin (Table G-11).

Data supplied by the Applicant's engineering contractor.

Equipment emissions factors assumed to be Tier 4 final (Table G-13).

Black Rock Geothermal Project**BRGP Construction Air Quality Impacts Analysis****Table 14. Point Source Parameters****April 2023****BRGP Construction Modeled Point Source Parameters**

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_1	POINT	HORIZONTAL	Construction Point Source 1	628,110.00	3,670,890.00	-70.11	4.60	533.00	18.00	0.13
POINT_2	POINT	HORIZONTAL	Construction Point Source 2	628,135.00	3,670,890.00	-70.12	4.60	533.00	18.00	0.13
POINT_3	POINT	HORIZONTAL	Construction Point Source 3	628,160.00	3,670,890.00	-70.09	4.60	533.00	18.00	0.13
POINT_4	POINT	HORIZONTAL	Construction Point Source 4	628,185.00	3,670,890.00	-70.11	4.60	533.00	18.00	0.13
POINT_5	POINT	HORIZONTAL	Construction Point Source 5	628,210.00	3,670,890.00	-70.06	4.60	533.00	18.00	0.13
POINT_6	POINT	HORIZONTAL	Construction Point Source 6	628,235.00	3,670,890.00	-70.03	4.60	533.00	18.00	0.13
POINT_7	POINT	HORIZONTAL	Construction Point Source 7	628,260.00	3,670,890.00	-70.01	4.60	533.00	18.00	0.13
POINT_8	POINT	HORIZONTAL	Construction Point Source 8	628,285.00	3,670,890.00	-69.98	4.60	533.00	18.00	0.13
POINT_9	POINT	HORIZONTAL	Construction Point Source 9	628,310.00	3,670,890.00	-69.88	4.60	533.00	18.00	0.13
POINT_10	POINT	HORIZONTAL	Construction Point Source 10	628,335.00	3,670,890.00	-69.85	4.60	533.00	18.00	0.13
POINT_11	POINT	HORIZONTAL	Construction Point Source 11	628,360.00	3,670,890.00	-69.81	4.60	533.00	18.00	0.13
POINT_12	POINT	HORIZONTAL	Construction Point Source 12	627,835.00	3,670,790.00	-70.10	4.60	533.00	18.00	0.13
POINT_13	POINT	HORIZONTAL	Construction Point Source 13	627,835.00	3,670,765.00	-70.06	4.60	533.00	18.00	0.13
POINT_14	POINT	HORIZONTAL	Construction Point Source 14	627,835.00	3,670,740.00	-70.01	4.60	533.00	18.00	0.13
POINT_15	POINT	HORIZONTAL	Construction Point Source 15	627,835.00	3,670,715.00	-69.97	4.60	533.00	18.00	0.13
POINT_16	POINT	HORIZONTAL	Construction Point Source 16	627,835.00	3,670,690.00	-69.94	4.60	533.00	18.00	0.13
POINT_17	POINT	HORIZONTAL	Construction Point Source 17	627,835.00	3,670,665.00	-69.90	4.60	533.00	18.00	0.13
POINT_18	POINT	HORIZONTAL	Construction Point Source 18	627,835.00	3,670,640.00	-69.85	4.60	533.00	18.00	0.13
POINT_19	POINT	HORIZONTAL	Construction Point Source 19	627,835.00	3,670,615.00	-69.80	4.60	533.00	18.00	0.13
POINT_20	POINT	HORIZONTAL	Construction Point Source 20	627,835.00	3,670,590.00	-69.75	4.60	533.00	18.00	0.13
POINT_21	POINT	HORIZONTAL	Construction Point Source 21	627,835.00	3,670,565.00	-69.71	4.60	533.00	18.00	0.13
POINT_22	POINT	HORIZONTAL	Construction Point Source 22	627,835.00	3,670,540.00	-69.66	4.60	533.00	18.00	0.13
POINT_23	POINT	HORIZONTAL	Construction Point Source 23	627,835.00	3,670,515.00	-69.60	4.60	533.00	18.00	0.13
POINT_24	POINT	HORIZONTAL	Construction Point Source 24	627,835.00	3,670,490.00	-69.38	4.60	533.00	18.00	0.13
POINT_25	POINT	HORIZONTAL	Construction Point Source 25	627,860.00	3,670,790.00	-70.10	4.60	533.00	18.00	0.13
POINT_26	POINT	HORIZONTAL	Construction Point Source 26	627,860.00	3,670,765.00	-70.06	4.60	533.00	18.00	0.13
POINT_27	POINT	HORIZONTAL	Construction Point Source 27	627,860.00	3,670,740.00	-70.01	4.60	533.00	18.00	0.13
POINT_28	POINT	HORIZONTAL	Construction Point Source 28	627,860.00	3,670,715.00	-69.95	4.60	533.00	18.00	0.13
POINT_29	POINT	HORIZONTAL	Construction Point Source 29	627,860.00	3,670,690.00	-69.93	4.60	533.00	18.00	0.13
POINT_30	POINT	HORIZONTAL	Construction Point Source 30	627,860.00	3,670,665.00	-69.89	4.60	533.00	18.00	0.13
POINT_31	POINT	HORIZONTAL	Construction Point Source 31	627,860.00	3,670,640.00	-69.81	4.60	533.00	18.00	0.13
POINT_32	POINT	HORIZONTAL	Construction Point Source 32	627,860.00	3,670,615.00	-69.77	4.60	533.00	18.00	0.13
POINT_33	POINT	HORIZONTAL	Construction Point Source 33	627,860.00	3,670,590.00	-69.74	4.60	533.00	18.00	0.13
POINT_34	POINT	HORIZONTAL	Construction Point Source 34	627,860.00	3,670,565.00	-69.68	4.60	533.00	18.00	0.13
POINT_35	POINT	HORIZONTAL	Construction Point Source 35	627,860.00	3,670,540.00	-69.64	4.60	533.00	18.00	0.13
POINT_36	POINT	HORIZONTAL	Construction Point Source 36	627,860.00	3,670,515.00	-69.57	4.60	533.00	18.00	0.13
POINT_37	POINT	HORIZONTAL	Construction Point Source 37	627,860.00	3,670,490.00	-69.44	4.60	533.00	18.00	0.13
POINT_38	POINT	HORIZONTAL	Construction Point Source 38	627,885.00	3,670,790.00	-70.06	4.60	533.00	18.00	0.13
POINT_39	POINT	HORIZONTAL	Construction Point Source 39	627,885.00	3,670,765.00	-70.03	4.60	533.00	18.00	0.13
POINT_40	POINT	HORIZONTAL	Construction Point Source 40	627,885.00	3,670,740.00	-70.01	4.60	533.00	18.00	0.13

Black Rock Geothermal Project
BRGP Construction Air Quality Impacts Analysis
Table 14. Point Source Parameters
April 2023

BRGP Construction Modeled Point Source Parameters

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_41	POINT	HORIZONTAL	Construction Point Source 41	627,885.00	3,670,715.00	-69.95	4.60	533.00	18.00	0.13
POINT_42	POINT	HORIZONTAL	Construction Point Source 42	627,885.00	3,670,690.00	-69.90	4.60	533.00	18.00	0.13
POINT_43	POINT	HORIZONTAL	Construction Point Source 43	627,885.00	3,670,665.00	-69.84	4.60	533.00	18.00	0.13
POINT_44	POINT	HORIZONTAL	Construction Point Source 44	627,885.00	3,670,640.00	-69.80	4.60	533.00	18.00	0.13
POINT_45	POINT	HORIZONTAL	Construction Point Source 45	627,885.00	3,670,615.00	-69.75	4.60	533.00	18.00	0.13
POINT_46	POINT	HORIZONTAL	Construction Point Source 46	627,885.00	3,670,590.00	-69.71	4.60	533.00	18.00	0.13
POINT_47	POINT	HORIZONTAL	Construction Point Source 47	627,885.00	3,670,565.00	-69.67	4.60	533.00	18.00	0.13
POINT_48	POINT	HORIZONTAL	Construction Point Source 48	627,885.00	3,670,540.00	-69.62	4.60	533.00	18.00	0.13
POINT_49	POINT	HORIZONTAL	Construction Point Source 49	627,885.00	3,670,515.00	-69.56	4.60	533.00	18.00	0.13
POINT_50	POINT	HORIZONTAL	Construction Point Source 50	627,885.00	3,670,490.00	-69.44	4.60	533.00	18.00	0.13
POINT_51	POINT	HORIZONTAL	Construction Point Source 51	627,910.00	3,670,790.00	-70.04	4.60	533.00	18.00	0.13
POINT_52	POINT	HORIZONTAL	Construction Point Source 52	627,910.00	3,670,765.00	-70.02	4.60	533.00	18.00	0.13
POINT_53	POINT	HORIZONTAL	Construction Point Source 53	627,910.00	3,670,740.00	-69.98	4.60	533.00	18.00	0.13
POINT_54	POINT	HORIZONTAL	Construction Point Source 54	627,910.00	3,670,715.00	-69.91	4.60	533.00	18.00	0.13
POINT_55	POINT	HORIZONTAL	Construction Point Source 55	627,910.00	3,670,690.00	-69.85	4.60	533.00	18.00	0.13
POINT_56	POINT	HORIZONTAL	Construction Point Source 56	627,910.00	3,670,665.00	-69.81	4.60	533.00	18.00	0.13
POINT_57	POINT	HORIZONTAL	Construction Point Source 57	627,910.00	3,670,640.00	-69.79	4.60	533.00	18.00	0.13
POINT_58	POINT	HORIZONTAL	Construction Point Source 58	627,910.00	3,670,615.00	-69.75	4.60	533.00	18.00	0.13
POINT_59	POINT	HORIZONTAL	Construction Point Source 59	627,910.00	3,670,590.00	-69.69	4.60	533.00	18.00	0.13
POINT_60	POINT	HORIZONTAL	Construction Point Source 60	627,910.00	3,670,565.00	-69.66	4.60	533.00	18.00	0.13
POINT_61	POINT	HORIZONTAL	Construction Point Source 61	627,910.00	3,670,540.00	-69.62	4.60	533.00	18.00	0.13
POINT_62	POINT	HORIZONTAL	Construction Point Source 62	627,910.00	3,670,515.00	-69.58	4.60	533.00	18.00	0.13
POINT_63	POINT	HORIZONTAL	Construction Point Source 63	627,910.00	3,670,490.00	-69.43	4.60	533.00	18.00	0.13
POINT_64	POINT	HORIZONTAL	Construction Point Source 64	627,935.00	3,670,790.00	-70.05	4.60	533.00	18.00	0.13
POINT_65	POINT	HORIZONTAL	Construction Point Source 65	627,935.00	3,670,765.00	-70.01	4.60	533.00	18.00	0.13
POINT_66	POINT	HORIZONTAL	Construction Point Source 66	627,935.00	3,670,740.00	-69.95	4.60	533.00	18.00	0.13
POINT_67	POINT	HORIZONTAL	Construction Point Source 67	627,935.00	3,670,715.00	-69.90	4.60	533.00	18.00	0.13
POINT_68	POINT	HORIZONTAL	Construction Point Source 68	627,935.00	3,670,690.00	-69.84	4.60	533.00	18.00	0.13
POINT_69	POINT	HORIZONTAL	Construction Point Source 69	627,935.00	3,670,665.00	-69.83	4.60	533.00	18.00	0.13
POINT_70	POINT	HORIZONTAL	Construction Point Source 70	627,935.00	3,670,640.00	-69.77	4.60	533.00	18.00	0.13
POINT_71	POINT	HORIZONTAL	Construction Point Source 71	627,935.00	3,670,615.00	-69.73	4.60	533.00	18.00	0.13
POINT_72	POINT	HORIZONTAL	Construction Point Source 72	627,935.00	3,670,590.00	-69.70	4.60	533.00	18.00	0.13
POINT_73	POINT	HORIZONTAL	Construction Point Source 73	627,935.00	3,670,565.00	-69.65	4.60	533.00	18.00	0.13
POINT_74	POINT	HORIZONTAL	Construction Point Source 74	627,935.00	3,670,540.00	-69.61	4.60	533.00	18.00	0.13
POINT_75	POINT	HORIZONTAL	Construction Point Source 75	627,935.00	3,670,515.00	-69.54	4.60	533.00	18.00	0.13
POINT_76	POINT	HORIZONTAL	Construction Point Source 76	627,935.00	3,670,490.00	-69.45	4.60	533.00	18.00	0.13
POINT_77	POINT	HORIZONTAL	Construction Point Source 77	627,960.00	3,670,790.00	-70.02	4.60	533.00	18.00	0.13
POINT_78	POINT	HORIZONTAL	Construction Point Source 78	627,960.00	3,670,765.00	-69.98	4.60	533.00	18.00	0.13
POINT_79	POINT	HORIZONTAL	Construction Point Source 79	627,960.00	3,670,740.00	-69.92	4.60	533.00	18.00	0.13
POINT_80	POINT	HORIZONTAL	Construction Point Source 80	627,960.00	3,670,715.00	-69.89	4.60	533.00	18.00	0.13

Black Rock Geothermal Project
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Table 14. Point Source Parameters
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BRGP Construction Modeled Point Source Parameters

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_81	POINT	HORIZONTAL	Construction Point Source 81	627,960.00	3,670,690.00	-69.84	4.60	533.00	18.00	0.13
POINT_82	POINT	HORIZONTAL	Construction Point Source 82	627,960.00	3,670,665.00	-69.81	4.60	533.00	18.00	0.13
POINT_83	POINT	HORIZONTAL	Construction Point Source 83	627,960.00	3,670,640.00	-69.75	4.60	533.00	18.00	0.13
POINT_84	POINT	HORIZONTAL	Construction Point Source 84	627,960.00	3,670,615.00	-69.71	4.60	533.00	18.00	0.13
POINT_85	POINT	HORIZONTAL	Construction Point Source 85	627,960.00	3,670,590.00	-69.66	4.60	533.00	18.00	0.13
POINT_86	POINT	HORIZONTAL	Construction Point Source 86	627,960.00	3,670,565.00	-69.62	4.60	533.00	18.00	0.13
POINT_87	POINT	HORIZONTAL	Construction Point Source 87	627,960.00	3,670,540.00	-69.58	4.60	533.00	18.00	0.13
POINT_88	POINT	HORIZONTAL	Construction Point Source 88	627,960.00	3,670,515.00	-69.51	4.60	533.00	18.00	0.13
POINT_89	POINT	HORIZONTAL	Construction Point Source 89	627,960.00	3,670,490.00	-69.38	4.60	533.00	18.00	0.13
POINT_90	POINT	HORIZONTAL	Construction Point Source 90	627,985.00	3,670,790.00	-69.99	4.60	533.00	18.00	0.13
POINT_91	POINT	HORIZONTAL	Construction Point Source 91	627,985.00	3,670,765.00	-69.95	4.60	533.00	18.00	0.13
POINT_92	POINT	HORIZONTAL	Construction Point Source 92	627,985.00	3,670,740.00	-69.91	4.60	533.00	18.00	0.13
POINT_93	POINT	HORIZONTAL	Construction Point Source 93	627,985.00	3,670,715.00	-69.86	4.60	533.00	18.00	0.13
POINT_94	POINT	HORIZONTAL	Construction Point Source 94	627,985.00	3,670,690.00	-69.83	4.60	533.00	18.00	0.13
POINT_95	POINT	HORIZONTAL	Construction Point Source 95	627,985.00	3,670,665.00	-69.78	4.60	533.00	18.00	0.13
POINT_96	POINT	HORIZONTAL	Construction Point Source 96	627,985.00	3,670,640.00	-69.73	4.60	533.00	18.00	0.13
POINT_97	POINT	HORIZONTAL	Construction Point Source 97	627,985.00	3,670,615.00	-69.70	4.60	533.00	18.00	0.13
POINT_98	POINT	HORIZONTAL	Construction Point Source 98	627,985.00	3,670,590.00	-69.64	4.60	533.00	18.00	0.13
POINT_99	POINT	HORIZONTAL	Construction Point Source 99	627,985.00	3,670,565.00	-69.62	4.60	533.00	18.00	0.13
POINT_100	POINT	HORIZONTAL	Construction Point Source 100	627,985.00	3,670,540.00	-69.57	4.60	533.00	18.00	0.13
POINT_101	POINT	HORIZONTAL	Construction Point Source 101	627,985.00	3,670,515.00	-69.50	4.60	533.00	18.00	0.13
POINT_102	POINT	HORIZONTAL	Construction Point Source 102	627,985.00	3,670,490.00	-69.35	4.60	533.00	18.00	0.13
POINT_103	POINT	HORIZONTAL	Construction Point Source 103	628,010.00	3,670,790.00	-69.99	4.60	533.00	18.00	0.13
POINT_104	POINT	HORIZONTAL	Construction Point Source 104	628,010.00	3,670,765.00	-69.93	4.60	533.00	18.00	0.13
POINT_105	POINT	HORIZONTAL	Construction Point Source 105	628,010.00	3,670,740.00	-69.89	4.60	533.00	18.00	0.13
POINT_106	POINT	HORIZONTAL	Construction Point Source 106	628,010.00	3,670,715.00	-69.85	4.60	533.00	18.00	0.13
POINT_107	POINT	HORIZONTAL	Construction Point Source 107	628,010.00	3,670,690.00	-69.78	4.60	533.00	18.00	0.13
POINT_108	POINT	HORIZONTAL	Construction Point Source 108	628,010.00	3,670,665.00	-69.76	4.60	533.00	18.00	0.13
POINT_109	POINT	HORIZONTAL	Construction Point Source 109	628,010.00	3,670,640.00	-69.73	4.60	533.00	18.00	0.13
POINT_110	POINT	HORIZONTAL	Construction Point Source 110	628,010.00	3,670,615.00	-69.66	4.60	533.00	18.00	0.13
POINT_111	POINT	HORIZONTAL	Construction Point Source 111	628,010.00	3,670,590.00	-69.63	4.60	533.00	18.00	0.13
POINT_112	POINT	HORIZONTAL	Construction Point Source 112	628,010.00	3,670,565.00	-69.59	4.60	533.00	18.00	0.13
POINT_113	POINT	HORIZONTAL	Construction Point Source 113	628,010.00	3,670,540.00	-69.55	4.60	533.00	18.00	0.13
POINT_114	POINT	HORIZONTAL	Construction Point Source 114	628,010.00	3,670,515.00	-69.47	4.60	533.00	18.00	0.13
POINT_115	POINT	HORIZONTAL	Construction Point Source 115	628,010.00	3,670,490.00	-69.40	4.60	533.00	18.00	0.13
POINT_116	POINT	HORIZONTAL	Construction Point Source 116	628,035.00	3,670,790.00	-69.96	4.60	533.00	18.00	0.13
POINT_117	POINT	HORIZONTAL	Construction Point Source 117	628,035.00	3,670,765.00	-69.92	4.60	533.00	18.00	0.13
POINT_118	POINT	HORIZONTAL	Construction Point Source 118	628,035.00	3,670,740.00	-69.88	4.60	533.00	18.00	0.13
POINT_119	POINT	HORIZONTAL	Construction Point Source 119	628,035.00	3,670,715.00	-69.84	4.60	533.00	18.00	0.13
POINT_120	POINT	HORIZONTAL	Construction Point Source 120	628,035.00	3,670,690.00	-69.78	4.60	533.00	18.00	0.13

Black Rock Geothermal Project**BRGP Construction Air Quality Impacts Analysis****Table 14. Point Source Parameters****April 2023****BRGP Construction Modeled Point Source Parameters**

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_121	POINT	HORIZONTAL	Construction Point Source 121	628,035.00	3,670,665.00	-69.76	4.60	533.00	18.00	0.13
POINT_122	POINT	HORIZONTAL	Construction Point Source 122	628,035.00	3,670,640.00	-69.71	4.60	533.00	18.00	0.13
POINT_123	POINT	HORIZONTAL	Construction Point Source 123	628,035.00	3,670,615.00	-69.67	4.60	533.00	18.00	0.13
POINT_124	POINT	HORIZONTAL	Construction Point Source 124	628,035.00	3,670,590.00	-69.63	4.60	533.00	18.00	0.13
POINT_125	POINT	HORIZONTAL	Construction Point Source 125	628,035.00	3,670,565.00	-69.57	4.60	533.00	18.00	0.13
POINT_126	POINT	HORIZONTAL	Construction Point Source 126	628,035.00	3,670,540.00	-69.53	4.60	533.00	18.00	0.13
POINT_127	POINT	HORIZONTAL	Construction Point Source 127	628,035.00	3,670,515.00	-69.45	4.60	533.00	18.00	0.13
POINT_128	POINT	HORIZONTAL	Construction Point Source 128	628,035.00	3,670,490.00	-69.34	4.60	533.00	18.00	0.13
POINT_129	POINT	HORIZONTAL	Construction Point Source 129	628,060.00	3,670,790.00	-69.94	4.60	533.00	18.00	0.13
POINT_130	POINT	HORIZONTAL	Construction Point Source 130	628,060.00	3,670,765.00	-69.89	4.60	533.00	18.00	0.13
POINT_131	POINT	HORIZONTAL	Construction Point Source 131	628,060.00	3,670,740.00	-69.84	4.60	533.00	18.00	0.13
POINT_132	POINT	HORIZONTAL	Construction Point Source 132	628,060.00	3,670,715.00	-69.81	4.60	533.00	18.00	0.13
POINT_133	POINT	HORIZONTAL	Construction Point Source 133	628,060.00	3,670,690.00	-69.77	4.60	533.00	18.00	0.13
POINT_134	POINT	HORIZONTAL	Construction Point Source 134	628,060.00	3,670,665.00	-69.71	4.60	533.00	18.00	0.13
POINT_135	POINT	HORIZONTAL	Construction Point Source 135	628,060.00	3,670,640.00	-69.68	4.60	533.00	18.00	0.13
POINT_136	POINT	HORIZONTAL	Construction Point Source 136	628,060.00	3,670,615.00	-69.65	4.60	533.00	18.00	0.13
POINT_137	POINT	HORIZONTAL	Construction Point Source 137	628,060.00	3,670,590.00	-69.62	4.60	533.00	18.00	0.13
POINT_138	POINT	HORIZONTAL	Construction Point Source 138	628,060.00	3,670,565.00	-69.56	4.60	533.00	18.00	0.13
POINT_139	POINT	HORIZONTAL	Construction Point Source 139	628,060.00	3,670,540.00	-69.52	4.60	533.00	18.00	0.13
POINT_140	POINT	HORIZONTAL	Construction Point Source 140	628,060.00	3,670,515.00	-69.47	4.60	533.00	18.00	0.13
POINT_141	POINT	HORIZONTAL	Construction Point Source 141	628,060.00	3,670,490.00	-69.31	4.60	533.00	18.00	0.13
POINT_142	POINT	HORIZONTAL	Construction Point Source 142	628,085.00	3,670,790.00	-69.92	4.60	533.00	18.00	0.13
POINT_143	POINT	HORIZONTAL	Construction Point Source 143	628,085.00	3,670,765.00	-69.89	4.60	533.00	18.00	0.13
POINT_144	POINT	HORIZONTAL	Construction Point Source 144	628,085.00	3,670,740.00	-69.83	4.60	533.00	18.00	0.13
POINT_145	POINT	HORIZONTAL	Construction Point Source 145	628,085.00	3,670,715.00	-69.80	4.60	533.00	18.00	0.13
POINT_146	POINT	HORIZONTAL	Construction Point Source 146	628,085.00	3,670,690.00	-69.76	4.60	533.00	18.00	0.13
POINT_147	POINT	HORIZONTAL	Construction Point Source 147	628,085.00	3,670,665.00	-69.72	4.60	533.00	18.00	0.13
POINT_148	POINT	HORIZONTAL	Construction Point Source 148	628,085.00	3,670,640.00	-69.67	4.60	533.00	18.00	0.13
POINT_149	POINT	HORIZONTAL	Construction Point Source 149	628,085.00	3,670,615.00	-69.63	4.60	533.00	18.00	0.13
POINT_150	POINT	HORIZONTAL	Construction Point Source 150	628,085.00	3,670,590.00	-69.60	4.60	533.00	18.00	0.13
POINT_151	POINT	HORIZONTAL	Construction Point Source 151	628,085.00	3,670,565.00	-69.57	4.60	533.00	18.00	0.13
POINT_152	POINT	HORIZONTAL	Construction Point Source 152	628,085.00	3,670,540.00	-69.50	4.60	533.00	18.00	0.13
POINT_153	POINT	HORIZONTAL	Construction Point Source 153	628,085.00	3,670,515.00	-69.46	4.60	533.00	18.00	0.13
POINT_154	POINT	HORIZONTAL	Construction Point Source 154	628,085.00	3,670,490.00	-69.30	4.60	533.00	18.00	0.13
POINT_155	POINT	HORIZONTAL	Construction Point Source 155	628,110.00	3,670,865.00	-70.09	4.60	533.00	18.00	0.13
POINT_156	POINT	HORIZONTAL	Construction Point Source 156	628,110.00	3,670,840.00	-70.05	4.60	533.00	18.00	0.13
POINT_157	POINT	HORIZONTAL	Construction Point Source 157	628,110.00	3,670,815.00	-70.00	4.60	533.00	18.00	0.13
POINT_158	POINT	HORIZONTAL	Construction Point Source 158	628,110.00	3,670,790.00	-69.96	4.60	533.00	18.00	0.13
POINT_159	POINT	HORIZONTAL	Construction Point Source 159	628,110.00	3,670,765.00	-69.86	4.60	533.00	18.00	0.13
POINT_160	POINT	HORIZONTAL	Construction Point Source 160	628,110.00	3,670,740.00	-69.83	4.60	533.00	18.00	0.13

