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State of California

From:

## Memorandum

To: Chair Robert B. Weisenmiller Commissioner Karen Douglas Commissioner David Hochschild Commissioner Andrew McAllister Commissioner Janea A. Scott Date: November 7, 2016

Robert P. Oglesby **Executive Director** 

### subject: Approval of the City of Burbank Emission Performance Standard Compliance Filing

On November 1, 2016, the City of Burbank (Burbank) submitted a compliance filing requesting the Energy Commission find that Burbank's covered procurement for the proposed natural gas-fired Intermountain Power Project (IPP) Repowering Project (Project) be determined to be compliant with the Energy Commission's Greenhouse Gases Emission Performance Standard (EPS), pursuant to Title 20 of the California Code of Regulations, Section 2900, et seq.

SB 1368 EPS limits long-term investments in baseload generation by the state's utilities to power plants that meet an EPS jointly established by the Energy Commission and the California Public Utilities Commission. The emission rate limit is 1,100 pounds of carbon dioxide (CO<sub>2</sub>) per megawatt-hour (MWh). The EPS establishes a public process for determining the compliance of proposed utility investments. Utilities are required to submit a compliance filing upon committing to an investment that is required to meet the EPS.

Six California publicly owned utilities (Anaheim, Burbank, Glendale, Los Angeles, Pasadena, and Riverside) along with 23 Utah municipalities, and 6 rural electric cooperatives currently purchase power from IPP under a Power Sales Contract that was signed on July 11, 1980 and expires on June 15, 2027. The Intermountain Power Authority, a political subdivision of the State of Utah, is the owner of IPP.

On June 30, 2015, the Burbank City Council approved the Second Amendatory Power Sales Contract, which subsequently went into effect on March 16, 2016. This new contract allows for the repowering of IPP's 1,800 MW coal-fired generating units with up to 1,200 MW of EPS-compliant natural gas-fired combined cycle (NGCC) units by July 1, 2025. The Project will include two NGCC units, each with a design capacity of 600 MW and an expected CO<sub>2</sub> emission rate of approximately 800 pounds per MWh. Burbank's share will be 40 MW up to a maximum of 50 MW. Burbank also has an option to withdraw from the Project or reduce its entitlement by up to 20 percent by November 1, 2019. A subsequent EPS filing will be necessary if Burbank does not withdraw and the final design implementation is significantly different from the three options described in the filing.

Commissioners November 7, 2016 Page 2

Los Angeles Department of Water and Power (LADWP) previously submitted a compliance filing for the conversion of IPP from a coal-fired to a gas-fired power plant and was found compliant.

Burbank's compliance filing involves the exact same resource as LADWP and identifies the same three potential NGCC designs and vendor specifications. Based on this information, staff calculated the expected  $CO_2$  emission rates at various loads using the higher and lower heat inputs and associated capacities provided. Staff was able to duplicate the  $CO_2$  emission rates to within 0 to 2 percent. Table 1 summarizes the Engineering Office's review of the three proposed NGCC designs.

Staff has evaluated Burbank's compliance filing and concludes that the analysis conducted in reviewing LADWP's compliance filing holds here as well: staff concludes that the Second Amendatory Power Sales Contract is compliant with the EPS pursuant to Section 2902(a); specifically, that the proposed NGCC power plant design in the compliance filing is below the EPS limit of 1,100 pounds per MWh. The NGCC units specified in the Second Amendatory Power Sales Contract meet the EPS.

Following the recent approval of LADWP's compliance filing for this facility, staff recommends the Energy Commission find that the covered procurement described in Burbank's filing complies with the Energy Commission's EPS, Title 20, Section 2900 et seq., of the California Code of Regulations.

Attachment

Commissioners November 7, 2016 Page 3

# Table 1: Supporting Greenhouse Gas Emission CalculationsGE 2x1 7F.04

Load	GHG Emission Factor (lb/MMBtu)	Heat input (MMBtu/h [LHV])	Heat Input (MMBtu/h [HHV])	GHG Emissions from LHV (lb/h)	GHG Emissions from HHV (lb/h)	Capacity (MW)	Calculated GHG Emission Rate from LHV (lb/MWh)	Calculated GHG Emission Rate from HHV (lb/MWh)	Manufacturer Provided GHG Emission Rate (lb/MWh)	Difference (%)
50%	117	1,908	2,099	223,236	245,560	300	744	819	811	1%
60%	117	2,192	2,411	256,464	282,110	360	712	784	776	1%
70%	117	2,501	2,751	292,617	321,879	420	697	766	759	1%
80%	117	2,828	3,111	330,876	363,964	480	689	758	751	1%
85%	117	2,981	3,279	348,777	383,655	508	687	755	748	1%
90%	117	3,214	3,535	376,038	413,642	540	696	766	759	1%
100%	117	3,669	4,036	429,273	472,200	600	715	787	780	1%