Black Rock Geothermal Project
BRGP Construction Air Quality Impacts Analysis
Table 14. Point Source Parameters
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BRGP Construction Modeled Point Source Parameters

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_161	POINT	HORIZONTAL	Construction Point Source 161	628,110.00	3,670,715.00	-69.77	4.60	533.00	18.00	0.13
POINT_162	POINT	HORIZONTAL	Construction Point Source 162	628,110.00	3,670,690.00	-69.74	4.60	533.00	18.00	0.13
POINT_163	POINT	HORIZONTAL	Construction Point Source 163	628,110.00	3,670,665.00	-69.71	4.60	533.00	18.00	0.13
POINT_164	POINT	HORIZONTAL	Construction Point Source 164	628,110.00	3,670,640.00	-69.68	4.60	533.00	18.00	0.13
POINT_165	POINT	HORIZONTAL	Construction Point Source 165	628,110.00	3,670,615.00	-69.63	4.60	533.00	18.00	0.13
POINT_166	POINT	HORIZONTAL	Construction Point Source 166	628,110.00	3,670,590.00	-69.59	4.60	533.00	18.00	0.13
POINT_167	POINT	HORIZONTAL	Construction Point Source 167	628,110.00	3,670,565.00	-69.54	4.60	533.00	18.00	0.13
POINT_168	POINT	HORIZONTAL	Construction Point Source 168	628,110.00	3,670,540.00	-69.49	4.60	533.00	18.00	0.13
POINT_169	POINT	HORIZONTAL	Construction Point Source 169	628,110.00	3,670,515.00	-69.46	4.60	533.00	18.00	0.13
POINT_170	POINT	HORIZONTAL	Construction Point Source 170	628,110.00	3,670,490.00	-69.28	4.60	533.00	18.00	0.13
POINT_171	POINT	HORIZONTAL	Construction Point Source 171	628,135.00	3,670,865.00	-70.08	4.60	533.00	18.00	0.13
POINT_172	POINT	HORIZONTAL	Construction Point Source 172	628,135.00	3,670,840.00	-70.04	4.60	533.00	18.00	0.13
POINT_173	POINT	HORIZONTAL	Construction Point Source 173	628,135.00	3,670,815.00	-69.96	4.60	533.00	18.00	0.13
POINT_174	POINT	HORIZONTAL	Construction Point Source 174	628,135.00	3,670,790.00	-69.91	4.60	533.00	18.00	0.13
POINT_175	POINT	HORIZONTAL	Construction Point Source 175	628,135.00	3,670,765.00	-69.84	4.60	533.00	18.00	0.13
POINT_176	POINT	HORIZONTAL	Construction Point Source 176	628,135.00	3,670,740.00	-69.81	4.60	533.00	18.00	0.13
POINT_177	POINT	HORIZONTAL	Construction Point Source 177	628,135.00	3,670,715.00	-69.77	4.60	533.00	18.00	0.13
POINT_178	POINT	HORIZONTAL	Construction Point Source 178	628,135.00	3,670,690.00	-69.72	4.60	533.00	18.00	0.13
POINT_179	POINT	HORIZONTAL	Construction Point Source 179	628,135.00	3,670,665.00	-69.69	4.60	533.00	18.00	0.13
POINT_180	POINT	HORIZONTAL	Construction Point Source 180	628,135.00	3,670,640.00	-69.64	4.60	533.00	18.00	0.13
POINT_181	POINT	HORIZONTAL	Construction Point Source 181	628,135.00	3,670,615.00	-69.61	4.60	533.00	18.00	0.13
POINT_182	POINT	HORIZONTAL	Construction Point Source 182	628,135.00	3,670,590.00	-69.56	4.60	533.00	18.00	0.13
POINT_183	POINT	HORIZONTAL	Construction Point Source 183	628,135.00	3,670,565.00	-69.52	4.60	533.00	18.00	0.13
POINT_184	POINT	HORIZONTAL	Construction Point Source 184	628,135.00	3,670,540.00	-69.49	4.60	533.00	18.00	0.13
POINT_185	POINT	HORIZONTAL	Construction Point Source 185	628,135.00	3,670,515.00	-69.45	4.60	533.00	18.00	0.13
POINT_186	POINT	HORIZONTAL	Construction Point Source 186	628,135.00	3,670,490.00	-69.33	4.60	533.00	18.00	0.13
POINT_187	POINT	HORIZONTAL	Construction Point Source 187	628,160.00	3,670,865.00	-70.07	4.60	533.00	18.00	0.13
POINT_188	POINT	HORIZONTAL	Construction Point Source 188	628,160.00	3,670,840.00	-70.02	4.60	533.00	18.00	0.13
POINT_189	POINT	HORIZONTAL	Construction Point Source 189	628,160.00	3,670,815.00	-69.95	4.60	533.00	18.00	0.13
POINT_190	POINT	HORIZONTAL	Construction Point Source 190	628,160.00	3,670,790.00	-69.90	4.60	533.00	18.00	0.13
POINT_191	POINT	HORIZONTAL	Construction Point Source 191	628,160.00	3,670,765.00	-69.87	4.60	533.00	18.00	0.13
POINT_192	POINT	HORIZONTAL	Construction Point Source 192	628,160.00	3,670,740.00	-69.79	4.60	533.00	18.00	0.13
POINT_193	POINT	HORIZONTAL	Construction Point Source 193	628,160.00	3,670,715.00	-69.75	4.60	533.00	18.00	0.13
POINT_194	POINT	HORIZONTAL	Construction Point Source 194	628,160.00	3,670,690.00	-69.72	4.60	533.00	18.00	0.13
POINT_195	POINT	HORIZONTAL	Construction Point Source 195	628,160.00	3,670,665.00	-69.67	4.60	533.00	18.00	0.13
POINT_196	POINT	HORIZONTAL	Construction Point Source 196	628,160.00	3,670,640.00	-69.64	4.60	533.00	18.00	0.13
POINT_197	POINT	HORIZONTAL	Construction Point Source 197	628,160.00	3,670,615.00	-69.59	4.60	533.00	18.00	0.13
POINT_198	POINT	HORIZONTAL	Construction Point Source 198	628,160.00	3,670,590.00	-69.55	4.60	533.00	18.00	0.13
POINT_199	POINT	HORIZONTAL	Construction Point Source 199	628,160.00	3,670,565.00	-69.51	4.60	533.00	18.00	0.13
POINT_200	POINT	HORIZONTAL	Construction Point Source 200	628,160.00	3,670,540.00	-69.45	4.60	533.00	18.00	0.13

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Table 14. Point Source Parameters
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BRGP Construction Modeled Point Source Parameters

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_201	POINT	HORIZONTAL	Construction Point Source 201	628,160.00	3,670,515.00	-69.42	4.60	533.00	18.00	0.13
POINT_202	POINT	HORIZONTAL	Construction Point Source 202	628,160.00	3,670,490.00	-69.29	4.60	533.00	18.00	0.13
POINT_203	POINT	HORIZONTAL	Construction Point Source 203	628,185.00	3,670,865.00	-70.06	4.60	533.00	18.00	0.13
POINT_204	POINT	HORIZONTAL	Construction Point Source 204	628,185.00	3,670,840.00	-70.01	4.60	533.00	18.00	0.13
POINT_205	POINT	HORIZONTAL	Construction Point Source 205	628,185.00	3,670,815.00	-69.92	4.60	533.00	18.00	0.13
POINT_206	POINT	HORIZONTAL	Construction Point Source 206	628,185.00	3,670,790.00	-69.88	4.60	533.00	18.00	0.13
POINT_207	POINT	HORIZONTAL	Construction Point Source 207	628,185.00	3,670,765.00	-69.83	4.60	533.00	18.00	0.13
POINT_208	POINT	HORIZONTAL	Construction Point Source 208	628,185.00	3,670,740.00	-69.78	4.60	533.00	18.00	0.13
POINT_209	POINT	HORIZONTAL	Construction Point Source 209	628,185.00	3,670,715.00	-69.75	4.60	533.00	18.00	0.13
POINT_210	POINT	HORIZONTAL	Construction Point Source 210	628,185.00	3,670,690.00	-69.72	4.60	533.00	18.00	0.13
POINT_211	POINT	HORIZONTAL	Construction Point Source 211	628,185.00	3,670,665.00	-69.64	4.60	533.00	18.00	0.13
POINT_212	POINT	HORIZONTAL	Construction Point Source 212	628,185.00	3,670,640.00	-69.61	4.60	533.00	18.00	0.13
POINT_213	POINT	HORIZONTAL	Construction Point Source 213	628,185.00	3,670,615.00	-69.57	4.60	533.00	18.00	0.13
POINT_214	POINT	HORIZONTAL	Construction Point Source 214	628,185.00	3,670,590.00	-69.55	4.60	533.00	18.00	0.13
POINT_215	POINT	HORIZONTAL	Construction Point Source 215	628,185.00	3,670,565.00	-69.49	4.60	533.00	18.00	0.13
POINT_216	POINT	HORIZONTAL	Construction Point Source 216	628,185.00	3,670,540.00	-69.46	4.60	533.00	18.00	0.13
POINT_217	POINT	HORIZONTAL	Construction Point Source 217	628,185.00	3,670,515.00	-69.40	4.60	533.00	18.00	0.13
POINT_218	POINT	HORIZONTAL	Construction Point Source 218	628,185.00	3,670,490.00	-69.39	4.60	533.00	18.00	0.13
POINT_219	POINT	HORIZONTAL	Construction Point Source 219	628,210.00	3,670,865.00	-70.03	4.60	533.00	18.00	0.13
POINT_220	POINT	HORIZONTAL	Construction Point Source 220	628,210.00	3,670,840.00	-69.98	4.60	533.00	18.00	0.13
POINT_221	POINT	HORIZONTAL	Construction Point Source 221	628,210.00	3,670,815.00	-69.90	4.60	533.00	18.00	0.13
POINT_222	POINT	HORIZONTAL	Construction Point Source 222	628,210.00	3,670,790.00	-69.87	4.60	533.00	18.00	0.13
POINT_223	POINT	HORIZONTAL	Construction Point Source 223	628,210.00	3,670,765.00	-69.83	4.60	533.00	18.00	0.13
POINT_224	POINT	HORIZONTAL	Construction Point Source 224	628,210.00	3,670,740.00	-69.77	4.60	533.00	18.00	0.13
POINT_225	POINT	HORIZONTAL	Construction Point Source 225	628,210.00	3,670,715.00	-69.73	4.60	533.00	18.00	0.13
POINT_226	POINT	HORIZONTAL	Construction Point Source 226	628,210.00	3,670,690.00	-69.71	4.60	533.00	18.00	0.13
POINT_227	POINT	HORIZONTAL	Construction Point Source 227	628,210.00	3,670,665.00	-69.66	4.60	533.00	18.00	0.13
POINT_228	POINT	HORIZONTAL	Construction Point Source 228	628,210.00	3,670,640.00	-69.60	4.60	533.00	18.00	0.13
POINT_229	POINT	HORIZONTAL	Construction Point Source 229	628,210.00	3,670,615.00	-69.55	4.60	533.00	18.00	0.13
POINT_230	POINT	HORIZONTAL	Construction Point Source 230	628,210.00	3,670,590.00	-69.53	4.60	533.00	18.00	0.13
POINT_231	POINT	HORIZONTAL	Construction Point Source 231	628,210.00	3,670,565.00	-69.48	4.60	533.00	18.00	0.13
POINT_232	POINT	HORIZONTAL	Construction Point Source 232	628,210.00	3,670,540.00	-69.43	4.60	533.00	18.00	0.13
POINT_233	POINT	HORIZONTAL	Construction Point Source 233	628,210.00	3,670,515.00	-69.39	4.60	533.00	18.00	0.13
POINT_234	POINT	HORIZONTAL	Construction Point Source 234	628,210.00	3,670,490.00	-69.30	4.60	533.00	18.00	0.13
POINT_235	POINT	HORIZONTAL	Construction Point Source 235	628,235.00	3,670,865.00	-70.03	4.60	533.00	18.00	0.13
POINT_236	POINT	HORIZONTAL	Construction Point Source 236	628,235.00	3,670,840.00	-69.98	4.60	533.00	18.00	0.13
POINT_237	POINT	HORIZONTAL	Construction Point Source 237	628,235.00	3,670,815.00	-69.92	4.60	533.00	18.00	0.13
POINT_238	POINT	HORIZONTAL	Construction Point Source 238	628,235.00	3,670,790.00	-69.87	4.60	533.00	18.00	0.13
POINT_239	POINT	HORIZONTAL	Construction Point Source 239	628,235.00	3,670,765.00	-69.80	4.60	533.00	18.00	0.13
POINT_240	POINT	HORIZONTAL	Construction Point Source 240	628,235.00	3,670,740.00	-69.76	4.60	533.00	18.00	0.13

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Table 14. Point Source Parameters
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BRGP Construction Modeled Point Source Parameters

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_241	POINT	HORIZONTAL	Construction Point Source 241	628,235.00	3,670,715.00	-69.72	4.60	533.00	18.00	0.13
POINT_242	POINT	HORIZONTAL	Construction Point Source 242	628,235.00	3,670,690.00	-69.67	4.60	533.00	18.00	0.13
POINT_243	POINT	HORIZONTAL	Construction Point Source 243	628,235.00	3,670,665.00	-69.65	4.60	533.00	18.00	0.13
POINT_244	POINT	HORIZONTAL	Construction Point Source 244	628,235.00	3,670,640.00	-69.58	4.60	533.00	18.00	0.13
POINT_245	POINT	HORIZONTAL	Construction Point Source 245	628,235.00	3,670,615.00	-69.57	4.60	533.00	18.00	0.13
POINT_246	POINT	HORIZONTAL	Construction Point Source 246	628,235.00	3,670,590.00	-69.51	4.60	533.00	18.00	0.13
POINT_247	POINT	HORIZONTAL	Construction Point Source 247	628,235.00	3,670,565.00	-69.49	4.60	533.00	18.00	0.13
POINT_248	POINT	HORIZONTAL	Construction Point Source 248	628,235.00	3,670,540.00	-69.43	4.60	533.00	18.00	0.13
POINT_249	POINT	HORIZONTAL	Construction Point Source 249	628,235.00	3,670,515.00	-69.38	4.60	533.00	18.00	0.13
POINT_250	POINT	HORIZONTAL	Construction Point Source 250	628,235.00	3,670,490.00	-69.45	4.60	533.00	18.00	0.13
POINT_251	POINT	HORIZONTAL	Construction Point Source 251	628,260.00	3,670,865.00	-69.99	4.60	533.00	18.00	0.13
POINT_252	POINT	HORIZONTAL	Construction Point Source 252	628,260.00	3,670,840.00	-69.95	4.60	533.00	18.00	0.13
POINT_253	POINT	HORIZONTAL	Construction Point Source 253	628,260.00	3,670,815.00	-69.90	4.60	533.00	18.00	0.13
POINT_254	POINT	HORIZONTAL	Construction Point Source 254	628,260.00	3,670,790.00	-69.83	4.60	533.00	18.00	0.13
POINT_255	POINT	HORIZONTAL	Construction Point Source 255	628,260.00	3,670,765.00	-69.80	4.60	533.00	18.00	0.13
POINT_256	POINT	HORIZONTAL	Construction Point Source 256	628,260.00	3,670,740.00	-69.75	4.60	533.00	18.00	0.13
POINT_257	POINT	HORIZONTAL	Construction Point Source 257	628,260.00	3,670,715.00	-69.70	4.60	533.00	18.00	0.13
POINT_258	POINT	HORIZONTAL	Construction Point Source 258	628,260.00	3,670,690.00	-69.66	4.60	533.00	18.00	0.13
POINT_259	POINT	HORIZONTAL	Construction Point Source 259	628,260.00	3,670,665.00	-69.64	4.60	533.00	18.00	0.13
POINT_260	POINT	HORIZONTAL	Construction Point Source 260	628,260.00	3,670,640.00	-69.58	4.60	533.00	18.00	0.13
POINT_261	POINT	HORIZONTAL	Construction Point Source 261	628,260.00	3,670,615.00	-69.54	4.60	533.00	18.00	0.13
POINT_262	POINT	HORIZONTAL	Construction Point Source 262	628,260.00	3,670,590.00	-69.48	4.60	533.00	18.00	0.13
POINT_263	POINT	HORIZONTAL	Construction Point Source 263	628,260.00	3,670,565.00	-69.45	4.60	533.00	18.00	0.13
POINT_264	POINT	HORIZONTAL	Construction Point Source 264	628,260.00	3,670,540.00	-69.42	4.60	533.00	18.00	0.13
POINT_265	POINT	HORIZONTAL	Construction Point Source 265	628,260.00	3,670,515.00	-69.37	4.60	533.00	18.00	0.13
POINT_266	POINT	HORIZONTAL	Construction Point Source 266	628,260.00	3,670,490.00	-69.54	4.60	533.00	18.00	0.13
POINT_267	POINT	HORIZONTAL	Construction Point Source 267	628,285.00	3,670,865.00	-69.96	4.60	533.00	18.00	0.13
POINT_268	POINT	HORIZONTAL	Construction Point Source 268	628,285.00	3,670,840.00	-69.92	4.60	533.00	18.00	0.13
POINT_269	POINT	HORIZONTAL	Construction Point Source 269	628,285.00	3,670,815.00	-69.90	4.60	533.00	18.00	0.13
POINT_270	POINT	HORIZONTAL	Construction Point Source 270	628,285.00	3,670,790.00	-69.82	4.60	533.00	18.00	0.13
POINT_271	POINT	HORIZONTAL	Construction Point Source 271	628,285.00	3,670,765.00	-69.79	4.60	533.00	18.00	0.13
POINT_272	POINT	HORIZONTAL	Construction Point Source 272	628,285.00	3,670,740.00	-69.73	4.60	533.00	18.00	0.13
POINT_273	POINT	HORIZONTAL	Construction Point Source 273	628,285.00	3,670,715.00	-69.68	4.60	533.00	18.00	0.13
POINT_274	POINT	HORIZONTAL	Construction Point Source 274	628,285.00	3,670,690.00	-69.66	4.60	533.00	18.00	0.13
POINT_275	POINT	HORIZONTAL	Construction Point Source 275	628,285.00	3,670,665.00	-69.62	4.60	533.00	18.00	0.13
POINT_276	POINT	HORIZONTAL	Construction Point Source 276	628,285.00	3,670,640.00	-69.56	4.60	533.00	18.00	0.13
POINT_277	POINT	HORIZONTAL	Construction Point Source 277	628,285.00	3,670,615.00	-69.53	4.60	533.00	18.00	0.13
POINT_278	POINT	HORIZONTAL	Construction Point Source 278	628,285.00	3,670,590.00	-69.47	4.60	533.00	18.00	0.13
POINT_279	POINT	HORIZONTAL	Construction Point Source 279	628,285.00	3,670,565.00	-69.45	4.60	533.00	18.00	0.13
POINT_280	POINT	HORIZONTAL	Construction Point Source 280	628,285.00	3,670,540.00	-69.40	4.60	533.00	18.00	0.13

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Table 14. Point Source Parameters
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BRGP Construction Modeled Point Source Parameters

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_281	POINT	HORIZONTAL	Construction Point Source 281	628,285.00	3,670,515.00	-69.37	4.60	533.00	18.00	0.13
POINT_282	POINT	HORIZONTAL	Construction Point Source 282	628,285.00	3,670,490.00	-69.65	4.60	533.00	18.00	0.13
POINT_283	POINT	HORIZONTAL	Construction Point Source 283	628,310.00	3,670,865.00	-69.86	4.60	533.00	18.00	0.13
POINT_284	POINT	HORIZONTAL	Construction Point Source 284	628,310.00	3,670,840.00	-69.80	4.60	533.00	18.00	0.13
POINT_285	POINT	HORIZONTAL	Construction Point Source 285	628,310.00	3,670,815.00	-69.65	4.60	533.00	18.00	0.13
POINT_286	POINT	HORIZONTAL	Construction Point Source 286	628,310.00	3,670,790.00	-69.80	4.60	533.00	18.00	0.13
POINT_287	POINT	HORIZONTAL	Construction Point Source 287	628,310.00	3,670,765.00	-69.76	4.60	533.00	18.00	0.13
POINT_288	POINT	HORIZONTAL	Construction Point Source 288	628,310.00	3,670,740.00	-69.72	4.60	533.00	18.00	0.13
POINT_289	POINT	HORIZONTAL	Construction Point Source 289	628,310.00	3,670,715.00	-69.66	4.60	533.00	18.00	0.13
POINT_290	POINT	HORIZONTAL	Construction Point Source 290	628,310.00	3,670,690.00	-69.64	4.60	533.00	18.00	0.13
POINT_291	POINT	HORIZONTAL	Construction Point Source 291	628,310.00	3,670,665.00	-69.60	4.60	533.00	18.00	0.13
POINT_292	POINT	HORIZONTAL	Construction Point Source 292	628,310.00	3,670,640.00	-69.53	4.60	533.00	18.00	0.13
POINT_293	POINT	HORIZONTAL	Construction Point Source 293	628,310.00	3,670,615.00	-69.52	4.60	533.00	18.00	0.13
POINT_294	POINT	HORIZONTAL	Construction Point Source 294	628,310.00	3,670,590.00	-69.45	4.60	533.00	18.00	0.13
POINT_295	POINT	HORIZONTAL	Construction Point Source 295	628,310.00	3,670,565.00	-69.42	4.60	533.00	18.00	0.13
POINT_296	POINT	HORIZONTAL	Construction Point Source 296	628,310.00	3,670,540.00	-69.39	4.60	533.00	18.00	0.13
POINT_297	POINT	HORIZONTAL	Construction Point Source 297	628,310.00	3,670,515.00	-69.32	4.60	533.00	18.00	0.13
POINT_298	POINT	HORIZONTAL	Construction Point Source 298	628,310.00	3,670,490.00	-69.66	4.60	533.00	18.00	0.13
POINT_299	POINT	HORIZONTAL	Construction Point Source 299	628,335.00	3,670,865.00	-69.82	4.60	533.00	18.00	0.13
POINT_300	POINT	HORIZONTAL	Construction Point Source 300	628,335.00	3,670,840.00	-69.81	4.60	533.00	18.00	0.13
POINT_301	POINT	HORIZONTAL	Construction Point Source 301	628,335.00	3,670,815.00	-69.62	4.60	533.00	18.00	0.13
POINT_302	POINT	HORIZONTAL	Construction Point Source 302	628,335.00	3,670,790.00	-69.74	4.60	533.00	18.00	0.13
POINT_303	POINT	HORIZONTAL	Construction Point Source 303	628,335.00	3,670,765.00	-69.73	4.60	533.00	18.00	0.13
POINT_304	POINT	HORIZONTAL	Construction Point Source 304	628,335.00	3,670,740.00	-69.70	4.60	533.00	18.00	0.13
POINT_305	POINT	HORIZONTAL	Construction Point Source 305	628,335.00	3,670,715.00	-69.65	4.60	533.00	18.00	0.13
POINT_306	POINT	HORIZONTAL	Construction Point Source 306	628,335.00	3,670,690.00	-69.63	4.60	533.00	18.00	0.13
POINT_307	POINT	HORIZONTAL	Construction Point Source 307	628,335.00	3,670,665.00	-69.58	4.60	533.00	18.00	0.13
POINT_308	POINT	HORIZONTAL	Construction Point Source 308	628,335.00	3,670,640.00	-69.52	4.60	533.00	18.00	0.13
POINT_309	POINT	HORIZONTAL	Construction Point Source 309	628,335.00	3,670,615.00	-69.49	4.60	533.00	18.00	0.13
POINT_310	POINT	HORIZONTAL	Construction Point Source 310	628,335.00	3,670,590.00	-69.45	4.60	533.00	18.00	0.13
POINT_311	POINT	HORIZONTAL	Construction Point Source 311	628,335.00	3,670,565.00	-69.44	4.60	533.00	18.00	0.13
POINT_312	POINT	HORIZONTAL	Construction Point Source 312	628,335.00	3,670,540.00	-69.35	4.60	533.00	18.00	0.13
POINT_313	POINT	HORIZONTAL	Construction Point Source 313	628,335.00	3,670,515.00	-69.32	4.60	533.00	18.00	0.13
POINT_314	POINT	HORIZONTAL	Construction Point Source 314	628,335.00	3,670,490.00	-69.75	4.60	533.00	18.00	0.13
POINT_315	POINT	HORIZONTAL	Construction Point Source 315	628,360.00	3,670,865.00	-69.81	4.60	533.00	18.00	0.13
POINT_316	POINT	HORIZONTAL	Construction Point Source 316	628,360.00	3,670,840.00	-69.73	4.60	533.00	18.00	0.13
POINT_317	POINT	HORIZONTAL	Construction Point Source 317	628,360.00	3,670,815.00	-69.72	4.60	533.00	18.00	0.13
POINT_318	POINT	HORIZONTAL	Construction Point Source 318	628,360.00	3,670,790.00	-69.76	4.60	533.00	18.00	0.13
POINT_319	POINT	HORIZONTAL	Construction Point Source 319	628,360.00	3,670,765.00	-69.75	4.60	533.00	18.00	0.13
POINT_320	POINT	HORIZONTAL	Construction Point Source 320	628,360.00	3,670,740.00	-69.69	4.60	533.00	18.00	0.13

Black Rock Geothermal Project**BRGP Construction Air Quality Impacts Analysis****Table 14. Point Source Parameters****April 2023****BRGP Construction Modeled Point Source Parameters**

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_321	POINT	HORIZONTAL	Construction Point Source 321	628,360.00	3,670,715.00	-69.66	4.60	533.00	18.00	0.13
POINT_322	POINT	HORIZONTAL	Construction Point Source 322	628,360.00	3,670,690.00	-69.61	4.60	533.00	18.00	0.13
POINT_323	POINT	HORIZONTAL	Construction Point Source 323	628,360.00	3,670,665.00	-69.61	4.60	533.00	18.00	0.13
POINT_324	POINT	HORIZONTAL	Construction Point Source 324	628,360.00	3,670,640.00	-69.54	4.60	533.00	18.00	0.13
POINT_325	POINT	HORIZONTAL	Construction Point Source 325	628,360.00	3,670,615.00	-69.51	4.60	533.00	18.00	0.13
POINT_326	POINT	HORIZONTAL	Construction Point Source 326	628,360.00	3,670,590.00	-69.47	4.60	533.00	18.00	0.13
POINT_327	POINT	HORIZONTAL	Construction Point Source 327	628,360.00	3,670,565.00	-69.42	4.60	533.00	18.00	0.13
POINT_328	POINT	HORIZONTAL	Construction Point Source 328	628,360.00	3,670,540.00	-69.35	4.60	533.00	18.00	0.13
POINT_329	POINT	HORIZONTAL	Construction Point Source 329	628,360.00	3,670,515.00	-69.31	4.60	533.00	18.00	0.13
POINT_330	POINT	HORIZONTAL	Construction Point Source 330	628,360.00	3,670,490.00	-69.59	4.60	533.00	18.00	0.13
POINT_331	POINT	HORIZONTAL	Construction Point Source 331	627,835.00	3,670,465.00	-69.79	4.60	533.00	18.00	0.13
POINT_332	POINT	HORIZONTAL	Construction Point Source 332	627,860.00	3,670,465.00	-69.77	4.60	533.00	18.00	0.13
POINT_333	POINT	HORIZONTAL	Construction Point Source 333	627,885.00	3,670,465.00	-69.76	4.60	533.00	18.00	0.13
POINT_334	POINT	HORIZONTAL	Construction Point Source 334	627,910.00	3,670,465.00	-69.72	4.60	533.00	18.00	0.13
POINT_335	POINT	HORIZONTAL	Construction Point Source 335	627,935.00	3,670,465.00	-69.70	4.60	533.00	18.00	0.13
POINT_336	POINT	HORIZONTAL	Construction Point Source 336	627,960.00	3,670,465.00	-69.69	4.60	533.00	18.00	0.13
POINT_337	POINT	HORIZONTAL	Construction Point Source 337	627,985.00	3,670,465.00	-69.65	4.60	533.00	18.00	0.13
POINT_338	POINT	HORIZONTAL	Construction Point Source 338	628,010.00	3,670,465.00	-69.61	4.60	533.00	18.00	0.13
POINT_339	POINT	HORIZONTAL	Construction Point Source 339	628,035.00	3,670,465.00	-69.62	4.60	533.00	18.00	0.13
POINT_340	POINT	HORIZONTAL	Construction Point Source 340	628,060.00	3,670,465.00	-69.59	4.60	533.00	18.00	0.13
POINT_341	POINT	HORIZONTAL	Construction Point Source 341	628,085.00	3,670,465.00	-69.54	4.60	533.00	18.00	0.13
POINT_342	POINT	HORIZONTAL	Construction Point Source 342	628,110.00	3,670,465.00	-69.53	4.60	533.00	18.00	0.13
POINT_343	POINT	HORIZONTAL	Construction Point Source 343	628,135.00	3,670,465.00	-69.53	4.60	533.00	18.00	0.13
POINT_344	POINT	HORIZONTAL	Construction Point Source 344	628,160.00	3,670,465.00	-69.48	4.60	533.00	18.00	0.13
POINT_345	POINT	HORIZONTAL	Construction Point Source 345	628,185.00	3,670,465.00	-69.50	4.60	533.00	18.00	0.13
POINT_346	POINT	HORIZONTAL	Construction Point Source 346	628,210.00	3,670,465.00	-69.42	4.60	533.00	18.00	0.13
POINT_347	POINT	HORIZONTAL	Construction Point Source 347	628,235.00	3,670,465.00	-69.53	4.60	533.00	18.00	0.13
POINT_348	POINT	HORIZONTAL	Construction Point Source 348	628,260.00	3,670,465.00	-69.71	4.60	533.00	18.00	0.13
POINT_349	POINT	HORIZONTAL	Construction Point Source 349	628,285.00	3,670,465.00	-69.74	4.60	533.00	18.00	0.13
POINT_350	POINT	HORIZONTAL	Construction Point Source 350	628,310.00	3,670,465.00	-69.68	4.60	533.00	18.00	0.13
POINT_351	POINT	HORIZONTAL	Construction Point Source 351	628,335.00	3,670,465.00	-69.70	4.60	533.00	18.00	0.13
POINT_352	POINT	HORIZONTAL	Construction Point Source 352	628,360.00	3,670,465.00	-69.73	4.60	533.00	18.00	0.13
POINT_353	POINT	HORIZONTAL	Construction Point Source 353	627,835.00	3,670,890.00	-70.31	4.60	533.00	18.00	0.13
POINT_354	POINT	HORIZONTAL	Construction Point Source 354	627,860.00	3,670,890.00	-70.30	4.60	533.00	18.00	0.13
POINT_355	POINT	HORIZONTAL	Construction Point Source 355	627,885.00	3,670,890.00	-70.28	4.60	533.00	18.00	0.13
POINT_356	POINT	HORIZONTAL	Construction Point Source 356	627,910.00	3,670,890.00	-70.25	4.60	533.00	18.00	0.13
POINT_357	POINT	HORIZONTAL	Construction Point Source 357	627,935.00	3,670,890.00	-70.24	4.60	533.00	18.00	0.13
POINT_358	POINT	HORIZONTAL	Construction Point Source 358	627,960.00	3,670,890.00	-70.23	4.60	533.00	18.00	0.13
POINT_359	POINT	HORIZONTAL	Construction Point Source 359	627,985.00	3,670,890.00	-70.19	4.60	533.00	18.00	0.13
POINT_360	POINT	HORIZONTAL	Construction Point Source 360	628,010.00	3,670,890.00	-70.20	4.60	533.00	18.00	0.13

Black Rock Geothermal Project
BRGP Construction Air Quality Impacts Analysis
Table 14. Point Source Parameters
April 2023

BRGP Construction Modeled Point Source Parameters

Source ID	Source Type	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter
				(m)	(m)	(m)	(m)	(K)	(m/s)	(m)
POINT_361	POINT	HORIZONTAL	Construction Point Source 361	628,035.00	3,670,890.00	-70.18	4.60	533.00	18.00	0.13
POINT_362	POINT	HORIZONTAL	Construction Point Source 362	628,060.00	3,670,890.00	-70.15	4.60	533.00	18.00	0.13
POINT_363	POINT	HORIZONTAL	Construction Point Source 363	628,085.00	3,670,890.00	-70.12	4.60	533.00	18.00	0.13
POINT_364	POINT	HORIZONTAL	Construction Point Source 364	627,835.00	3,670,865.00	-70.25	4.60	533.00	18.00	0.13
POINT_365	POINT	HORIZONTAL	Construction Point Source 365	627,835.00	3,670,840.00	-70.20	4.60	533.00	18.00	0.13
POINT_366	POINT	HORIZONTAL	Construction Point Source 366	627,835.00	3,670,815.00	-70.13	4.60	533.00	18.00	0.13
POINT_367	POINT	HORIZONTAL	Construction Point Source 367	627,860.00	3,670,865.00	-70.24	4.60	533.00	18.00	0.13
POINT_368	POINT	HORIZONTAL	Construction Point Source 368	627,860.00	3,670,840.00	-70.21	4.60	533.00	18.00	0.13
POINT_369	POINT	HORIZONTAL	Construction Point Source 369	627,860.00	3,670,815.00	-70.14	4.60	533.00	18.00	0.13
POINT_370	POINT	HORIZONTAL	Construction Point Source 370	627,885.00	3,670,865.00	-70.23	4.60	533.00	18.00	0.13
POINT_371	POINT	HORIZONTAL	Construction Point Source 371	627,885.00	3,670,840.00	-70.19	4.60	533.00	18.00	0.13
POINT_372	POINT	HORIZONTAL	Construction Point Source 372	627,885.00	3,670,815.00	-70.12	4.60	533.00	18.00	0.13
POINT_373	POINT	HORIZONTAL	Construction Point Source 373	627,910.00	3,670,865.00	-70.20	4.60	533.00	18.00	0.13
POINT_374	POINT	HORIZONTAL	Construction Point Source 374	627,910.00	3,670,840.00	-70.17	4.60	533.00	18.00	0.13
POINT_375	POINT	HORIZONTAL	Construction Point Source 375	627,910.00	3,670,815.00	-70.12	4.60	533.00	18.00	0.13
POINT_376	POINT	HORIZONTAL	Construction Point Source 376	627,935.00	3,670,865.00	-70.20	4.60	533.00	18.00	0.13
POINT_377	POINT	HORIZONTAL	Construction Point Source 377	627,935.00	3,670,840.00	-70.16	4.60	533.00	18.00	0.13
POINT_378	POINT	HORIZONTAL	Construction Point Source 378	627,935.00	3,670,815.00	-70.14	4.60	533.00	18.00	0.13
POINT_379	POINT	HORIZONTAL	Construction Point Source 379	627,960.00	3,670,865.00	-70.17	4.60	533.00	18.00	0.13
POINT_380	POINT	HORIZONTAL	Construction Point Source 380	627,960.00	3,670,840.00	-70.15	4.60	533.00	18.00	0.13
POINT_381	POINT	HORIZONTAL	Construction Point Source 381	627,960.00	3,670,815.00	-70.10	4.60	533.00	18.00	0.13
POINT_382	POINT	HORIZONTAL	Construction Point Source 382	627,985.00	3,670,865.00	-70.20	4.60	533.00	18.00	0.13
POINT_383	POINT	HORIZONTAL	Construction Point Source 383	627,985.00	3,670,840.00	-70.14	4.60	533.00	18.00	0.13
POINT_384	POINT	HORIZONTAL	Construction Point Source 384	627,985.00	3,670,815.00	-70.08	4.60	533.00	18.00	0.13
POINT_385	POINT	HORIZONTAL	Construction Point Source 385	628,010.00	3,670,865.00	-70.17	4.60	533.00	18.00	0.13
POINT_386	POINT	HORIZONTAL	Construction Point Source 386	628,010.00	3,670,840.00	-70.12	4.60	533.00	18.00	0.13
POINT_387	POINT	HORIZONTAL	Construction Point Source 387	628,010.00	3,670,815.00	-70.05	4.60	533.00	18.00	0.13
POINT_388	POINT	HORIZONTAL	Construction Point Source 388	628,035.00	3,670,865.00	-70.15	4.60	533.00	18.00	0.13
POINT_389	POINT	HORIZONTAL	Construction Point Source 389	628,035.00	3,670,840.00	-70.08	4.60	533.00	18.00	0.13
POINT_390	POINT	HORIZONTAL	Construction Point Source 390	628,035.00	3,670,815.00	-70.03	4.60	533.00	18.00	0.13
POINT_391	POINT	HORIZONTAL	Construction Point Source 391	628,060.00	3,670,865.00	-70.10	4.60	533.00	18.00	0.13
POINT_392	POINT	HORIZONTAL	Construction Point Source 392	628,060.00	3,670,840.00	-70.07	4.60	533.00	18.00	0.13
POINT_393	POINT	HORIZONTAL	Construction Point Source 393	628,060.00	3,670,815.00	-69.98	4.60	533.00	18.00	0.13
POINT_394	POINT	HORIZONTAL	Construction Point Source 394	628,085.00	3,670,865.00	-70.10	4.60	533.00	18.00	0.13
POINT_395	POINT	HORIZONTAL	Construction Point Source 395	628,085.00	3,670,840.00	-70.05	4.60	533.00	18.00	0.13
POINT_396	POINT	HORIZONTAL	Construction Point Source 396	628,085.00	3,670,815.00	-70.00	4.60	533.00	18.00	0.13

Note: Coordinates presented are UTM NAD83 Zone 11

m = meter(s)

K = Kelvin

m/s = meter(s) per second

Black Rock Geothermal Project
BRGP Construction Air Quality Impacts Analysis
Table 15. Area Source Parameters
April 2023

BRGP Construction Modeled Area Source Parameters

Source ID	Source Description	Base Elevation	Release Height	Number of Vertices	Initial Vert. Dimension	Easting (X1)	Northing (Y1)	Easting (X2)	Northing (Y2)	Easting (X3)	Northing (Y3)	Easting (X4)	Northing (Y4)	Easting (X5)	Northing (Y5)	Easting (X6)	Northing (Y6)
		(m)	(m)		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
AREA_1	Construction Fugitive Dust Source	-70.10	0.00	6	0.00	627,835.90	3,670,788.63	627,833.63	3,670,465.32	628,359.86	3,670,463.80	628,359.86	3,670,890.09	628,109.24	3,670,890.85	628,109.24	3,670,790.14

Note: Coordinates presented are UTM NAD83 Zone 11
m = meter(s)

Black Rock Geothermal Project

BRGP Construction Air Quality Impacts Analysis

Table 16. Source Emission Rates

April 2023

BRGP Construction Modeled Source Emission Rates Per Source

Source ID	Source Type	Release Type	Source Description	CO	NO2	NO2A	SO2	SO2A	PM10	PM10A	PM25	PM25A
				(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
Point1-Point352	POINT	DEFAULT	Construction Point Sources	3.82E-03	1.87E-03	1.71E-03	9.17E-06	1.70E-05	4.47E-05	1.82E-05	4.18E-05	1.72E-05
AREA_1	AREAPOLY	DEFAULT	Construction Fugitive Dust Source	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.49E-02	1.58E-02	2.59E-03	1.60E-03

Notes:

Emission rates developed based upon emissions presented in Section 5.1 and Appendix 5.1D, Construction Emissions Inventory.

Descriptions of pollutant IDs and their associated averaging periods are as follows:

CO emission rates correspond to the 1-hour and 8-hour CO averaging period.

NO2 emission rates correspond to the 1-hour NO₂ averaging period.

NO2A emission rates correspond to the Annual NO₂ averaging period.

PM25 emission rates correspond to the 24-hour PM_{2.5} averaging period.

PM25A emission rates correspond to the Annual PM_{2.5} averaging period.

PM10 emission rates correspond to the 24-hour PM₁₀ averaging period.

PM10A emission rates correspond to the Annual PM₁₀ averaging period.

SO2 emission rates correspond to the 1-hour, 3-hour, and 24-hour SO₂ averaging period.

SO2A emission rates correspond to the Annual SO₂ averaging period.

g/s = gram(s) per second

Appendix 5.1E

Basis of BACT Determination





March 9, 2017

Mr. Jesus Ramirez
Mr. Thomas Brinkerhoff
Imperial County Air Pollution Control District
150 South Ninth Street
El Centro, California 92243
(Via Email & Mail)

Subject: Elmore Back-Pressure Turbine Installation, April 2017
Update to Air Permit Application

Dear Mr. Ramirez and Mr. Binkerhoff,

Enclosed please find an update to the air permit application for the installation of a new turbine at the Elmore facility. CalEnergy submitted the original application on January 3, 2017, and is supplementing the original application information with an analysis of the Best Available Control Technologies (a BACT analysis) for minimizing air emissions from the facility.

The submittal of this information is meant to provide all of the information required for the issuance of an authority- to-construct. Upon approval of the air abatement technologies recommended in the BACT analysis, by the Imperial County Air Pollution Control District, the final equipment design will proceed. It is CalEnergy's intention to submit final design/sizing of the equipment to the air district prior to the issuance of the permit-to-operate for the new turbine and air abatement equipment.

Please do not hesitate to me at 760-348-4275, or via e-mail at Anetha.lue@calenergy.com, with any questions regarding this submittal; and thank you in advance for your review of this application.

Sincerely,

D. Anetha Lue

Digitally signed by D. Anetha Lue
DN: cn=D. Anetha Lue, o, ou=CalEnergy,
email=anetha.lue@calenergy.com, c=US
Date: 2017.03.09 18:02:47 -08'00'

Anetha Lue
Director IPP Environmental Services

Attachment

CALENERGY
OPERATING CORPORATION
7030 Gentry Road, Calipatria, California 92233
Phone: 760-348-4200 Fax: 760-348-2714

Cc: Lenie Sarion
Randy Keller
Ed Arceo
Jenny Wu
Jie Meng
Henry Veizades - Veizades & Associates, Inc.
Jill Haizlip - Geologica Geothermal Group Inc

BACT Analysis for Air Abatement Systems at Elmore Facility

Back-Pressure Turbine Installation

Prepared by
CalEnergy Operating Corporation



with
Geologica Geothermal Group, Inc.



And
Veizades & Associates, Inc.



March 07, 2017

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1 Introduction

This memorandum presents the Best Available Control Technology (BACT) analysis prepared as part of the permitting process for the proposed modification of the J.J. Elmore Geothermal Power Plant for submittal to the Imperial County Air Pollution Control District, in order to authorize the installation of a back-pressure turbine at the facility. The initial permit application was submitted on January 3, 2017, and following submittal of the application it was determined (during discussions with the air district) that since the turbine addition constituted a modification of the facility, a BACT analysis would be required to supplement the initial application. The purpose of this BACT analysis is to identify the technologically feasible and cost effective controls for limiting air emissions from the facility. This analysis briefly describes the modifications and impacts to air emissions, the potential to emit levels for air pollutants; several control technologies are described including efficiencies, cost effectiveness, and related results.

The information contained herein is based on CalEnergy's operating experience and data with air pollution controls, and on engineering estimates of the planned modification provided by Geologica Geothermal Group, Inc. (Geologica) and Veizades and Associates, Inc.

1.1 Plant Background, Modifications & BACT Thresholds

Plant Background

CalEnergy Operating Corporation (CalEnergy) owns and operates the J.J. Elmore Geothermal Power Plant (Elmore Plant), located at 786 West Sinclair Road, Calipatria, California. The Elmore Plant entered into commercial operation in 1989 with an air permit issued from the Imperial County Air Pollution Control District (ICAPCD) for 45MWe operation. The Elmore plant is currently operating under amended conditions and authority to construct with permit to operate #1890F-2 from the ICAPCD dated May 31, 2016. CalEnergy is proposing to install a back-pressure turbine at the Elmore Plant to optimize and increase the conversion of geothermal heat into electrical energy. The revised net output for the power plant will be 49.9 MWe.

The Elmore Plant currently uses high pressure steam, via a heat exchanger to augment the standard pressure steam by reheating clean condensate for re-entry into the existing condensing turbine. This system is called a heat recovery system and it generates additional steam without having the impurities in the high pressure steam encounter the turbine. At the time the Elmore facility was designed, the heat recovery system was the best available technology to make additional power without having to mitigate the impurities in high pressure steam.

Modifications

Enhancements in steam purification have been made since the Elmore facility entered commercial operation in 1989 and CalEnergy is proposing to use improved technology to remove the impurities from the high pressure (HP) steam. This improved steam purification technology will allow CalEnergy to use a more efficient high pressure steam turbine in addition to the existing turbine. Using a high pressure steam turbine in place of the heat recovery system will allow the Elmore plant to generate up to 49.9 MWe without increasing fluid flow from the geothermal resource.

In order to use a high pressure steam turbine in place of the heat recovery system, additional equipment will be installed within the existing boundary of the Elmore facility. The heat recovery system will remain in place as a back-up system. The following new equipment will be located within the power generation area of the Elmore plant and within the existing paved site containment:

1. Skid mounted back pressure Turbine and auxiliary equipment
2. Power Distribution Control (PDC) System
3. High Pressure Steam Scrubber
4. High Pressure Steam Demister
5. Standard Pressure Steam Scrubber
6. Non-condensable gas (NCG) removal system
7. High Pressure and Standard Pressure interconnecting piping

BACT Thresholds

Given that the air district has determined that the changes described herein will be determined a modification of the facility, the following requirements become effective:

- ICAPCD Rule 207 C.1.b states that “An applicant shall apply (BACT) on a pollutant by pollutant basis to any modified Emissions Unit with a Potential to Emit of 25 pounds per day or more of any Nonattainment Pollutant or its Precursors”. Given that the Elmore facility is located in a non-attainment area for particulate matter and ozone, emissions of particulate matter, and ozone precursors (i.e. nitrogen oxides, volatile organic compounds and benzene) are initially considered in this review. **With potential emissions of particulate matter at 383.6 lbs/day, and potential emission of benzene at 54.7 lbs/day, based on the permit, these parameters were included in the BACT analysis.** However, given that nitrogen oxides, and VOCs (except for benzene), are submitted by combustion engines at the facility (which are not part of the modification), nitrogen oxides and (non-benzene) VOCs are not included in the BACT analysis.
- ICAPCD Rule 207.1.c requires a BACT for “ any new or modified Emissions Unit with a Potential to Emit equal to or greater than” 55 lbs/day or hydrogen sulfide; which is emitted by the Elmore facility (and below certain thresholds for pollutants such as fluorides, which are not emitted by the source). **Given potential emission of 547.2 lbs/day of hydrogen sulfide from Elmore (based on the 22.8 lbs/hr permit limit for the source) hydrogen sulfide emissions were included in the BACT review.**

1.2 Unabated Air Pollutants & Historical Actual Emissions

Potential air pollutants, controls and monitoring were previously identified in air permit applications and permits (ATC-PTO #1890F-2) for the Elmore plant. These include hydrogen sulfide (H_2S), benzene (C_6H_6) and particulate matter (PM_{10}). In addition, since Imperial Valley is a non-attainment area for ozone, the effect (or lack thereof) of this project on nitrogen oxide and other volatile organic compound emissions was also verified. Currently, the Elmore plant maintains air emissions below permit levels with two abatement technologies: the Oxidizer Box (OxBox), which abates H_2S in the condensate from the plant, and cooling tower drift eliminators which mitigate PM_{10} emissions.

Although the proposed modifications will not change the total amount of geothermal fluid flowing through the plant, the unabated emissions for H_2S could be affected by the change because H_2S is emitted in both steam condensate (into which it dissolves) and in the non-condensable gas (NCG) flow

which remains after the steam is condensed; and the modification is expected to redistribute the H₂S concentrations in these streams. Because H₂S control technologies for the condensate and NCG flow streams can be different and they have been treated differently at Elmore, the emissions and controls for each flow stream are evaluated separately in this analysis, while understanding that H₂S emission limits apply to the combined emissions from each flow stream.

The range of partitioning of H₂S between condensate and NCG is estimated based on field testing by CalEnergy Operations. Steam mass flows and H₂S concentrations also vary depending on the relative contribution of wells supplying the plant. These variables produce a range of potential unabated H₂S emissions from the condensate and NCG flow streams (Table 1.a).

Because there will be no modifications to the cooling tower, which is the only source of particulate emissions under normal operating conditions at Elmore, impacts to PM₁₀ emissions are not anticipated. Similarly, since the total flow of geothermal fluid through the plant is not changing, and benzene emissions occur in the NCG flow (partitioning into the condensate phase is minimal), there are no anticipated changes to benzene emissions as a result of the proposed modifications.

The average benzene emissions appear to be about 0.073 lb/hr, with a maximum of 0.103 lb/hr (based on APCD data from 2014-2016). Even at maximum benzene emission, emissions are below the permit (#1890F-2) threshold limit of 2.8 lb/day and significantly below the BACT threshold of 25 lb/day.

Average cooling tower PM₁₀ emissions were 2.29 lb/hr (54.96 lb/day) in July, 2014 (based for the July 2014 source test), and are not expected to change (apart for normal fluctuations) with the plant modifications.

At Elmore nitrogen oxides and volatile organic compounds (with the exception of benzene) are emitted in minor quantities from the emergency diesel generators, the emergency diesel fire pump, and portable diesel engines (all of which are permitted by the Imperial County Air Pollution Control District). Given that the installation of this project will have no effect on these sources, a BACT analysis was not conducted for these pollutants (with the exception of benzene emissions from the geothermal brine).

The potential unabated emissions of H₂S without any abatement efforts is between 27.25-43.50 lb/hr based on plant data from 2016, and sampling of HP steam for H₂S analysis on December 7th, 2016 (Table 1.a). The average hourly rate of H₂S emissions (in NCG + condensate) based on the currently installed abatement systems is 7.28 lb/hr, which is below the current permit limit of 22.8 lb/hr (Table 1.a). The of PM₁₀ and benzene emissions from source test data is included in Table 1.b.

Table 1.a – Unabated H₂S Emissions

1) Potential for total H₂S emission with no abatement; 2) current average H₂S emissions using existing abatement system; and 3) current permit limit for H₂S emissions at Elmore.

	Total Unabated Emissions (lb/hr)	Unabated Condensate Emissions (lb/hr)	Unabated Gas Emissions (lb/hr)
	Potential to emit without any abatement		
H ₂ S minimum	40.37	13.12	27.25
H ₂ S maximum	64.44	20.94	43.50

H₂S from proposed mass flows from P&ID from June 7, 2016 and proposed Elmore modification; H₂S from plant sampling by CalEnergy on December 7, 2016.

Using an average partitioning ratio of 32.5% condensate and 67.5% gas for H₂S

Table 1.b – Benzene & PM₁₀ Source Test Data Emissions

	2014 Source Test Emissions	Average Emissions (lb/hr) ^A	Current Permit Limit (lb/hr)
Benzene	0.006	0.073	2.28
PM ₁₀	2.29	-	15.98

^A From 2014-2016

Historical actual emissions (HAEs) from the facility are shown in Tables 2.

Table 2- Historical Actual Emissions – For the Brine Process

Quarterly Average Emissions						
Hydrogen Sulfide Emissions, (lbs/hr)			Benzene Emissions, (lbs/hr)			
2014	2015	2016	2014	2015	2016	
Quarter I	6.17	3.65	13.04	0.02	0.04	0.04
Quarter II	7.29	3.68	5.65	0.02	0.01	0.01
Quarter III	6.87	8.36	10.81	0.01	0.01	0.03
Quarter IV	3.96	7.67	5.05	0.01	0.02	0.01
Annual Maximum of Hourly Averages						
Hydrogen Sulfide Emissions, (lbs/hr)			Benzene Emissions, (lbs/hr)			
2014	2015	2016	2014	2015	2016	
10.71	10.84	20.57	0.045	0.103	0.07	
Sampled during Aug 2014	Aug 2015	Jan 2016	Feb 2014	Feb 2016	Jan 2016	

Notes:

Combined emissions from condensate and non-condensable gasses are shown above.

(1) Historical flows are based on weekly readings that can be taken when plant MW loads/output are low, historical actual emissions should be based on the annual maximum values.

(2) Facility-wide emissions are not shown above – These include emissions from an emergency generator and emissions from portable equipment permitted in 2015 and 2016. The emissions from the portable equipment are offset.

1.3 BACT Process and Options

BACT analysis includes consideration of several possible abatement technologies. The efficiency of the current OxBox, as well as chemical oxidation and iron chelate, were considered to determine which constitutes Best Available Control Technology (BACT) for the abatement of H₂S in sour condensate liquid emissions at Elmore. For potential H₂S emissions in the non-condensable gas (NCG) flow stream, the feasibility of the use of a regenerative thermal oxidizer (RTO), bioreactor, sparger, and BIOX were considered for Elmore. RTO was considered for benzene abatement in NCG.

Both control efficiencies and cost of the abatement processes are considered in this BACT. The BACT analysis includes five steps:

1. Identification of control technologies
2. Elimination of infeasible options
3. Rank of the remaining control technologies
4. Evaluation of the most effective control
5. Selection of BACT

2 Step 1: Identification of Control Technologies

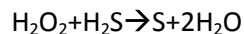
2.1 Sour Condensate Liquid (H₂S) Abatement Options

2.1.1 OxBox

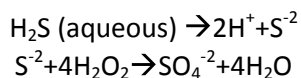
After separation of the non-condensable gas and condensate, condensate is routed to the bio-oxidation box (OxBox) in the cooling tower, where the naturally occurring bacteria present in geothermal cooling tower water abates H₂S in the condensate (see Air Permit Application for Cal Energy Region 1, Unit 3 Cooling Tower Bio-oxidation Box Modification, CalEnergy Operations 2016). Average condensate abatement efficiency from the existing OxBox and average total H₂S emissions were calculated using data reported to the APCD by CalEnergy over the last three years (from 2014-2016). The average condensate abatement efficiency of the OxBox over the last three years is 90.9%.

2.1.2 Chemical Oxidation (Iron Chelate)

The chemical oxidation process uses hydrogen peroxide (H₂O₂) to treat water in order to oxidize H₂S into elemental sulfur (S) (if the solution is neutral or acidic) or sulfates (if the solution is basic) (Rodriguez, Harvey and Asbjornsson 2014). In acidic or neutral solutions, the H₂O₂ and H₂S forms S and H₂O:



In basic solutions, H₂O₂ and S²⁻ react to form sulfate (SO₄⁻²) and H₂O (Stephens, Hill and Phelps, Jr. 1980):



Iron chelate is sometimes added as a catalyst in this oxidation process. This system can generate sulfur solid build-up in the cooling tower, a maintenance issue.

2.1.3 BIOX (liquid) System

The Biox® process consists of adding an oxidizing biocide into the condensate from condenser to convert dissolved hydrogen sulfide to water-soluble sulfates. Biocide-assisted oxidation prevents secondary emissions of hydrogen sulfide from cooling towers that utilize steam condensate for makeup water. The Biox® liquid abatement system is expected to remove at least 98 percent of the H₂S in the portion of the condensate used as cooling tower makeup water.

2.2 Non-condensable Gas (H₂S) Abatement Options

2.2.1 Regenerative Thermal Oxidizer

A Regenerative Thermal Oxidizer Unit (RTO) allows for the direct oxidizing process for H₂S in the NCG. The RTO is pre-heated with propane, and then a vacuum, created by the downstream vacuum blower, causes the steam and outside air to enter the oxidizing chamber (CE Obsidian Energy LLC 2010). The RTO oxidizes H₂S and supplemental propane in the NCG through an exothermic process (Imperial County Planning & Development Services Department 2011). As a result, H₂S is oxidized to sulfur dioxide (SO₂) and a small amount of sulfur trioxide (SO₃), while hydrogen (H) is oxidized to water vapor (CE Obsidian Energy LLC 2010). The gases then flow through a caustic scrubber and venturi scrubber to remove PM₁₀ before discharging in a stack. Small amounts of NO_x, SO_x, and PM₁₀ not present in the geothermal gas are discharged, being generated as a result of the process.

2.2.2 Bioreactor

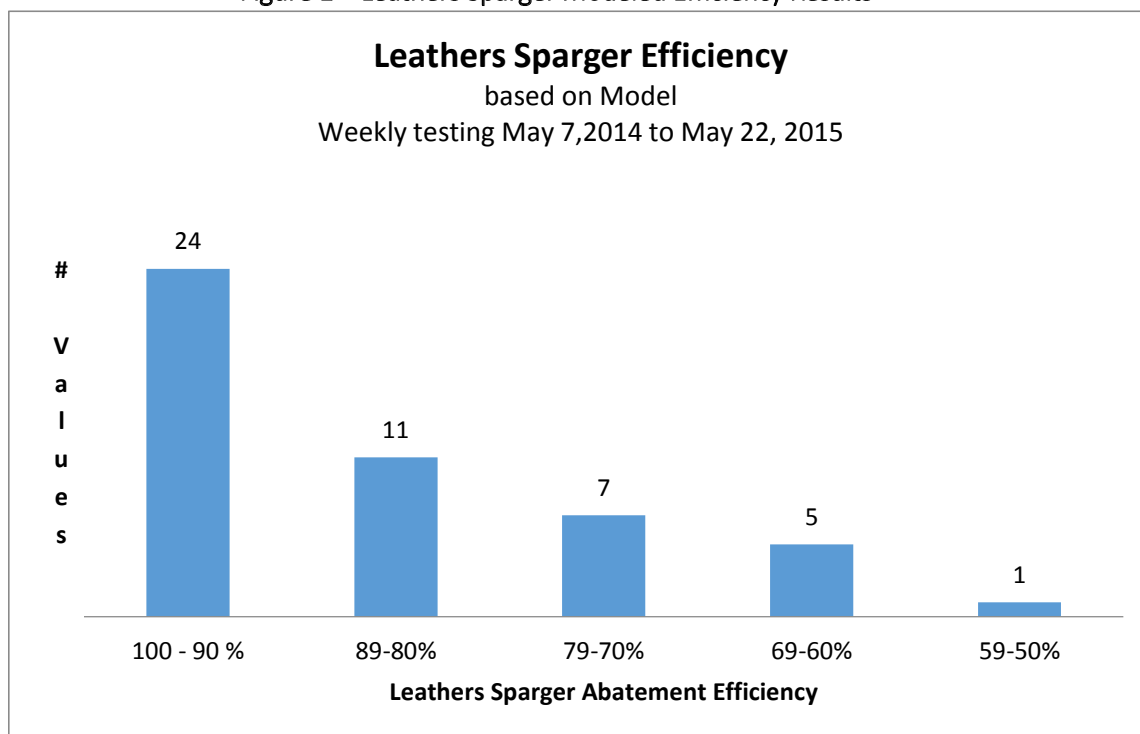
The bioreactor bubbles NCG through columns containing liquid and plastic spheres. The plastic spheres act as a surface to grow biologic agent (“microbes”). These “microbes” consume H₂S and produce sulfuric acid and sulfate. Effluent gasses from the bioreactor are routed to the shrouds on the cooling tower after abatement in the bioreactor, while condensate is discharged to the cooling tower (Gregory Jacobs, personal communication). While published literature provides the average performance of the bioreactor as a control efficiency of 99%, CalEnergy’s operating experience with this system finds that the efficiency can be reduced during times of extreme weather to approximately 50%. This is due to fact that overheating during the summer can damage the microbes and equipment; likewise excessive cold can cause the microbes to become less efficient in abating hydrogen sulfide. Heating and cooling systems are therefore used in order to attempt to achieve the optimal temperature for abatement to occur.

2.2.3 Sparger with Biocide Abatement

The sparger system for BIOX process comprises distribution pipes with bubble diffusers/nozzles. The off-gas containing hydrogen sulfide from the condenser is transported and bubbled through the sparger system to the bottom of the cooling tower basin. The hydrogen sulfide contained in the off-gas is dissolved in the cooling tower water and converted to sulfate by reacting with the oxidizing biocides and the dissolved oxygen in the water. If an effective amount of an oxidizing biocide is maintained, the sparger system for BIOX process is expected to remove more than 90%

percent of the H₂S in the non-condensable gases based on the sparger system utilized at CalEnergy's Leathers cooling tower (when emissions are measured from the shrouds). It should be noted that historical data from the Leathers sparger system has been evaluated by way of a conservative model, which has estimated an average abatement efficiency of 86% between May 7, 2014, to May 22, 2015. (However, as shown in the figure below, operational fluctuations can cause the removal efficiency to be as low as 50%, when measured by the model).

Figure 1 – Leathers Sparger Modeled Efficiency Results



2.3 Benzene Abatement Options

2.3.1 Regenerative Thermal Oxidizer

Similar to the use of RTO's for the abatement of H₂S in NCG, the RTO oxidizes hydrocarbons (in the non-condensable gas) and supplemental propane (used to pre-heat the unit) to carbon dioxide and water vapor in an exothermic process to abate benzene from NCG (Imperial County Planning & Development Services Department 2011). The gases then flow through a caustic scrubber and venturi scrubber to remove PM₁₀ before discharging in a stack. The RTO is not feasible as small amounts of NO_x, SO_x, and PM₁₀, not present in the geothermal gas are discharged, being generated as a result of the process.

2.4 2.5 Particulate Matter Abatement Options

2.4.1 (Existing) Drift Eliminators

The only source of PM₁₀ at Elmore is from Total Dissolved Solids (TDS) in the cooling tower recirculating water. Steam condensate comes from the condenser and fills the cooling tower with steam condensate. The steam condensate carries TDS, including PM₁₀, into the cooling tower. Elmore currently uses drift eliminators to control PM₁₀ emissions. Drift eliminators are devices that remove water droplets, which contain dissolved solids, from the exhaust steam and return them to the circulating tower (Calpine Corporation 1998). For the retrofit project the TDS in the cooling tower will be unaffected by the installation of the back-pressure turbine; therefore, the current drift eliminators are deemed adequate for controlling emissions.

3 Step 2 and 3: Eliminate Technically Infeasible Options and Rank Remaining Control Technologies

Eliminating Infeasible Options

Table 3 includes a summary of control efficiencies and technologies. (CH2M Hill 2004). As shown in the table, the regenerative thermal oxidizer (RTO) is not considered feasible for control of benzene emissions due to fact that more emissions will be created by the use of the technology than the emissions that are abated. That is, the uses propane to attain a combustion temperature of approximately 1500 degrees Fahrenheit, which results in combustion products of nitrogen oxides. Based on CalEnergy's RTO for Units 1 and 2 at Region 1 emission of nitrogen oxide can range from 14.5 lbs/hr (based on a source test on December 2010) which are in excess of the 0.103 lbs/hr of unabated benzene that are emitted from Elmore. **Given that RTO is considered technologically infeasible, no controls are being recommended for benzene emissions; and given that benzene is currently uncontrolled total emissions of benzene from the facility will be unchanged as a result of this project.**

The RTO could also be considered infeasible for hydrogen sulfide gaseous abatement as it produces additional emissions of particulate matter and sulfur dioxide in order to abate hydrogen sulfide. However the quantity of the emissions generated by the RTO unit cannot be definitely stated to exceed the emissions that are abated, therefore this option is not eliminated for hydrogen sulfide control based solely on technology performance.

Ranking Remaining Options

The rank of remaining control technologies (which have not been eliminated based on technology) based on average control efficiency is as follows:

For H₂S condensate abatement,

1. BIOX (liquid, 98% efficient)
2. Bio-oxidation box (ox-box) (90.9% efficient)
3. Chemical Oxidation (the control efficiency for using only H₂O₂ has not been determined)

For NCG H₂S abatement::

1. Bioreactor (99% efficient)
2. RTO (98% efficient)
3. Sparger system for (NCG, 90% efficient average)

Table 1. Control Technology Efficiencies & Feasibilities

Parameter	Technology Alternative	Control Efficiency	Technology Feasible?
Sour Condensate Liquid (H ₂ S)	Ox-Box	90.9% (3 year average) ¹	Feasible
	Chemical Oxidation	40-70% (without iron chelate), 93-98% (iron catalyst + H ₂ O ₂ combined system) ²	Feasible
	BIOX (liquid)	98%	Feasible
NCG (H ₂ S)	Regenerative Thermal Oxidizer (RTO)+caustic scrubber and venturi	~98% but increases SO _x , NO _x and PM ₁₀ ⁴	Not Feasible
	Bioreactor	99% ⁵	Feasible
	Sparger - system	90%	Feasible
NCG (Benzene)	RTO	>98% but increases net emissions by increasing SO _x , NO _x and PM ₁₀ ⁴	Not Feasible
	No Action	-	Feasible
Cooling Tower recirculating water (PM10)	Drift Eliminators (No Action)	>99% ⁸	Feasible (& already installed)

¹ Calculations based on data provided by CalEnergy

² Acurex 1980

³ Nagl 1999

⁴ Imperial County Planning & Development Services Department 2011

⁵ Rodriguez 2013

⁶ Based on Leathers data provided by Calenergy

⁸ Salton Sea Unit 6 License California Energy Commission Amendment 1, 2004

4 Steps 4: Cost Evaluation of Most Effective Technologies

4.1 Cost Analysis

Table 4 contains summary of comparative cost analysis for H₂S control technologies and the bases for these costs are included in Attachment A.

Table 4: Cost of Control Alternatives (\$/ton)

Parameter	Technology Alternative	Capital Cost	Annual Operating Cost	Abated Emission Rate (US ton/yr)	Resulting Cost \$/ton removal	Reasonable BACT cost from Agency
Sour Condensate Liquid (H ₂ S)	Ox-Box	\$570,000	\$25,000	83.4	<u>\$2,247</u>	\$14,230/ton
	Chemical Oxidation	\$400,000	\$301,000	87.6	\$5,588	\$14,230/ton
	BIOX (liquid)	\$600,000	\$250,000	89.9	\$5,145	\$14,230/ton
NCG (H ₂ S)	RTO	\$3,350,000	\$639,185	186.7	\$7,495	\$14,230/ton
	Bioreactor	\$2,000,000	\$131,702	188.6	\$2,968	\$14,230/ton
	Sparger	\$200,000	\$150,000	171.48	<u>\$1,599</u>	\$14,230/ton

5 Step 5: Selection of BACT

Selection of BACT

For abatement of hydrogen sulfide in the condensate, the BACT cost analysis (in Table 4) found that while there was little difference in the abatement efficiencies of the technologies evaluated, the bio-oxidation box (ox-box) was the most cost effective for the control of hydrogen sulfide in condensate.

For the abatement of hydrogen sulfide emissions in the non-condensable gasses, the BACT cost analysis found that the sparger (with the oxidizing biocide) was the most cost effective for the abatement of hydrogen sulfide in the non-condensable gasses and this technology is recommended in favor of the bioreactor based on cost even though the bioreactor has slightly higher abatement efficiencies as the performance of both systems are subject to fluctuations based on operational conditions. Furthermore, the operational controls for the sparger (which is the addition of chemicals) results in a faster response in improving abatement than does the adjustment of temperature and other conditions needed to optimize the performance of the microbes in bioreactor. The sparger is therefore easier to operate in terms of controlling the abatement efficiency.

Attachment B provides examples of the sparger and bioreactor technologies already in use at CalEnergy, and it provides the conceptual arrangement of this equipment at Elmore). Final specifications for the equipment will be provided before issuance of the operating permit for the equipment.

Estimating Post-retrofit Emissions

Applying these technologies to the calculated post-retrofit control emissions (shown in Table 1.a) results in average estimated post-retrofit emissions of 6 lbs/hr of hydrogen sulfide from the brine (as shown in

Table 5). Given that the expected emissions are calculated and the efficiency of the equipment will fluctuate, maximum emissions at any given time are expected to fluctuate but (as demonstrated herein) emissions will not exceed the current historical actual emission rates (shown in Table 2). Post-retrofit hydrogen sulfide emissions also comply with the permit requirement of 22.8 lbs/hr permit limit hydrogen sulfide.

Table 5 – Post-Retrofit Abated H₂S Emissions

Post-Retrofit Emissions	Condensate Abated with Bio-oxidation Box	NCG Abated with Biox (gas) system	Total expected emissions
Unabated Maximum H ₂ S Emissions (lbs/hr)	20.94	43.50	
Average Abatement Efficiency (%)	90.90%	90%	
Expected Average Emissions (lbs/hr)	1.91	4.35	6.26
Expected Average Emissions(tons/year)			27.27

6 Conclusion

The conclusion of this analysis was that:

- **Hydrogen Sulfide Emissions Control:** Control technologies will be installed to maintain emissions within the range of historical actual emissions for hydrogen sulfide by installing a bio-oxidation box on the condensate and a sparger system for the non-condensable gas stream. Furthermore the technologies selected will allow emissions to be less than or equal to historical actual maximum emission and the historical actual average emissions. Emissions will also be less than the permit limit for the facility.
- **Benzene Emissions Control:** No technology was identified that was technologically practical for controlling benzene emissions; therefore no change/reduction in unabated emissions of benzene is recommended and no changes in emission rates are expected.
- **Nitrogen Oxide & (non-benzene) VOC Emissions:** Given that the modification does not affect nitrogen oxide & (non-benzene) VOC emissions (which result from diesel and gasoline engines at the facility) a BACT analysis was not performed for these emissions.
- **Particulate Matter Emissions:** Given that the modification does not affect particulate matter emissions from the cooling tower recirculating water, or from engines at the facility) a BACT analysis was not performed for these emissions.

In conclusion, additional abatement equipment is proposed herein for this project and emissions levels will not be increased by the project.

7 References

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- CalEnergy Operations. 2016. "Air Permit Application for Cal Energy Region 1 Unit 3 Cooling Tower Bio-oxidation Box Modification." Submitted to the Imperial County Air Pollution Control District, October 11.
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- CH2M Hill. 2004. "Salton Sea Unit 6 License California Energy Commission Amendment 1." Prepared for Cal Energy Obsidian Energy LLC. Submitted to the California Energy Commission., December 17.
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- Stephens, Frederick B., John H. Hill, and Paul L. Phelps, Jr. 1980. *State-of-the-Art hydrogen sulfide control for geothermal energy systems:1979*. Technical Report, Washington, D.C.: Department of Energy, Division of Environmental Control Technology.

ATTACHMENT A - BACT Cost Worksheets

Attachment A – BACT Costs Summaries

	Condensate H2S Abatement Technologies			Non-condensable Gas H2S Abatement Technologies		
	Ox-Box	Chemical Oxidation	BIOX (liquid)	RTO	Bioreactor	Sparger
Capital Costs	\$570,000	\$400,000	\$600,000	\$3,350,000	\$2,000,000	\$200,000
Annual O&M cost (Note B)	\$25,000	\$301,000	\$250,000	\$639,185	\$131,702	\$150,000
Source testing	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
Capital Recovery Cost (see Note A)	\$81,155	\$56,951	\$85,427	\$476,965	\$284,755	\$28,476
Annualized cost	\$156,155	\$407,951	\$385,427	\$1,166,150	\$466,457	\$228,476
Total Annualized Cost with 20 % Contingency	\$187,386	\$489,541	\$462,512	\$1,399,380	\$559,748	\$274,171
Abated Emission						
pre-abatement, lbs/hr	20.94	20.94	20.94	43.50	43.50	43.50
post-abatement, lbs/hr	1.91	0.94	0.42	0.87	0.44	4.35
abated, lbs/hr	19.04	20.00	20.53	42.63	43.07	39.15
abated, tons/yr	83.39	87.61	89.90	186.72	188.62	171.48
BACT, \$/ton abated	\$2,247	\$5,588	\$5,145	\$7,495	\$2,968	\$1,599
BACT Threshold,	\$14,230	\$14,230	\$14,230	\$14,230	\$14,230	\$14,230

[BACT Threshold is based on SCAQMD 2016 Update - using SOx Threshold for H2S Threshold - see Note B](#)

Note A - Capital Recovery Costs

Equipment life 10

Interest rate 7%

Capital recovery factor 0.1423775

The formula for the capital recovery factor is:

$$CRF = \frac{i * (1 + i)^n}{(1 + i)^n - 1}$$

where:

CRF = capital recovery factor

n = economic life of equipment

i = real interest rate

Note B: Costs have not been broken down for maintenance.

ATTACHMENT B – General Arrangement Selected Technologies

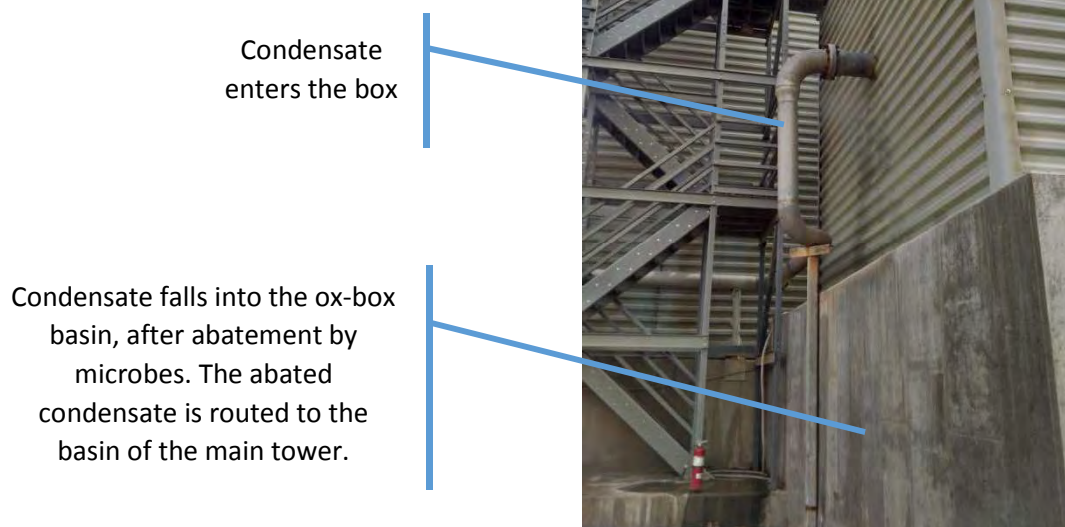
Figure B.1- External Bio-Oxidation Box Proposed for Abating H₂S from Condensate



(Southern side of) external bio-oxidation box for Vulcan facility is located adjacent to the Vulcan cooling tower rather than inside the cooling tower. A similar external box will be built for Elmore.

Figure B.2 –

Northern side of Vulcan external ox-box



Architectural drawings of a new tower and concrete basin. The top drawing is a plan view showing a circular structure with a diameter of 56'-6" and a rectangular basin with dimensions 27'-0" by 10'-0". The bottom drawing is a section view showing the internal structure of the tower and basin, including a concrete wall and a steel structure. The section view is labeled "SECTION" and "NEW TOWER AND CONCRETE BASIN".

	UNIT 3 EXTERNAL OX BOX NEW TOWER AND CONCRETE BASIN PLAN & DETAILS	PROJECT NUMBER DRAWING NUMBER DATE SCALE 1 OF 1	ENGINEERING NAME J. WU PROJECT NAME J. WU PROJECT NO. 1000000000 DATE 5/20/12 SCALE 1/8" = 1'-0"	ISSUED FOR REVIEW DATE 10/11/11 BY J. WU REVIEWED BY J. WU DATE 10/11/11 REVISION 1.0	DESCRIPTION DATE 10/11/11 BY J. WU REVIEWED BY J. WU DATE 10/11/11 REVISION 1.0	SECTION DATE 10/11/11 BY J. WU REVIEWED BY J. WU DATE 10/11/11 REVISION 1.0	PLAN VIEW DATE 10/11/11 BY J. WU REVIEWED BY J. WU DATE 10/11/11 REVISION 1.0	SECTION DATE 10/11/11 BY J. WU REVIEWED BY J. WU DATE 10/11/11 REVISION 1.0	SECTION DATE 10/11/11 BY J. WU REVIEWED BY J. WU DATE 10/11/11 REVISION 1.0
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Figure B-4 - Sparger System for Abating H₂S Emission in the Non-condensable gasses



Piping for Sparger system at Leathers facility. A similar system will be installed at Elmore.



Chemical feed tank for sparger system at Leathers. Chemicals will be used at Elmore but feed system may differ depending on chemical used.

Figure B-5 - Plan view of Sparger Headers in Cooling Tower Basin

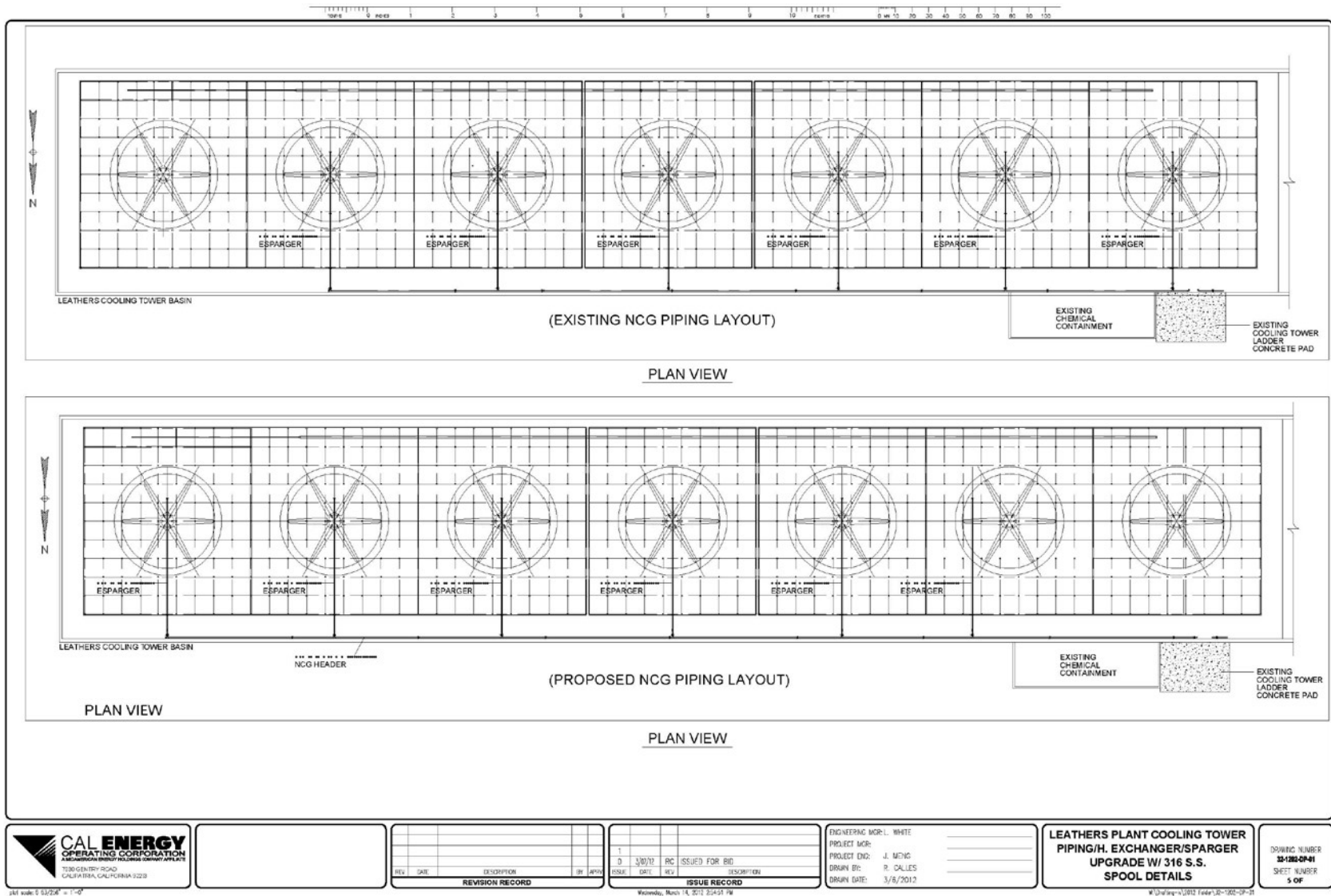
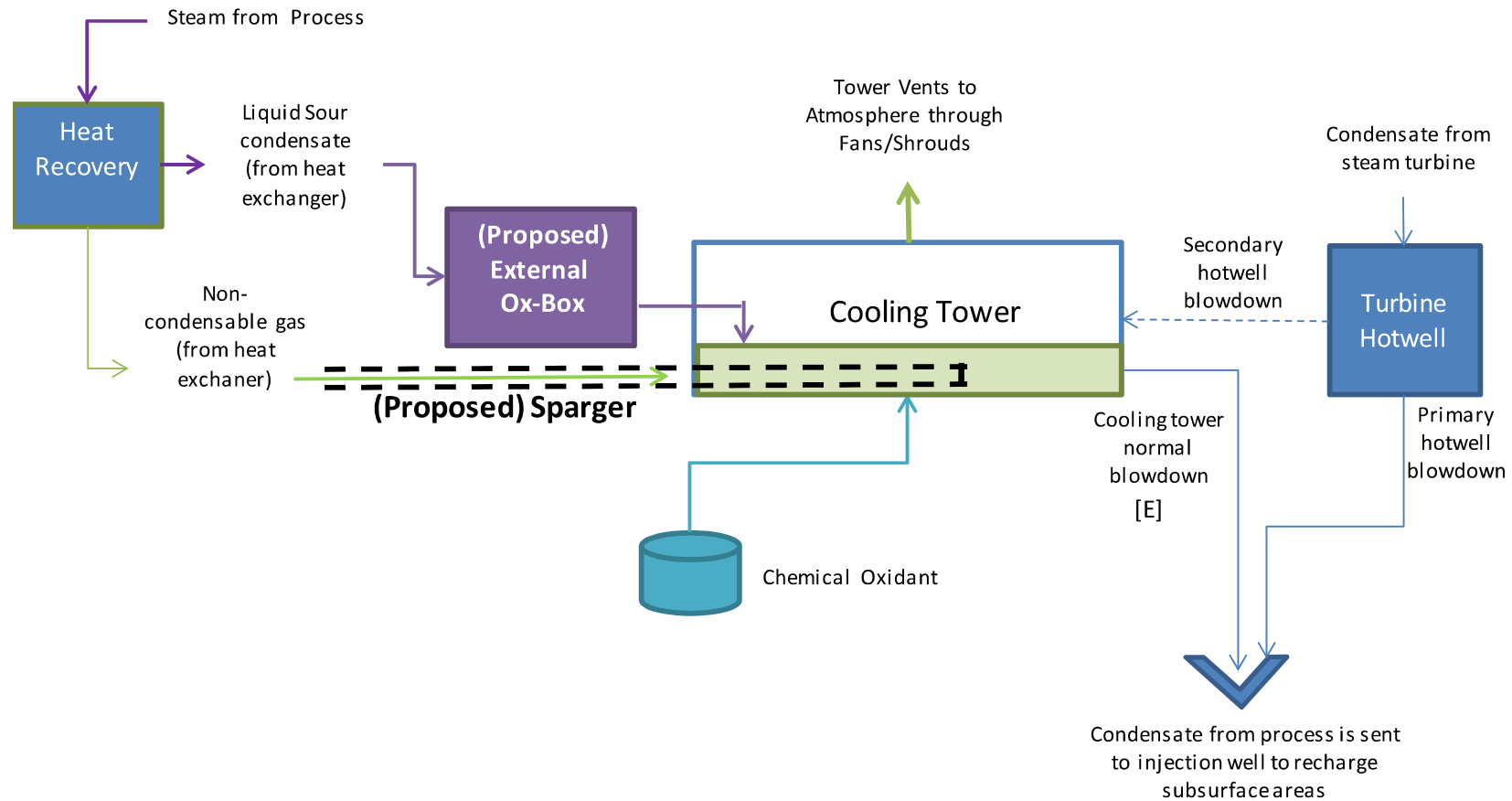


Figure B.6 - Conceptual Arrangement of Proposed External Ox-Box and Sparger for H₂S Abatement at Elmore



Note that during short-duration maintenance of the Ox-box, condensate will be routed to the cooling tower basin for abatement, and additional chemicals will be used to control emissions (as described in the application letter dated 1/3/17).

The final design information will be provided prior to the issuance of a permit to operate.

Appendix 5.9A

Operational Health Risk Assessment



Black Rock Geothermal Project

BRGP Health Risk Assessment

Table 1. Sensitive Receptors

April 2023

BRGP Nearby Sensitive Receptors

Receptor Number	Receptor Description	X Coordinate	Y Coordinate
5,550	Residence	630,020	3,666,838
5,551	Residence	630,812	3,666,941
5,552	Residence	632,437	3,665,342
5,553	Residence	634,165	3,665,327
5,554	Residence	633,274	3,668,579
5,555	Residence	635,720	3,668,695
5,556	Residence	635,683	3,667,001
5,557	Residence	636,085	3,666,125
5,558	Residence	629,091	3,671,844
5,559	Residence	629,311	3,674,439
5,560	Residence	633,189	3,676,633
5,561	Residence	638,071	3,677,428
5,562	Residence	637,938	3,674,194
5,563	Residence	638,180	3,672,664

Note: Coordinates presented are UTM NAD83 Zone 11, meters

Black Rock Geothermal Project

BRGP Health Risk Assessment

Table 2. Census Receptors

April 2023

BRGP Nearby Census Receptors

Receptor Number	Receptor Description	X Coordinate	Y Coordinate	Population
5,564	Census Receptor	627,051	3,678,982	0
5,565	Census Receptor	627,155	3,670,991	0
5,566	Census Receptor	629,644	3,677,138	0
5,567	Census Receptor	629,375	3,675,191	0
5,568	Census Receptor	630,177	3,673,064	3
5,569	Census Receptor	628,027	3,671,919	0
5,570	Census Receptor	626,742	3,670,099	0
5,571	Census Receptor	628,778	3,672,116	4
5,572	Census Receptor	621,292	3,671,311	0
5,573	Census Receptor	622,476	3,666,330	0
5,574	Census Receptor	624,159	3,666,810	0
5,575	Census Receptor	631,617	3,679,429	1
5,576	Census Receptor	631,160	3,672,764	0
5,577	Census Receptor	632,345	3,672,252	0
5,578	Census Receptor	633,050	3,672,205	0
5,579	Census Receptor	632,951	3,672,989	0
5,580	Census Receptor	634,606	3,673,010	0
5,581	Census Receptor	636,856	3,673,417	0
5,582	Census Receptor	636,839	3,673,832	3
5,583	Census Receptor	636,828	3,674,639	0
5,584	Census Receptor	633,987	3,675,392	0
5,585	Census Receptor	633,951	3,675,796	0
5,586	Census Receptor	634,129	3,675,823	0
5,587	Census Receptor	633,952	3,677,824	0
5,588	Census Receptor	633,871	3,677,409	0
5,589	Census Receptor	633,961	3,677,017	1
5,590	Census Receptor	633,920	3,676,628	0
5,591	Census Receptor	633,974	3,676,224	0
5,592	Census Receptor	634,819	3,672,601	0
5,593	Census Receptor	633,796	3,672,577	0
5,594	Census Receptor	633,792	3,672,178	0
5,595	Census Receptor	634,821	3,672,191	0
5,596	Census Receptor	636,049	3,672,217	0
5,597	Census Receptor	637,257	3,672,232	0
5,598	Census Receptor	636,875	3,672,640	0
5,599	Census Receptor	636,848	3,673,028	0
5,600	Census Receptor	633,737	3,669,371	5
5,601	Census Receptor	634,842	3,671,398	0
5,602	Census Receptor	633,485	3,667,547	3
5,603	Census Receptor	632,737	3,670,848	0

Black Rock Geothermal Project

BRGP Health Risk Assessment

Table 2. Census Receptors

April 2023

BRGP Nearby Census Receptors

Receptor Number	Receptor Description	X Coordinate	Y Coordinate	Population
5,604	Census Receptor	632,036	3,670,146	0
5,605	Census Receptor	631,227	3,670,139	0
5,606	Census Receptor	630,421	3,670,531	0
5,607	Census Receptor	629,595	3,671,722	0
5,608	Census Receptor	629,583	3,672,126	0
5,609	Census Receptor	632,822	3,669,354	0
5,610	Census Receptor	632,860	3,667,743	0
5,611	Census Receptor	632,061	3,667,730	0
5,612	Census Receptor	631,636	3,670,034	0
5,613	Census Receptor	630,015	3,670,414	0
5,614	Census Receptor	629,606	3,670,518	0
5,615	Census Receptor	629,209	3,670,508	0
5,616	Census Receptor	628,787	3,671,309	0
5,617	Census Receptor	628,735	3,671,709	0
5,618	Census Receptor	628,001	3,671,301	0
5,619	Census Receptor	630,028	3,668,910	0
5,620	Census Receptor	630,444	3,668,917	0
5,621	Census Receptor	630,825	3,669,939	0
5,622	Census Receptor	631,254	3,667,719	6
5,623	Census Receptor	630,461	3,667,712	2
5,624	Census Receptor	630,059	3,667,697	0
5,625	Census Receptor	630,033	3,667,752	0
5,626	Census Receptor	629,631	3,667,698	0
5,627	Census Receptor	629,612	3,668,907	0
5,628	Census Receptor	628,826	3,669,705	0
5,629	Census Receptor	628,423	3,669,766	0
5,630	Census Receptor	628,403	3,669,528	0
5,631	Census Receptor	628,006	3,669,690	0
5,632	Census Receptor	627,221	3,669,280	0
5,633	Census Receptor	626,409	3,669,252	0
5,634	Census Receptor	625,523	3,667,969	0
5,635	Census Receptor	625,220	3,667,217	0
5,636	Census Receptor	626,424	3,667,658	0
5,637	Census Receptor	627,235	3,667,667	0
5,638	Census Receptor	628,040	3,667,675	0
5,639	Census Receptor	628,840	3,667,688	0
5,640	Census Receptor	628,869	3,666,079	0
5,641	Census Receptor	629,659	3,666,492	6
5,642	Census Receptor	630,463	3,666,502	0
5,643	Census Receptor	631,270	3,666,513	0

Black Rock Geothermal Project

BRGP Health Risk Assessment

Table 2. Census Receptors

April 2023

BRGP Nearby Census Receptors

Receptor Number	Receptor Description	X Coordinate	Y Coordinate	Population
5,644	Census Receptor	632,077	3,666,524	0
5,645	Census Receptor	632,877	3,666,536	0
5,646	Census Receptor	633,381	3,666,693	0
5,647	Census Receptor	633,748	3,666,514	0
5,648	Census Receptor	633,798	3,667,999	0
5,649	Census Receptor	633,964	3,667,348	0
5,650	Census Receptor	632,087	3,665,722	7
5,651	Census Receptor	631,282	3,665,711	0
5,652	Census Receptor	630,474	3,665,699	0
5,653	Census Receptor	629,668	3,665,686	0
5,654	Census Receptor	629,685	3,664,490	0
5,655	Census Receptor	630,101	3,664,537	0
5,656	Census Receptor	630,504	3,664,504	0
5,657	Census Receptor	631,297	3,664,516	0
5,658	Census Receptor	634,471	3,668,168	0
5,659	Census Receptor	636,877	3,668,613	0
5,660	Census Receptor	636,908	3,669,008	13
5,661	Census Receptor	636,892	3,669,806	0
5,662	Census Receptor	637,006	3,670,197	0
5,663	Census Receptor	636,883	3,670,600	0
5,664	Census Receptor	636,922	3,671,004	0
5,665	Census Receptor	636,802	3,671,026	0
5,666	Census Receptor	636,873	3,671,431	0
5,667	Census Receptor	634,083	3,670,160	0
5,668	Census Receptor	634,856	3,670,576	0
5,669	Census Receptor	634,850	3,670,978	0
5,670	Census Receptor	634,876	3,668,982	0
5,671	Census Receptor	634,867	3,669,372	0
5,672	Census Receptor	634,880	3,669,774	0
5,673	Census Receptor	636,858	3,669,418	0
5,674	Census Receptor	636,791	3,669,394	0
5,675	Census Receptor	634,868	3,668,588	0
5,676	Census Receptor	630,916	3,663,304	0
5,677	Census Receptor	632,102	3,664,528	0
5,678	Census Receptor	632,902	3,664,535	0
5,679	Census Receptor	633,318	3,665,283	0
5,680	Census Receptor	633,498	3,665,497	0
5,681	Census Receptor	632,888	3,665,731	0
5,682	Census Receptor	634,681	3,665,224	0
5,683	Census Receptor	635,061	3,665,525	3

Black Rock Geothermal Project

BRGP Health Risk Assessment

Table 2. Census Receptors

April 2023

BRGP Nearby Census Receptors

Receptor Number	Receptor Description	X Coordinate	Y Coordinate	Population
5,684	Census Receptor	635,728	3,665,569	0
5,685	Census Receptor	635,952	3,665,370	0
5,686	Census Receptor	634,902	3,665,939	2
5,687	Census Receptor	634,917	3,666,145	0
5,688	Census Receptor	634,907	3,666,562	0
5,689	Census Receptor	634,899	3,667,364	8
5,690	Census Receptor	635,285	3,668,170	0
5,691	Census Receptor	635,714	3,668,169	0
5,692	Census Receptor	635,724	3,665,953	0
5,693	Census Receptor	635,941	3,665,760	13
5,694	Census Receptor	635,934	3,666,157	0
5,695	Census Receptor	635,937	3,666,182	0
5,696	Census Receptor	636,136	3,666,582	39
5,697	Census Receptor	636,992	3,667,380	6
5,698	Census Receptor	636,917	3,667,810	0
5,699	Census Receptor	636,923	3,668,213	0
5,700	Census Receptor	633,744	3,665,781	8
5,701	Census Receptor	636,341	3,666,162	0
5,702	Census Receptor	636,346	3,665,767	18
5,703	Census Receptor	636,737	3,666,586	15
5,704	Census Receptor	635,585	3,665,099	0
5,705	Census Receptor	634,513	3,664,445	0
5,706	Census Receptor	633,711	3,664,491	0
5,707	Census Receptor	634,541	3,663,747	0
5,708	Census Receptor	632,131	3,662,531	0
5,709	Census Receptor	630,916	3,662,511	0
5,710	Census Receptor	629,711	3,662,451	5
5,711	Census Receptor	627,756	3,663,256	9
5,712	Census Receptor	625,263	3,663,620	0
5,713	Census Receptor	625,676	3,664,036	0
5,714	Census Receptor	624,861	3,664,064	0
5,715	Census Receptor	623,622	3,664,320	0
5,716	Census Receptor	623,761	3,664,794	0
5,717	Census Receptor	624,335	3,665,989	0
5,718	Census Receptor	624,267	3,666,470	0
5,719	Census Receptor	625,222	3,666,032	0
5,720	Census Receptor	626,846	3,666,053	0
5,721	Census Receptor	628,430	3,666,853	0
5,722	Census Receptor	628,071	3,666,052	0
5,723	Census Receptor	626,861	3,664,844	0

Black Rock Geothermal Project

BRGP Health Risk Assessment

Table 2. Census Receptors

April 2023

BRGP Nearby Census Receptors

Receptor Number	Receptor Description	X Coordinate	Y Coordinate	Population
5,724	Census Receptor	625,665	3,664,825	0
5,725	Census Receptor	624,848	3,664,817	0
5,726	Census Receptor	624,351	3,664,823	0
5,727	Census Receptor	628,475	3,664,489	2
5,728	Census Receptor	627,666	3,666,030	0
5,729	Census Receptor	628,542	3,663,693	0
5,730	Census Receptor	626,864	3,663,670	0
5,731	Census Receptor	626,878	3,664,064	0
5,732	Census Receptor	630,678	3,662,102	0
5,733	Census Receptor	631,338	3,662,123	0
5,734	Census Receptor	631,948	3,662,131	0
5,735	Census Receptor	632,331	3,662,134	0
5,736	Census Receptor	633,314	3,663,319	0
5,737	Census Receptor	627,970	3,662,457	0
5,738	Census Receptor	628,458	3,661,831	0
5,739	Census Receptor	629,745	3,661,881	0
5,740	Census Receptor	630,316	3,662,066	0
5,741	Census Receptor	633,993	3,674,612	1
5,742	Census Receptor	634,210	3,674,214	0
5,743	Census Receptor	634,584	3,673,807	1
5,744	Census Receptor	630,286	3,661,355	0
5,745	Census Receptor	628,923	3,661,047	2
5,746	Census Receptor	627,248	3,661,098	0
5,747	Census Receptor	626,477	3,662,341	0
5,748	Census Receptor	625,060	3,663,157	0
5,749	Census Receptor	622,993	3,663,234	0
5,750	Census Receptor	622,831	3,663,251	0
5,751	Census Receptor	624,378	3,662,369	0
5,752	Census Receptor	624,441	3,662,594	0
5,753	Census Receptor	624,869	3,662,384	0
5,754	Census Receptor	625,685	3,662,391	0
5,755	Census Receptor	624,464	3,662,146	0

Note: Coordinates presented are UTM NAD83 Zone 11, meters

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
CT	7439921	Lead	8.03E-04	1.03E-07
FPUMP	7439921	Lead	0.00E+00	0.00E+00
G1	7439921	Lead	0.00E+00	0.00E+00
G2	7439921	Lead	0.00E+00	0.00E+00
G3	7439921	Lead	0.00E+00	0.00E+00
G4	7439921	Lead	0.00E+00	0.00E+00
PTU	7439921	Lead	0.00E+00	0.00E+00
RMP	7439921	Lead	0.00E+00	0.00E+00
CT	7439976	Mercury	2.41E-01	3.08E-05
FPUMP	7439976	Mercury	0.00E+00	0.00E+00
G1	7439976	Mercury	0.00E+00	0.00E+00
G2	7439976	Mercury	0.00E+00	0.00E+00
G3	7439976	Mercury	0.00E+00	0.00E+00
G4	7439976	Mercury	0.00E+00	0.00E+00
PTU	7439976	Mercury	1.52E-01	0.00E+00
RMP	7439976	Mercury	1.12E+00	0.00E+00
CT	71432	Benzene	5.90E+02	7.63E-02
FPUMP	71432	Benzene	0.00E+00	0.00E+00
G1	71432	Benzene	0.00E+00	0.00E+00
G2	71432	Benzene	0.00E+00	0.00E+00
G3	71432	Benzene	0.00E+00	0.00E+00
G4	71432	Benzene	0.00E+00	0.00E+00
PTU	71432	Benzene	4.31E+01	0.00E+00
RMP	71432	Benzene	3.17E+02	0.00E+00
CT	108883	Toluene	3.36E+01	4.34E-03
FPUMP	108883	Toluene	0.00E+00	0.00E+00
G1	108883	Toluene	0.00E+00	0.00E+00
G2	108883	Toluene	0.00E+00	0.00E+00
G3	108883	Toluene	0.00E+00	0.00E+00
G4	108883	Toluene	0.00E+00	0.00E+00
PTU	108883	Toluene	2.43E+00	0.00E+00
RMP	108883	Toluene	1.79E+01	0.00E+00
CT	100414	Ethylbenzene	6.20E+00	8.02E-04
FPUMP	100414	Ethylbenzene	0.00E+00	0.00E+00
G1	100414	Ethylbenzene	0.00E+00	0.00E+00
G2	100414	Ethylbenzene	0.00E+00	0.00E+00
G3	100414	Ethylbenzene	0.00E+00	0.00E+00
G4	100414	Ethylbenzene	0.00E+00	0.00E+00
PTU	100414	Ethylbenzene	4.29E-01	0.00E+00
RMP	100414	Ethylbenzene	3.15E+00	0.00E+00
CT	1330207	Xylenes	6.17E+00	7.97E-04
FPUMP	1330207	Xylenes	0.00E+00	0.00E+00
G1	1330207	Xylenes	0.00E+00	0.00E+00

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G2	1330207	Xylenes	0.00E+00	0.00E+00
G3	1330207	Xylenes	0.00E+00	0.00E+00
G4	1330207	Xylenes	0.00E+00	0.00E+00
PTU	1330207	Xylenes	4.01E-01	0.00E+00
RMP	1330207	Xylenes	2.95E+00	0.00E+00
CT	7429905	Aluminum	1.61E-02	2.06E-06
FPUMP	7429905	Aluminum	0.00E+00	0.00E+00
G1	7429905	Aluminum	0.00E+00	0.00E+00
G2	7429905	Aluminum	0.00E+00	0.00E+00
G3	7429905	Aluminum	0.00E+00	0.00E+00
G4	7429905	Aluminum	0.00E+00	0.00E+00
PTU	7429905	Aluminum	0.00E+00	0.00E+00
RMP	7429905	Aluminum	0.00E+00	0.00E+00
CT	7440360	Antimony	1.29E-03	1.65E-07
FPUMP	7440360	Antimony	0.00E+00	0.00E+00
G1	7440360	Antimony	0.00E+00	0.00E+00
G2	7440360	Antimony	0.00E+00	0.00E+00
G3	7440360	Antimony	0.00E+00	0.00E+00
G4	7440360	Antimony	0.00E+00	0.00E+00
PTU	7440360	Antimony	0.00E+00	0.00E+00
RMP	7440360	Antimony	0.00E+00	0.00E+00
CT	7440393	Barium	2.40E-02	3.07E-06
FPUMP	7440393	Barium	0.00E+00	0.00E+00
G1	7440393	Barium	0.00E+00	0.00E+00
G2	7440393	Barium	0.00E+00	0.00E+00
G3	7440393	Barium	0.00E+00	0.00E+00
G4	7440393	Barium	0.00E+00	0.00E+00
PTU	7440393	Barium	0.00E+00	0.00E+00
RMP	7440393	Barium	0.00E+00	0.00E+00
CT	7440417	Beryllium	1.61E-04	2.06E-08
FPUMP	7440417	Beryllium	0.00E+00	0.00E+00
G1	7440417	Beryllium	0.00E+00	0.00E+00
G2	7440417	Beryllium	0.00E+00	0.00E+00
G3	7440417	Beryllium	0.00E+00	0.00E+00
G4	7440417	Beryllium	0.00E+00	0.00E+00
PTU	7440417	Beryllium	0.00E+00	0.00E+00
RMP	7440417	Beryllium	0.00E+00	0.00E+00
CT	7440439	Cadmium	3.21E-04	4.11E-08
FPUMP	7440439	Cadmium	0.00E+00	0.00E+00
G1	7440439	Cadmium	0.00E+00	0.00E+00
G2	7440439	Cadmium	0.00E+00	0.00E+00
G3	7440439	Cadmium	0.00E+00	0.00E+00
G4	7440439	Cadmium	0.00E+00	0.00E+00

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns
April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
PTU	7440439	Cadmium	0.00E+00	0.00E+00
RMP	7440439	Cadmium	0.00E+00	0.00E+00
CT	7440473	Chromium	8.03E-04	1.03E-07
FPUMP	7440473	Chromium	0.00E+00	0.00E+00
G1	7440473	Chromium	0.00E+00	0.00E+00
G2	7440473	Chromium	0.00E+00	0.00E+00
G3	7440473	Chromium	0.00E+00	0.00E+00
G4	7440473	Chromium	0.00E+00	0.00E+00
PTU	7440473	Chromium	0.00E+00	0.00E+00
RMP	7440473	Chromium	0.00E+00	0.00E+00
CT	7440508	Copper	4.82E-04	6.17E-08
FPUMP	7440508	Copper	0.00E+00	0.00E+00
G1	7440508	Copper	0.00E+00	0.00E+00
G2	7440508	Copper	0.00E+00	0.00E+00
G3	7440508	Copper	0.00E+00	0.00E+00
G4	7440508	Copper	0.00E+00	0.00E+00
PTU	7440508	Copper	0.00E+00	0.00E+00
RMP	7440508	Copper	0.00E+00	0.00E+00
CT	7439965	Manganese	9.51E-02	1.22E-05
FPUMP	7439965	Manganese	0.00E+00	0.00E+00
G1	7439965	Manganese	0.00E+00	0.00E+00
G2	7439965	Manganese	0.00E+00	0.00E+00
G3	7439965	Manganese	0.00E+00	0.00E+00
G4	7439965	Manganese	0.00E+00	0.00E+00
PTU	7439965	Manganese	0.00E+00	0.00E+00
RMP	7439965	Manganese	0.00E+00	0.00E+00
CT	7440020	Nickel	1.83E-03	2.34E-07
FPUMP	7440020	Nickel	0.00E+00	0.00E+00
G1	7440020	Nickel	0.00E+00	0.00E+00
G2	7440020	Nickel	0.00E+00	0.00E+00
G3	7440020	Nickel	0.00E+00	0.00E+00
G4	7440020	Nickel	0.00E+00	0.00E+00
PTU	7440020	Nickel	0.00E+00	0.00E+00
RMP	7440020	Nickel	0.00E+00	0.00E+00
CT	7782492	Selenium	1.84E-02	2.35E-06
FPUMP	7782492	Selenium	0.00E+00	0.00E+00
G1	7782492	Selenium	0.00E+00	0.00E+00
G2	7782492	Selenium	0.00E+00	0.00E+00
G3	7782492	Selenium	0.00E+00	0.00E+00
G4	7782492	Selenium	0.00E+00	0.00E+00
PTU	7782492	Selenium	0.00E+00	0.00E+00
RMP	7782492	Selenium	0.00E+00	0.00E+00
CT	1175	Silica, Crystln	8.03E-01	1.03E-04

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
FPUMP	1175	Silica, Crystln	0.00E+00	0.00E+00
G1	1175	Silica, Crystln	0.00E+00	0.00E+00
G2	1175	Silica, Crystln	0.00E+00	0.00E+00
G3	1175	Silica, Crystln	0.00E+00	0.00E+00
G4	1175	Silica, Crystln	0.00E+00	0.00E+00
PTU	1175	Silica, Crystln	0.00E+00	0.00E+00
RMP	1175	Silica, Crystln	0.00E+00	0.00E+00
CT	7440224	Silver	8.03E-04	1.03E-07
FPUMP	7440224	Silver	0.00E+00	0.00E+00
G1	7440224	Silver	0.00E+00	0.00E+00
G2	7440224	Silver	0.00E+00	0.00E+00
G3	7440224	Silver	0.00E+00	0.00E+00
G4	7440224	Silver	0.00E+00	0.00E+00
PTU	7440224	Silver	0.00E+00	0.00E+00
RMP	7440224	Silver	0.00E+00	0.00E+00
CT	7440666	Zinc	1.19E-01	1.52E-05
FPUMP	7440666	Zinc	0.00E+00	0.00E+00
G1	7440666	Zinc	0.00E+00	0.00E+00
G2	7440666	Zinc	0.00E+00	0.00E+00
G3	7440666	Zinc	0.00E+00	0.00E+00
G4	7440666	Zinc	0.00E+00	0.00E+00
PTU	7440666	Zinc	0.00E+00	0.00E+00
RMP	7440666	Zinc	0.00E+00	0.00E+00
CT	9901	DieselExhPM	0.00E+00	0.00E+00
FPUMP	9901	DieselExhPM	2.86E+00	5.72E-02
G1	9901	DieselExhPM	8.93E+00	1.79E-01
G2	9901	DieselExhPM	1.15E+01	2.31E-01
G3	9901	DieselExhPM	1.15E+01	2.31E-01
G4	9901	DieselExhPM	1.15E+01	2.31E-01
PTU	9901	DieselExhPM	0.00E+00	0.00E+00
RMP	9901	DieselExhPM	0.00E+00	0.00E+00
CT	67663	Chloroform	0.00E+00	0.00E+00
FPUMP	67663	Chloroform	0.00E+00	0.00E+00
G1	67663	Chloroform	0.00E+00	0.00E+00
G2	67663	Chloroform	0.00E+00	0.00E+00
G3	67663	Chloroform	0.00E+00	0.00E+00
G4	67663	Chloroform	0.00E+00	0.00E+00
PTU	67663	Chloroform	0.00E+00	0.00E+00
RMP	67663	Chloroform	0.00E+00	0.00E+00
CT	50000	Formaldehyde	0.00E+00	0.00E+00
FPUMP	50000	Formaldehyde	0.00E+00	0.00E+00
G1	50000	Formaldehyde	0.00E+00	0.00E+00
G2	50000	Formaldehyde	0.00E+00	0.00E+00

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G3	50000	Formaldehyde	0.00E+00	0.00E+00
G4	50000	Formaldehyde	0.00E+00	0.00E+00
PTU	50000	Formaldehyde	0.00E+00	0.00E+00
RMP	50000	Formaldehyde	0.00E+00	0.00E+00
CT	1150	PAHs-w/	0.00E+00	0.00E+00
FPUMP	1150	PAHs-w/	0.00E+00	0.00E+00
G1	1150	PAHs-w/	0.00E+00	0.00E+00
G2	1150	PAHs-w/	0.00E+00	0.00E+00
G3	1150	PAHs-w/	0.00E+00	0.00E+00
G4	1150	PAHs-w/	0.00E+00	0.00E+00
PTU	1150	PAHs-w/	0.00E+00	0.00E+00
RMP	1150	PAHs-w/	0.00E+00	0.00E+00
CT	91203	Naphthalene	0.00E+00	0.00E+00
FPUMP	91203	Naphthalene	0.00E+00	0.00E+00
G1	91203	Naphthalene	0.00E+00	0.00E+00
G2	91203	Naphthalene	0.00E+00	0.00E+00
G3	91203	Naphthalene	0.00E+00	0.00E+00
G4	91203	Naphthalene	0.00E+00	0.00E+00
PTU	91203	Naphthalene	0.00E+00	0.00E+00
RMP	91203	Naphthalene	0.00E+00	0.00E+00
CT	75070	Acetaldehyde	0.00E+00	0.00E+00
FPUMP	75070	Acetaldehyde	0.00E+00	0.00E+00
G1	75070	Acetaldehyde	0.00E+00	0.00E+00
G2	75070	Acetaldehyde	0.00E+00	0.00E+00
G3	75070	Acetaldehyde	0.00E+00	0.00E+00
G4	75070	Acetaldehyde	0.00E+00	0.00E+00
PTU	75070	Acetaldehyde	0.00E+00	0.00E+00
RMP	75070	Acetaldehyde	0.00E+00	0.00E+00
CT	107028	Acrolein	0.00E+00	0.00E+00
FPUMP	107028	Acrolein	0.00E+00	0.00E+00
G1	107028	Acrolein	0.00E+00	0.00E+00
G2	107028	Acrolein	0.00E+00	0.00E+00
G3	107028	Acrolein	0.00E+00	0.00E+00
G4	107028	Acrolein	0.00E+00	0.00E+00
PTU	107028	Acrolein	0.00E+00	0.00E+00
RMP	107028	Acrolein	0.00E+00	0.00E+00
CT	115071	Propylene	0.00E+00	0.00E+00
FPUMP	115071	Propylene	0.00E+00	0.00E+00
G1	115071	Propylene	0.00E+00	0.00E+00
G2	115071	Propylene	0.00E+00	0.00E+00
G3	115071	Propylene	0.00E+00	0.00E+00
G4	115071	Propylene	0.00E+00	0.00E+00
PTU	115071	Propylene	0.00E+00	0.00E+00

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Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
RMP	115071	Propylene	0.00E+00	0.00E+00
CT	110543	Hexane	0.00E+00	0.00E+00
FPUMP	110543	Hexane	0.00E+00	0.00E+00
G1	110543	Hexane	0.00E+00	0.00E+00
G2	110543	Hexane	0.00E+00	0.00E+00
G3	110543	Hexane	0.00E+00	0.00E+00
G4	110543	Hexane	0.00E+00	0.00E+00
PTU	110543	Hexane	0.00E+00	0.00E+00
RMP	110543	Hexane	0.00E+00	0.00E+00
CT	1166	Radon	2.04E+03	1.32E-04
FPUMP	1166	Radon	0.00E+00	0.00E+00
G1	1166	Radon	0.00E+00	0.00E+00
G2	1166	Radon	0.00E+00	0.00E+00
G3	1166	Radon	0.00E+00	0.00E+00
G4	1166	Radon	0.00E+00	0.00E+00
PTU	1166	Radon	1.49E+02	0.00E+00
RMP	1166	Radon	1.09E+03	0.00E+00
CT	208968	Acenaphthylene	0.00E+00	0.00E+00
FPUMP	208968	Acenaphthylene	0.00E+00	0.00E+00
G1	208968	Acenaphthylene	0.00E+00	0.00E+00
G2	208968	Acenaphthylene	0.00E+00	0.00E+00
G3	208968	Acenaphthylene	0.00E+00	0.00E+00
G4	208968	Acenaphthylene	0.00E+00	0.00E+00
PTU	208968	Acenaphthylene	0.00E+00	0.00E+00
RMP	208968	Acenaphthylene	0.00E+00	0.00E+00
CT	83329	Acenaphthene	0.00E+00	0.00E+00
FPUMP	83329	Acenaphthene	0.00E+00	0.00E+00
G1	83329	Acenaphthene	0.00E+00	0.00E+00
G2	83329	Acenaphthene	0.00E+00	0.00E+00
G3	83329	Acenaphthene	0.00E+00	0.00E+00
G4	83329	Acenaphthene	0.00E+00	0.00E+00
PTU	83329	Acenaphthene	0.00E+00	0.00E+00
RMP	83329	Acenaphthene	0.00E+00	0.00E+00
CT	86737	Fluorene	0.00E+00	0.00E+00
FPUMP	86737	Fluorene	0.00E+00	0.00E+00
G1	86737	Fluorene	0.00E+00	0.00E+00
G2	86737	Fluorene	0.00E+00	0.00E+00
G3	86737	Fluorene	0.00E+00	0.00E+00
G4	86737	Fluorene	0.00E+00	0.00E+00
PTU	86737	Fluorene	0.00E+00	0.00E+00
RMP	86737	Fluorene	0.00E+00	0.00E+00
CT	85018	Phenanthrene	0.00E+00	0.00E+00
FPUMP	85018	Phenanthrene	0.00E+00	0.00E+00

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BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G1	85018	Phenanthrene	0.00E+00	0.00E+00
G2	85018	Phenanthrene	0.00E+00	0.00E+00
G3	85018	Phenanthrene	0.00E+00	0.00E+00
G4	85018	Phenanthrene	0.00E+00	0.00E+00
PTU	85018	Phenanthrene	0.00E+00	0.00E+00
RMP	85018	Phenanthrene	0.00E+00	0.00E+00
CT	120127	Anthracene	0.00E+00	0.00E+00
FPUMP	120127	Anthracene	0.00E+00	0.00E+00
G1	120127	Anthracene	0.00E+00	0.00E+00
G2	120127	Anthracene	0.00E+00	0.00E+00
G3	120127	Anthracene	0.00E+00	0.00E+00
G4	120127	Anthracene	0.00E+00	0.00E+00
PTU	120127	Anthracene	0.00E+00	0.00E+00
RMP	120127	Anthracene	0.00E+00	0.00E+00
CT	206440	Fluoranthene	0.00E+00	0.00E+00
FPUMP	206440	Fluoranthene	0.00E+00	0.00E+00
G1	206440	Fluoranthene	0.00E+00	0.00E+00
G2	206440	Fluoranthene	0.00E+00	0.00E+00
G3	206440	Fluoranthene	0.00E+00	0.00E+00
G4	206440	Fluoranthene	0.00E+00	0.00E+00
PTU	206440	Fluoranthene	0.00E+00	0.00E+00
RMP	206440	Fluoranthene	0.00E+00	0.00E+00
CT	129000	Pyrene	0.00E+00	0.00E+00
FPUMP	129000	Pyrene	0.00E+00	0.00E+00
G1	129000	Pyrene	0.00E+00	0.00E+00
G2	129000	Pyrene	0.00E+00	0.00E+00
G3	129000	Pyrene	0.00E+00	0.00E+00
G4	129000	Pyrene	0.00E+00	0.00E+00
PTU	129000	Pyrene	0.00E+00	0.00E+00
RMP	129000	Pyrene	0.00E+00	0.00E+00
CT	56553	Benz[a]anthracene	0.00E+00	0.00E+00
FPUMP	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G1	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G2	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G3	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G4	56553	Benz[a]anthracene	0.00E+00	0.00E+00
PTU	56553	Benz[a]anthracene	0.00E+00	0.00E+00
RMP	56553	Benz[a]anthracene	0.00E+00	0.00E+00
CT	218019	Chrysene	0.00E+00	0.00E+00
FPUMP	218019	Chrysene	0.00E+00	0.00E+00
G1	218019	Chrysene	0.00E+00	0.00E+00
G2	218019	Chrysene	0.00E+00	0.00E+00
G3	218019	Chrysene	0.00E+00	0.00E+00

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Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G4	218019	Chrysene	0.00E+00	0.00E+00
PTU	218019	Chrysene	0.00E+00	0.00E+00
RMP	218019	Chrysene	0.00E+00	0.00E+00
CT	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
FPUMP	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G1	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G2	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G3	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G4	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
PTU	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
RMP	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
CT	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
FPUMP	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G1	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G2	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G3	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G4	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
PTU	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
RMP	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
CT	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
FPUMP	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G1	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G2	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G3	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G4	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
PTU	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
RMP	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
CT	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
FPUMP	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G1	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G2	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G3	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G4	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
PTU	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
RMP	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
CT	53703	D[a,h]anthracen	0.00E+00	0.00E+00
FPUMP	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G1	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G2	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G3	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G4	53703	D[a,h]anthracen	0.00E+00	0.00E+00
PTU	53703	D[a,h]anthracen	0.00E+00	0.00E+00
RMP	53703	D[a,h]anthracen	0.00E+00	0.00E+00

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
CT	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
FPUMP	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G1	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G2	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G3	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G4	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
PTU	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
RMP	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
CT	7783064	H2S	0.00E+00	0.00E+00
FPUMP	7783064	H2S	0.00E+00	0.00E+00
G1	7783064	H2S	0.00E+00	0.00E+00
G2	7783064	H2S	0.00E+00	0.00E+00
G3	7783064	H2S	0.00E+00	0.00E+00
G4	7783064	H2S	0.00E+00	0.00E+00
PTU	7783064	H2S	0.00E+00	0.00E+00
RMP	7783064	H2S	0.00E+00	0.00E+00
CT	7664417	NH3	1.54E+05	1.97E+01
FPUMP	7664417	NH3	0.00E+00	0.00E+00
G1	7664417	NH3	1.39E+01	2.77E-01
G2	7664417	NH3	1.69E+01	3.37E-01
G3	7664417	NH3	1.69E+01	3.37E-01
G4	7664417	NH3	1.69E+01	3.37E-01
PTU	7664417	NH3	1.99E+02	0.00E+00
RMP	7664417	NH3	1.46E+03	0.00E+00
CT	124389	CO2	1.16E+07	1.50E+03
FPUMP	124389	CO2	0.00E+00	0.00E+00
G1	124389	CO2	0.00E+00	0.00E+00
G2	124389	CO2	0.00E+00	0.00E+00
G3	124389	CO2	0.00E+00	0.00E+00
G4	124389	CO2	0.00E+00	0.00E+00
PTU	124389	CO2	8.46E+05	0.00E+00
RMP	124389	CO2	6.22E+06	0.00E+00
CT	74828	CH4	4.47E+04	5.78E+00
FPUMP	74828	CH4	0.00E+00	0.00E+00
G1	74828	CH4	0.00E+00	0.00E+00
G2	74828	CH4	0.00E+00	0.00E+00
G3	74828	CH4	0.00E+00	0.00E+00
G4	74828	CH4	0.00E+00	0.00E+00
PTU	74828	CH4	3.27E+03	0.00E+00
RMP	74828	CH4	2.40E+04	0.00E+00
CT	10024972	Nitrous Oxide	0.00E+00	0.00E+00
FPUMP	10024972	Nitrous Oxide	0.00E+00	0.00E+00
G1	10024972	Nitrous Oxide	0.00E+00	0.00E+00

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BRGP Operational Health Risk Assessment

Table 3. Source Emission Rates: Routine Operating Year With Startups and Shutdowns
April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year With Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G2	10024972	Nitrous Oxide	0.00E+00	0.00E+00
G3	10024972	Nitrous Oxide	0.00E+00	0.00E+00
G4	10024972	Nitrous Oxide	0.00E+00	0.00E+00
PTU	10024972	Nitrous Oxide	0.00E+00	0.00E+00
RMP	10024972	Nitrous Oxide	0.00E+00	0.00E+00
CT	7440382	Arsenic	4.61E-02	5.91E-06
FPUMP	7440382	Arsenic	0.00E+00	0.00E+00
G1	7440382	Arsenic	0.00E+00	0.00E+00
G2	7440382	Arsenic	0.00E+00	0.00E+00
G3	7440382	Arsenic	0.00E+00	0.00E+00
G4	7440382	Arsenic	0.00E+00	0.00E+00
PTU	7440382	Arsenic	1.54E-02	0.00E+00
RMP	7440382	Arsenic	1.13E-01	0.00E+00
CT	106990	1,3-Butadiene	0.00E+00	0.00E+00
FPUMP	106990	1,3-Butadiene	0.00E+00	0.00E+00
G1	106990	1,3-Butadiene	0.00E+00	0.00E+00
G2	106990	1,3-Butadiene	0.00E+00	0.00E+00
G3	106990	1,3-Butadiene	0.00E+00	0.00E+00
G4	106990	1,3-Butadiene	0.00E+00	0.00E+00
PTU	106990	1,3-Butadiene	0.00E+00	0.00E+00
RMP	106990	1,3-Butadiene	0.00E+00	0.00E+00
CT	7440484	Cobalt	1.61E-04	2.06E-08
FPUMP	7440484	Cobalt	0.00E+00	0.00E+00
G1	7440484	Cobalt	0.00E+00	0.00E+00
G2	7440484	Cobalt	0.00E+00	0.00E+00
G3	7440484	Cobalt	0.00E+00	0.00E+00
G4	7440484	Cobalt	0.00E+00	0.00E+00
PTU	7440484	Cobalt	0.00E+00	0.00E+00
RMP	7440484	Cobalt	0.00E+00	0.00E+00
CT	7440622	Vanadium (fume or dust)	8.03E-04	1.03E-07
FPUMP	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G1	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G2	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G3	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G4	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
PTU	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
RMP	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00

^a The CT source group includes emissions associated with a single cooling tower cell.

^b Radon emissions are presented in units of curies per time period.

^c CARB/OEHHA-developed health risk assessment criteria for DPM includes risks and estimates of all speciated emissions. Therefore, only DPM is modeled from diesel combustion sources including the emergency generators and fire water pump.

lbs/yr = pound(s) per year

lbs/hr = pound(s) per hour

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BRGP Operational Health Risk Assessment

Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
CT	7439921	Lead	9.01E-04	1.03E-07
FPUMP	7439921	Lead	0.00E+00	0.00E+00
G1	7439921	Lead	0.00E+00	0.00E+00
G2	7439921	Lead	0.00E+00	0.00E+00
G3	7439921	Lead	0.00E+00	0.00E+00
G4	7439921	Lead	0.00E+00	0.00E+00
PTU	7439921	Lead	0.00E+00	0.00E+00
RMP	7439921	Lead	0.00E+00	0.00E+00
CT	7439976	Mercury	2.70E-01	3.08E-05
FPUMP	7439976	Mercury	0.00E+00	0.00E+00
G1	7439976	Mercury	0.00E+00	0.00E+00
G2	7439976	Mercury	0.00E+00	0.00E+00
G3	7439976	Mercury	0.00E+00	0.00E+00
G4	7439976	Mercury	0.00E+00	0.00E+00
PTU	7439976	Mercury	0.00E+00	0.00E+00
RMP	7439976	Mercury	0.00E+00	0.00E+00
CT	71432	Benzene	6.68E+02	7.63E-02
FPUMP	71432	Benzene	0.00E+00	0.00E+00
G1	71432	Benzene	0.00E+00	0.00E+00
G2	71432	Benzene	0.00E+00	0.00E+00
G3	71432	Benzene	0.00E+00	0.00E+00
G4	71432	Benzene	0.00E+00	0.00E+00
PTU	71432	Benzene	0.00E+00	0.00E+00
RMP	71432	Benzene	0.00E+00	0.00E+00
CT	108883	Toluene	3.80E+01	4.34E-03
FPUMP	108883	Toluene	0.00E+00	0.00E+00
G1	108883	Toluene	0.00E+00	0.00E+00
G2	108883	Toluene	0.00E+00	0.00E+00
G3	108883	Toluene	0.00E+00	0.00E+00
G4	108883	Toluene	0.00E+00	0.00E+00
PTU	108883	Toluene	0.00E+00	0.00E+00
RMP	108883	Toluene	0.00E+00	0.00E+00
CT	100414	Ethylbenzene	7.02E+00	8.02E-04
FPUMP	100414	Ethylbenzene	0.00E+00	0.00E+00
G1	100414	Ethylbenzene	0.00E+00	0.00E+00
G2	100414	Ethylbenzene	0.00E+00	0.00E+00
G3	100414	Ethylbenzene	0.00E+00	0.00E+00
G4	100414	Ethylbenzene	0.00E+00	0.00E+00
PTU	100414	Ethylbenzene	0.00E+00	0.00E+00
RMP	100414	Ethylbenzene	0.00E+00	0.00E+00
CT	1330207	Xylenes	6.98E+00	7.97E-04
FPUMP	1330207	Xylenes	0.00E+00	0.00E+00
G1	1330207	Xylenes	0.00E+00	0.00E+00

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Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

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BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G2	1330207	Xylenes	0.00E+00	0.00E+00
G3	1330207	Xylenes	0.00E+00	0.00E+00
G4	1330207	Xylenes	0.00E+00	0.00E+00
PTU	1330207	Xylenes	0.00E+00	0.00E+00
RMP	1330207	Xylenes	0.00E+00	0.00E+00
CT	7429905	Aluminum	1.80E-02	2.06E-06
FPUMP	7429905	Aluminum	0.00E+00	0.00E+00
G1	7429905	Aluminum	0.00E+00	0.00E+00
G2	7429905	Aluminum	0.00E+00	0.00E+00
G3	7429905	Aluminum	0.00E+00	0.00E+00
G4	7429905	Aluminum	0.00E+00	0.00E+00
PTU	7429905	Aluminum	0.00E+00	0.00E+00
RMP	7429905	Aluminum	0.00E+00	0.00E+00
CT	7440360	Antimony	1.44E-03	1.65E-07
FPUMP	7440360	Antimony	0.00E+00	0.00E+00
G1	7440360	Antimony	0.00E+00	0.00E+00
G2	7440360	Antimony	0.00E+00	0.00E+00
G3	7440360	Antimony	0.00E+00	0.00E+00
G4	7440360	Antimony	0.00E+00	0.00E+00
PTU	7440360	Antimony	0.00E+00	0.00E+00
RMP	7440360	Antimony	0.00E+00	0.00E+00
CT	7440393	Barium	2.69E-02	3.07E-06
FPUMP	7440393	Barium	0.00E+00	0.00E+00
G1	7440393	Barium	0.00E+00	0.00E+00
G2	7440393	Barium	0.00E+00	0.00E+00
G3	7440393	Barium	0.00E+00	0.00E+00
G4	7440393	Barium	0.00E+00	0.00E+00
PTU	7440393	Barium	0.00E+00	0.00E+00
RMP	7440393	Barium	0.00E+00	0.00E+00
CT	7440417	Beryllium	1.80E-04	2.06E-08
FPUMP	7440417	Beryllium	0.00E+00	0.00E+00
G1	7440417	Beryllium	0.00E+00	0.00E+00
G2	7440417	Beryllium	0.00E+00	0.00E+00
G3	7440417	Beryllium	0.00E+00	0.00E+00
G4	7440417	Beryllium	0.00E+00	0.00E+00
PTU	7440417	Beryllium	0.00E+00	0.00E+00
RMP	7440417	Beryllium	0.00E+00	0.00E+00
CT	7440439	Cadmium	3.60E-04	4.11E-08
FPUMP	7440439	Cadmium	0.00E+00	0.00E+00
G1	7440439	Cadmium	0.00E+00	0.00E+00
G2	7440439	Cadmium	0.00E+00	0.00E+00
G3	7440439	Cadmium	0.00E+00	0.00E+00
G4	7440439	Cadmium	0.00E+00	0.00E+00

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Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
PTU	7440439	Cadmium	0.00E+00	0.00E+00
RMP	7440439	Cadmium	0.00E+00	0.00E+00
CT	7440473	Chromium	9.01E-04	1.03E-07
FPUMP	7440473	Chromium	0.00E+00	0.00E+00
G1	7440473	Chromium	0.00E+00	0.00E+00
G2	7440473	Chromium	0.00E+00	0.00E+00
G3	7440473	Chromium	0.00E+00	0.00E+00
G4	7440473	Chromium	0.00E+00	0.00E+00
PTU	7440473	Chromium	0.00E+00	0.00E+00
RMP	7440473	Chromium	0.00E+00	0.00E+00
CT	7440508	Copper	5.40E-04	6.17E-08
FPUMP	7440508	Copper	0.00E+00	0.00E+00
G1	7440508	Copper	0.00E+00	0.00E+00
G2	7440508	Copper	0.00E+00	0.00E+00
G3	7440508	Copper	0.00E+00	0.00E+00
G4	7440508	Copper	0.00E+00	0.00E+00
PTU	7440508	Copper	0.00E+00	0.00E+00
RMP	7440508	Copper	0.00E+00	0.00E+00
CT	7439965	Manganese	1.07E-01	1.22E-05
FPUMP	7439965	Manganese	0.00E+00	0.00E+00
G1	7439965	Manganese	0.00E+00	0.00E+00
G2	7439965	Manganese	0.00E+00	0.00E+00
G3	7439965	Manganese	0.00E+00	0.00E+00
G4	7439965	Manganese	0.00E+00	0.00E+00
PTU	7439965	Manganese	0.00E+00	0.00E+00
RMP	7439965	Manganese	0.00E+00	0.00E+00
CT	7440020	Nickel	2.05E-03	2.34E-07
FPUMP	7440020	Nickel	0.00E+00	0.00E+00
G1	7440020	Nickel	0.00E+00	0.00E+00
G2	7440020	Nickel	0.00E+00	0.00E+00
G3	7440020	Nickel	0.00E+00	0.00E+00
G4	7440020	Nickel	0.00E+00	0.00E+00
PTU	7440020	Nickel	0.00E+00	0.00E+00
RMP	7440020	Nickel	0.00E+00	0.00E+00
CT	7782492	Selenium	2.06E-02	2.35E-06
FPUMP	7782492	Selenium	0.00E+00	0.00E+00
G1	7782492	Selenium	0.00E+00	0.00E+00
G2	7782492	Selenium	0.00E+00	0.00E+00
G3	7782492	Selenium	0.00E+00	0.00E+00
G4	7782492	Selenium	0.00E+00	0.00E+00
PTU	7782492	Selenium	0.00E+00	0.00E+00
RMP	7782492	Selenium	0.00E+00	0.00E+00
CT	1175	Silica, Crystln	9.01E-01	1.03E-04

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Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
FPUMP	1175	Silica, Crystln	0.00E+00	0.00E+00
G1	1175	Silica, Crystln	0.00E+00	0.00E+00
G2	1175	Silica, Crystln	0.00E+00	0.00E+00
G3	1175	Silica, Crystln	0.00E+00	0.00E+00
G4	1175	Silica, Crystln	0.00E+00	0.00E+00
PTU	1175	Silica, Crystln	0.00E+00	0.00E+00
RMP	1175	Silica, Crystln	0.00E+00	0.00E+00
CT	7440224	Silver	9.01E-04	1.03E-07
FPUMP	7440224	Silver	0.00E+00	0.00E+00
G1	7440224	Silver	0.00E+00	0.00E+00
G2	7440224	Silver	0.00E+00	0.00E+00
G3	7440224	Silver	0.00E+00	0.00E+00
G4	7440224	Silver	0.00E+00	0.00E+00
PTU	7440224	Silver	0.00E+00	0.00E+00
RMP	7440224	Silver	0.00E+00	0.00E+00
CT	7440666	Zinc	1.33E-01	1.52E-05
FPUMP	7440666	Zinc	0.00E+00	0.00E+00
G1	7440666	Zinc	0.00E+00	0.00E+00
G2	7440666	Zinc	0.00E+00	0.00E+00
G3	7440666	Zinc	0.00E+00	0.00E+00
G4	7440666	Zinc	0.00E+00	0.00E+00
PTU	7440666	Zinc	0.00E+00	0.00E+00
RMP	7440666	Zinc	0.00E+00	0.00E+00
CT	9901	DieselExhPM	0.00E+00	0.00E+00
FPUMP	9901	DieselExhPM	2.86E+00	5.72E-02
G1	9901	DieselExhPM	8.93E+00	1.79E-01
G2	9901	DieselExhPM	1.15E+01	2.31E-01
G3	9901	DieselExhPM	1.15E+01	2.31E-01
G4	9901	DieselExhPM	1.15E+01	2.31E-01
PTU	9901	DieselExhPM	0.00E+00	0.00E+00
RMP	9901	DieselExhPM	0.00E+00	0.00E+00
CT	67663	Chloroform	0.00E+00	0.00E+00
FPUMP	67663	Chloroform	0.00E+00	0.00E+00
G1	67663	Chloroform	0.00E+00	0.00E+00
G2	67663	Chloroform	0.00E+00	0.00E+00
G3	67663	Chloroform	0.00E+00	0.00E+00
G4	67663	Chloroform	0.00E+00	0.00E+00
PTU	67663	Chloroform	0.00E+00	0.00E+00
RMP	67663	Chloroform	0.00E+00	0.00E+00
CT	50000	Formaldehyde	0.00E+00	0.00E+00
FPUMP	50000	Formaldehyde	0.00E+00	0.00E+00
G1	50000	Formaldehyde	0.00E+00	0.00E+00
G2	50000	Formaldehyde	0.00E+00	0.00E+00

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Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

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BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G3	50000	Formaldehyde	0.00E+00	0.00E+00
G4	50000	Formaldehyde	0.00E+00	0.00E+00
PTU	50000	Formaldehyde	0.00E+00	0.00E+00
RMP	50000	Formaldehyde	0.00E+00	0.00E+00
CT	1150	PAHs-w/	0.00E+00	0.00E+00
FPUMP	1150	PAHs-w/	0.00E+00	0.00E+00
G1	1150	PAHs-w/	0.00E+00	0.00E+00
G2	1150	PAHs-w/	0.00E+00	0.00E+00
G3	1150	PAHs-w/	0.00E+00	0.00E+00
G4	1150	PAHs-w/	0.00E+00	0.00E+00
PTU	1150	PAHs-w/	0.00E+00	0.00E+00
RMP	1150	PAHs-w/	0.00E+00	0.00E+00
CT	91203	Naphthalene	0.00E+00	0.00E+00
FPUMP	91203	Naphthalene	0.00E+00	0.00E+00
G1	91203	Naphthalene	0.00E+00	0.00E+00
G2	91203	Naphthalene	0.00E+00	0.00E+00
G3	91203	Naphthalene	0.00E+00	0.00E+00
G4	91203	Naphthalene	0.00E+00	0.00E+00
PTU	91203	Naphthalene	0.00E+00	0.00E+00
RMP	91203	Naphthalene	0.00E+00	0.00E+00
CT	75070	Acetaldehyde	0.00E+00	0.00E+00
FPUMP	75070	Acetaldehyde	0.00E+00	0.00E+00
G1	75070	Acetaldehyde	0.00E+00	0.00E+00
G2	75070	Acetaldehyde	0.00E+00	0.00E+00
G3	75070	Acetaldehyde	0.00E+00	0.00E+00
G4	75070	Acetaldehyde	0.00E+00	0.00E+00
PTU	75070	Acetaldehyde	0.00E+00	0.00E+00
RMP	75070	Acetaldehyde	0.00E+00	0.00E+00
CT	107028	Acrolein	0.00E+00	0.00E+00
FPUMP	107028	Acrolein	0.00E+00	0.00E+00
G1	107028	Acrolein	0.00E+00	0.00E+00
G2	107028	Acrolein	0.00E+00	0.00E+00
G3	107028	Acrolein	0.00E+00	0.00E+00
G4	107028	Acrolein	0.00E+00	0.00E+00
PTU	107028	Acrolein	0.00E+00	0.00E+00
RMP	107028	Acrolein	0.00E+00	0.00E+00
CT	115071	Propylene	0.00E+00	0.00E+00
FPUMP	115071	Propylene	0.00E+00	0.00E+00
G1	115071	Propylene	0.00E+00	0.00E+00
G2	115071	Propylene	0.00E+00	0.00E+00
G3	115071	Propylene	0.00E+00	0.00E+00
G4	115071	Propylene	0.00E+00	0.00E+00
PTU	115071	Propylene	0.00E+00	0.00E+00

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Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

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BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
RMP	115071	Propylene	0.00E+00	0.00E+00
CT	110543	Hexane	0.00E+00	0.00E+00
FPUMP	110543	Hexane	0.00E+00	0.00E+00
G1	110543	Hexane	0.00E+00	0.00E+00
G2	110543	Hexane	0.00E+00	0.00E+00
G3	110543	Hexane	0.00E+00	0.00E+00
G4	110543	Hexane	0.00E+00	0.00E+00
PTU	110543	Hexane	0.00E+00	0.00E+00
RMP	110543	Hexane	0.00E+00	0.00E+00
CT	1166	Radon	2.31E+03	1.32E-04
FPUMP	1166	Radon	0.00E+00	0.00E+00
G1	1166	Radon	0.00E+00	0.00E+00
G2	1166	Radon	0.00E+00	0.00E+00
G3	1166	Radon	0.00E+00	0.00E+00
G4	1166	Radon	0.00E+00	0.00E+00
PTU	1166	Radon	0.00E+00	0.00E+00
RMP	1166	Radon	0.00E+00	0.00E+00
CT	208968	Acenaphthylene	0.00E+00	0.00E+00
FPUMP	208968	Acenaphthylene	0.00E+00	0.00E+00
G1	208968	Acenaphthylene	0.00E+00	0.00E+00
G2	208968	Acenaphthylene	0.00E+00	0.00E+00
G3	208968	Acenaphthylene	0.00E+00	0.00E+00
G4	208968	Acenaphthylene	0.00E+00	0.00E+00
PTU	208968	Acenaphthylene	0.00E+00	0.00E+00
RMP	208968	Acenaphthylene	0.00E+00	0.00E+00
CT	83329	Acenaphthene	0.00E+00	0.00E+00
FPUMP	83329	Acenaphthene	0.00E+00	0.00E+00
G1	83329	Acenaphthene	0.00E+00	0.00E+00
G2	83329	Acenaphthene	0.00E+00	0.00E+00
G3	83329	Acenaphthene	0.00E+00	0.00E+00
G4	83329	Acenaphthene	0.00E+00	0.00E+00
PTU	83329	Acenaphthene	0.00E+00	0.00E+00
RMP	83329	Acenaphthene	0.00E+00	0.00E+00
CT	86737	Fluorene	0.00E+00	0.00E+00
FPUMP	86737	Fluorene	0.00E+00	0.00E+00
G1	86737	Fluorene	0.00E+00	0.00E+00
G2	86737	Fluorene	0.00E+00	0.00E+00
G3	86737	Fluorene	0.00E+00	0.00E+00
G4	86737	Fluorene	0.00E+00	0.00E+00
PTU	86737	Fluorene	0.00E+00	0.00E+00
RMP	86737	Fluorene	0.00E+00	0.00E+00
CT	85018	Phenanthrene	0.00E+00	0.00E+00
FPUMP	85018	Phenanthrene	0.00E+00	0.00E+00

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Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

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BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G1	85018	Phenanthrene	0.00E+00	0.00E+00
G2	85018	Phenanthrene	0.00E+00	0.00E+00
G3	85018	Phenanthrene	0.00E+00	0.00E+00
G4	85018	Phenanthrene	0.00E+00	0.00E+00
PTU	85018	Phenanthrene	0.00E+00	0.00E+00
RMP	85018	Phenanthrene	0.00E+00	0.00E+00
CT	120127	Anthracene	0.00E+00	0.00E+00
FPUMP	120127	Anthracene	0.00E+00	0.00E+00
G1	120127	Anthracene	0.00E+00	0.00E+00
G2	120127	Anthracene	0.00E+00	0.00E+00
G3	120127	Anthracene	0.00E+00	0.00E+00
G4	120127	Anthracene	0.00E+00	0.00E+00
PTU	120127	Anthracene	0.00E+00	0.00E+00
RMP	120127	Anthracene	0.00E+00	0.00E+00
CT	206440	Fluoranthene	0.00E+00	0.00E+00
FPUMP	206440	Fluoranthene	0.00E+00	0.00E+00
G1	206440	Fluoranthene	0.00E+00	0.00E+00
G2	206440	Fluoranthene	0.00E+00	0.00E+00
G3	206440	Fluoranthene	0.00E+00	0.00E+00
G4	206440	Fluoranthene	0.00E+00	0.00E+00
PTU	206440	Fluoranthene	0.00E+00	0.00E+00
RMP	206440	Fluoranthene	0.00E+00	0.00E+00
CT	129000	Pyrene	0.00E+00	0.00E+00
FPUMP	129000	Pyrene	0.00E+00	0.00E+00
G1	129000	Pyrene	0.00E+00	0.00E+00
G2	129000	Pyrene	0.00E+00	0.00E+00
G3	129000	Pyrene	0.00E+00	0.00E+00
G4	129000	Pyrene	0.00E+00	0.00E+00
PTU	129000	Pyrene	0.00E+00	0.00E+00
RMP	129000	Pyrene	0.00E+00	0.00E+00
CT	56553	Benz[a]anthracene	0.00E+00	0.00E+00
FPUMP	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G1	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G2	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G3	56553	Benz[a]anthracene	0.00E+00	0.00E+00
G4	56553	Benz[a]anthracene	0.00E+00	0.00E+00
PTU	56553	Benz[a]anthracene	0.00E+00	0.00E+00
RMP	56553	Benz[a]anthracene	0.00E+00	0.00E+00
CT	218019	Chrysene	0.00E+00	0.00E+00
FPUMP	218019	Chrysene	0.00E+00	0.00E+00
G1	218019	Chrysene	0.00E+00	0.00E+00
G2	218019	Chrysene	0.00E+00	0.00E+00
G3	218019	Chrysene	0.00E+00	0.00E+00

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Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns
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BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G4	218019	Chrysene	0.00E+00	0.00E+00
PTU	218019	Chrysene	0.00E+00	0.00E+00
RMP	218019	Chrysene	0.00E+00	0.00E+00
CT	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
FPUMP	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G1	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G2	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G3	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
G4	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
PTU	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
RMP	205992	Benzo[b]fluoranthene	0.00E+00	0.00E+00
CT	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
FPUMP	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G1	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G2	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G3	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
G4	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
PTU	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
RMP	207089	Benzo[k]fluoranthene	0.00E+00	0.00E+00
CT	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
FPUMP	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G1	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G2	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G3	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
G4	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
PTU	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
RMP	50328	Benzo[a]pyrene	0.00E+00	0.00E+00
CT	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
FPUMP	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G1	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G2	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G3	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
G4	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
PTU	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
RMP	193395	ln[1,2,3-cd]pyr	0.00E+00	0.00E+00
CT	53703	D[a,h]anthracen	0.00E+00	0.00E+00
FPUMP	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G1	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G2	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G3	53703	D[a,h]anthracen	0.00E+00	0.00E+00
G4	53703	D[a,h]anthracen	0.00E+00	0.00E+00
PTU	53703	D[a,h]anthracen	0.00E+00	0.00E+00
RMP	53703	D[a,h]anthracen	0.00E+00	0.00E+00

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
CT	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
FPUMP	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G1	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G2	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G3	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
G4	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
PTU	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
RMP	191242	B[g,h,i]perylene	0.00E+00	0.00E+00
CT	7783064	H2S	0.00E+00	0.00E+00
FPUMP	7783064	H2S	0.00E+00	0.00E+00
G1	7783064	H2S	0.00E+00	0.00E+00
G2	7783064	H2S	0.00E+00	0.00E+00
G3	7783064	H2S	0.00E+00	0.00E+00
G4	7783064	H2S	0.00E+00	0.00E+00
PTU	7783064	H2S	0.00E+00	0.00E+00
RMP	7783064	H2S	0.00E+00	0.00E+00
CT	7664417	NH3	1.73E+05	1.97E+01
FPUMP	7664417	NH3	0.00E+00	0.00E+00
G1	7664417	NH3	1.39E+01	2.77E-01
G2	7664417	NH3	1.69E+01	3.37E-01
G3	7664417	NH3	1.69E+01	3.37E-01
G4	7664417	NH3	1.69E+01	3.37E-01
PTU	7664417	NH3	0.00E+00	0.00E+00
RMP	7664417	NH3	0.00E+00	0.00E+00
CT	124389	CO2	1.31E+07	1.50E+03
FPUMP	124389	CO2	0.00E+00	0.00E+00
G1	124389	CO2	0.00E+00	0.00E+00
G2	124389	CO2	0.00E+00	0.00E+00
G3	124389	CO2	0.00E+00	0.00E+00
G4	124389	CO2	0.00E+00	0.00E+00
PTU	124389	CO2	0.00E+00	0.00E+00
RMP	124389	CO2	0.00E+00	0.00E+00
CT	74828	CH4	5.06E+04	5.78E+00
FPUMP	74828	CH4	0.00E+00	0.00E+00
G1	74828	CH4	0.00E+00	0.00E+00
G2	74828	CH4	0.00E+00	0.00E+00
G3	74828	CH4	0.00E+00	0.00E+00
G4	74828	CH4	0.00E+00	0.00E+00
PTU	74828	CH4	0.00E+00	0.00E+00
RMP	74828	CH4	0.00E+00	0.00E+00
CT	10024972	Nitrous Oxide	0.00E+00	0.00E+00
FPUMP	10024972	Nitrous Oxide	0.00E+00	0.00E+00
G1	10024972	Nitrous Oxide	0.00E+00	0.00E+00

Black Rock Geothermal Project

BRGP Operational Health Risk Assessment

Table 4. Source Emission Rates: Routine Operating Year Without Startups and Shutdowns
April 2023

BRGP Operational Modeled Source Emission Rates: Routine Operating Year Without Startups and Shutdowns

Source ID ^a	CAS Number	Pollutant Name	Annual Emissions (lbs/yr) ^{b, c}	Hourly Emissions (lbs/hr) ^{b, c}
G2	10024972	Nitrous Oxide	0.00E+00	0.00E+00
G3	10024972	Nitrous Oxide	0.00E+00	0.00E+00
G4	10024972	Nitrous Oxide	0.00E+00	0.00E+00
PTU	10024972	Nitrous Oxide	0.00E+00	0.00E+00
RMP	10024972	Nitrous Oxide	0.00E+00	0.00E+00
CT	7440382	Arsenic	5.17E-02	5.91E-06
FPUMP	7440382	Arsenic	0.00E+00	0.00E+00
G1	7440382	Arsenic	0.00E+00	0.00E+00
G2	7440382	Arsenic	0.00E+00	0.00E+00
G3	7440382	Arsenic	0.00E+00	0.00E+00
G4	7440382	Arsenic	0.00E+00	0.00E+00
PTU	7440382	Arsenic	0.00E+00	0.00E+00
RMP	7440382	Arsenic	0.00E+00	0.00E+00
CT	106990	1,3-Butadiene	0.00E+00	0.00E+00
FPUMP	106990	1,3-Butadiene	0.00E+00	0.00E+00
G1	106990	1,3-Butadiene	0.00E+00	0.00E+00
G2	106990	1,3-Butadiene	0.00E+00	0.00E+00
G3	106990	1,3-Butadiene	0.00E+00	0.00E+00
G4	106990	1,3-Butadiene	0.00E+00	0.00E+00
PTU	106990	1,3-Butadiene	0.00E+00	0.00E+00
RMP	106990	1,3-Butadiene	0.00E+00	0.00E+00
CT	7440484	Cobalt	1.80E-04	2.06E-08
FPUMP	7440484	Cobalt	0.00E+00	0.00E+00
G1	7440484	Cobalt	0.00E+00	0.00E+00
G2	7440484	Cobalt	0.00E+00	0.00E+00
G3	7440484	Cobalt	0.00E+00	0.00E+00
G4	7440484	Cobalt	0.00E+00	0.00E+00
PTU	7440484	Cobalt	0.00E+00	0.00E+00
RMP	7440484	Cobalt	0.00E+00	0.00E+00
CT	7440622	Vanadium (fume or dust)	9.01E-04	1.03E-07
FPUMP	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G1	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G2	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G3	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
G4	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
PTU	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00
RMP	7440622	Vanadium (fume or dust)	0.00E+00	0.00E+00

^a The CT source group includes emissions associated with a single cooling tower cell.

^b Radon emissions are presented in units of curies per time period.

^c CARB/OEHHA-developed health risk assessment criteria for DPM includes risks and estimates of all speciated emissions. Therefore, only DPM is modeled from diesel combustion sources including the emergency generators and fire water pump.

lbs/yr = pound(s) per year

lbs/hr = pound(s) per hour

Black Rock Geothermal Project
BRGP Operational Health Risk Assessment
Table 5. Health Risk Assessment Results
April 2023

BRGP Operational Health Risk Assessment Results

Risk Type	Risk Analysis ^a	Receptor #	Easting ^b	Northing ^b	Risk ^c	Thresholds ^d
Facility Wide Impacts: Routine Operating Year with Startups and Shutdowns						
Cancer	PMI	54	628,375.53	3,670,628.05	9.09	--
	MEIR	5,612	629,090.70	3,671,844.15	0.24	10.00
	MEIW	54	628,375.53	3,670,628.05	0.64	10.00
	Maximally Exposed Sensitive Receptor	5,612	629,090.70	3,671,844.15	0.24	10.00
Non-Cancer Chronic	PMI	54	628,375.53	3,670,628.05	0.28	--
	MEIR	5,612	629,090.70	3,671,844.15	0.01	1.00
	MEIW	54	628,375.53	3,670,628.05	0.28	1.00
	Maximally Exposed Sensitive Receptor	5,612	629,090.70	3,671,844.15	0.01	1.00
Non-Cancer Acute	PMI	2,277	627,725.00	3,671,075.00	0.69	--
	MEIR	5,612	629,090.70	3,671,844.15	0.27	1.00
	MEIW	2,277	627,725.00	3,671,075.00	0.69	1.00
	Maximally Exposed Sensitive Receptor	5,612	629,090.70	3,671,844.15	0.27	1.00
Facility Wide Impacts: Routine Operating Year without Startups and Shutdowns						
Cancer	PMI	54	628,375.53	3,670,628.05	9.92	--
	MEIR	5,612	629,090.70	3,671,844.15	0.25	10.00
	MEIW	54	628,375.53	3,670,628.05	0.70	10.00
	Maximally Exposed Sensitive Receptor	5,612	629,090.70	3,671,844.15	0.25	10.00
Non-Cancer Chronic	PMI	54	628,375.53	3,670,628.05	0.30	--
	MEIR	5,612	629,090.70	3,671,844.15	0.01	1.00
	MEIW	54	628,375.53	3,670,628.05	0.30	1.00
	Maximally Exposed Sensitive Receptor	5,612	629,090.70	3,671,844.15	0.01	1.00
Non-Cancer Acute	PMI	2,277	627,725.00	3,671,075.00	0.69	--
	MEIR	5,612	629,090.70	3,671,844.15	0.27	1.00
	MEIW	2,277	627,725.00	3,671,075.00	0.69	1.00
	Maximally Exposed Sensitive Receptor	5,612	629,090.70	3,671,844.15	0.27	1.00

^a There are no nearby sensitive receptors so the Project conservatively assumes all nearby residences are potential sensitive receptors. For all non-cancer MEIW locations, the MEIW is assumed equal to the PMI.

^b Coordinates presented are UTM NAD 83 Zone 11, meters

^c Health risk results presented in incidences per million for cancer risks and hazard indices (HI) for non-cancer chronic and acute risks.

^d Thresholds presented in incidences per million for cancer risks and HI for non-cancer chronic and acute risks. In the absence of ICAPCD thresholds, facility total risk results are compared to the SCAQMD's CEQA significance thresholds.

Note: "--" = Not applicable per discussion in Section 5.9.

Appendix 5.9B

Construction Health Risk Assessment



Black Rock Geothermal Project
BRGP Construction Health Risk Assessment
Table 1. Health Risk Assessment Results - Cancer
April 2023

Modeled Concentrations			
Maximum annual impact of annualized project emissions			
PMI	0.07910	µg/m ³	Diesel PM
MEIR	0.00527	µg/m ³	Diesel PM
Sensitive	0.00527	µg/m ³	Diesel PM
MEIW	0.07910	µg/m ³	Diesel PM

Construction HRA per the 2015 OEHHA Guidance
Residential Calculation Procedure for Cancer Risks

PMI																															
Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dose (mg/kg/day)	2.74E-05	8.28E-05	8.28E-05	6.54E-05	6.54E-05	6.54E-05	6.54E-05	6.54E-05	6.54E-05	5.66E-05	5.66E-05	5.66E-05	5.66E-05	5.66E-05	5.66E-05	5.66E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	2.54E-05	
Risk	9.15E-07	1.11E-05	1.11E-05	2.22E-06	2.22E-06	2.22E-06	2.22E-06	2.22E-06	2.22E-06	1.92E-06	1.92E-06	1.92E-06	1.92E-06	1.92E-06	1.92E-06	1.92E-06	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	2.92E-07	
Rolling 3-yr Risk ^a				2.52E-05	1.55E-05	6.66E-06	6.66E-06	6.66E-06	6.66E-06	6.36E-06	6.06E-06	5.76E-06	5.76E-06	5.76E-06	5.76E-06	5.76E-06	4.13E-06	2.50E-06	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	8.75E-07	
Risk per Million				25.25	15.49	6.66	6.66	6.66	6.66	6.36	6.06	5.76	5.76	5.76	5.76	5.76	4.13	2.50	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	

Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dose (mg/kg/day)	1.83E-06	5.51E-06	5.51E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	
Risk	6.10E-08	7.37E-07	7.37E-07	1.48E-07	1.48E-07	1.48E-07	1.48E-07	1.48E-07	1.48E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	
Rolling 3-yr Risk ^a				1.68E-06	1.03E-06	4.44E-07	4.44E-07	4.44E-07	4.44E-07	4.24E-07	4.04E-07	3.84E-07	3.84E-07	3.84E-07	3.84E-07	3.84E-07	2.75E-07	1.67E-07	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	
Risk per Million				1.68	1.03	0.44	0.44	0.44	0.44	0.42	0.40	0.38	0.38	0.38	0.38	0.38	0.28	0.17	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	

MESR																															
Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dose (mg/kg/day)	1.83E-06	5.51E-06	5.51E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	1.69E-06	
Risk	6.10E-08	7.37E-07	7.37E-07	1.48E-07	1.48E-07	1.48E-07	1.48E-07	1.48E-07	1.48E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	1.94E-08	
Rolling 3-yr Risk ^a				1.68E-06	1.03E-06	4.44E-07	4.44E-07	4.44E-07	4.44E-07	4.24E-07	4.04E-07	3.84E-07	3.84E-07	3.84E-07	3.84E-07	3.84E-07	2.75E-07	1.67E-07	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	5.83E-08	
Risk per Million				1.68	1.03	0.44	0.44	0.44	0.44	0.42	0.40	0.38	0.38	0.38	0.38	0.38	0.28	0.17	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	

Worker Calculation Procedure for Cancer Risks

MEIW																									
Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Dose (mg/kg/day)	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05
Risk	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07	1.94E-07
Rolling 3-yr Risk ^a			5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07	5.83E-07
Risk per Million			0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58

Note:
^a Cancer risk was summed on a 3-year rolling basis to conservatively mirror the 29-month duration of Project construction.

Black Rock Geothermal Project

BRGP Construction Health Risk Assessment

Table 2. Health Risk Assessment Results - Chronic

April 2023

Construction HRA per the 2015 OEHHA Guidance

Calculation Procedure for Chronic Hazard Index

Receptor Type	Pollutant	Maximum Annual Modeled Concentration ($\mu\text{g}/\text{m}^3$) ^a	REL ($\mu\text{g}/\text{m}^3$) ^b	Chronic Hazard Index
PMI	Diesel PM	0.079	5.00	0.02
MEIR	Diesel PM	0.005	5.00	0.0011
MESR	Diesel PM	0.005	5.00	0.0011
MEIW	Diesel PM	0.079	5.00	0.02

Notes:

^a Maximum Annual Modeled Concentrations taken from Appendix 5.9B, Modeled Concentrations Table.

^b REL taken from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB 2022a).

Black Rock Geothermal Project
BRGP Construction Health Risk Assessment
Table 3. Health Risk Assessment Residential Cancer Risk Methodology
April 2023

Dose Constants																															
Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
BR/BW	361	1,090	1,090	861	861	861	861	861	861	745	745	745	745	745	745	745	335	335	335	335	335	335	335	335	335	335	335	335	335	335	335
A	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
EF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Conversion	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06

Risk Constants																																	
Year	0 (3rd tri)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
CPF (Diesel PM)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1		
ASF	10.0	10.0	10.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
ED	0.25	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
AT	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
FAH	0.85	0.85	0.85	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73

Black Rock Geothermal Project

BRGP Construction Health Risk Assessment

Table 4. Health Risk Assessment Worker Cancer Risk Methodology

April 2023

Dose Constants																									
Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
WAF ^a	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BR/BW	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0	230.0
A	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
EF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Conversion	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06

Risk Constants																									
Year	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CPF (Diesel PM)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
ASF	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ED	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
AT	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70

Note:

^a Conservatively assumes construction activities occur 24 hours per day, 7 days per week.