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#### Seimens 2x1 SCC6-5000F

(lb/MMBtu)	Heat Input (MMBtu/h [LHV])	Heat Input (MMBtu/h [HHV])	from LHV (lb/h)	from HHV (lb/h)	Capacity (MW)	from LHV (lb/MWh)	Emission Rate from HHV (lb/MWh)	Emission Rate (ib/MWh)	Difference (%)
117	2,203	2 423	257 751	283 526	310	831	915	918	0%
117	2,205	2,723	29/ 210	212 741	261	700	966	970	0%
11/	2,450	2,075	204,510	512,741	201	/00	800	870	0%
117	2,646	2,911	309,582	340,540	411	753	829	832	0%
117	2,864	3,150	335,088	368,597	461	727	800	803	0%
117	3,093	3,402	361,881	398,069	511	708	779	782	0%
117	3,342	3,676	391,014	430,115	563	695	764	767	0%
117	3,619	3,981	423,423	465,765	616	687	756	759	0%
	Factor (lb/MMBtu) 117 117 117 117 117 117 117 117	Factor Heat Input (MMBtu/h [LHV])   117 2,203   117 2,430   117 2,646   117 2,864   117 3,093   117 3,342   117 3,619	Factor Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV])   117 2,203 2,423   117 2,430 2,673   117 2,646 2,911   117 2,864 3,150   117 3,093 3,402   117 3,342 3,676   117 3,619 3,981	Factor Heat Input (Ib/MMBtu) Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (Ib/h)   117 2,203 2,423 257,751   117 2,430 2,673 284,310   117 2,646 2,911 309,582   117 2,864 3,150 335,088   117 3,093 3,402 361,881   117 3,342 3,676 391,014   117 3,619 3,981 423,423	Factor Heat Input (Ib/MMBtu) Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (Ib/h) from HHV (Ib/h)   117 2,203 2,423 257,751 283,526   117 2,430 2,673 284,310 312,741   117 2,646 2,911 309,582 340,540   117 2,864 3,150 335,088 368,597   117 3,093 3,402 361,881 398,069   117 3,342 3,676 391,014 430,115   117 3,619 3,981 423,423 465,765	Factor Heat Input (Ib/MMBtu) Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (Ib/h) from HHV (Ib/h) Capacity (MW)   117 2,203 2,423 257,751 283,526 310   117 2,430 2,673 284,310 312,741 361   117 2,646 2,911 309,582 340,540 411   117 2,864 3,150 335,088 368,597 461   117 3,093 3,402 361,881 398,069 511   117 3,342 3,676 391,014 430,115 563   117 3,619 3,981 423,423 465,765 616	Factor (Ib/MMBtu) Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (Ib/h) from HHV (Ib/h) Capacity (MW) from LHV (Ib/MWh)   117 2,203 2,423 257,751 283,526 310 831   117 2,430 2,673 284,310 312,741 361 788   117 2,646 2,911 309,582 340,540 411 753   117 2,864 3,150 335,088 368,597 461 727   117 3,093 3,402 361,881 398,069 511 708   117 3,342 3,676 391,014 430,115 563 695   117 3,619 3,981 423,423 465,765 616 687	Factor (lb/MMBtu) Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (lb/h) from HHV (lb/h) Capacity (lb/h) from LHV (lb/MWh) Emission Rate from HHV (lb/MWh)   117 2,203 2,423 257,751 283,526 310 831 915   117 2,430 2,673 284,310 312,741 361 788 866   117 2,646 2,911 309,582 340,540 411 753 829   117 2,864 3,150 335,088 368,597 461 727 800   117 3,093 3,402 361,881 398,069 511 708 779   117 3,342 3,676 391,014 430,115 563 695 764   117 3,619 3,981 423,423 465,765 616 687 756	Factor (Ib/MMBtu) Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (Ib/h) Capacity (MW) from LHV (Ib/MWh) Emission Rate from (Ib/MWh) Emission Rate from (Ib/MWh)   117 2,203 2,423 257,751 283,526 310 831 915 918   117 2,430 2,673 284,310 312,741 361 788 866 870   117 2,646 2,911 309,582 340,540 411 753 829 832   117 2,864 3,150 335,088 368,597 461 727 800 803   117 3,093 3,402 361,881 398,069 511 708 779 782   117 3,342 3,676 391,014 430,115 563 695 764 767   117 3,619 3,981 423,423 465,765 616 687 756 759

### Mitsubishi 2x1 M501GAC

						Calculated GHG		Manufacturer	
GHG Emission			GHG Emissions	GHG		<b>Emission Rate</b>	<b>Calculated GHG</b>	<b>Provided GHG</b>	
Factor	Heat Input	Heat Input	from LHV	Emissions	Capacity	from LHV	<b>Emission Rate from</b>	Emission Rate	Difference
(lb/MMBtu)	(MMBtu/h [LHV])	(MMBtu/h [HHV])	(lb/h)	(lb/h)	(MW)	(lb/MWh)	HHV (lb/MWh)	(lb/MWh)	(%)
117	2,716	2,988	317,772	349,549	427	744	819	834	-2%
117	4,492	4,941	525,564	578,120	765	687	756	772	-2%
117	2,552	2,807	298,584	328,442	401	745	819	836	-2%
117	4,150	4,565	485,550	534,105	714	680	748	764	-2%
117	2,348	2,583	274,716	302,188	360	763	839	854	-2%
117	3,606	3,967	421,902	464,092	616	685	753	770	-2%
117	2,276	2,504	266,292	292,921	351	759	835	850	-2%
117	3,480	3,828	407,160	447,876	595	684	753	768	-2%
	GHG Emission Factor (Ib/MMBtu) 117 117 117 117 117 117 117 117 117	GHG Emission Heat Input (Ib/MMBtu)   117 2,716   117 2,716   117 4,492   117 2,552   117 4,150   117 2,348   117 3,606   117 3,480	GHG Emission Heat Input (Ib/MMBtu) Heat Input (MMBtu/h [LHV])   117 2,716 2,988   117 2,716 2,988   117 2,552 2,807   117 2,348 2,583   117 2,348 2,583   117 3,606 3,967   117 3,480 3,828	GHG Emission GHG Emissions   Factor Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (lb/n   117 2,716 2,988 317,772   117 2,716 2,988 317,772   117 2,552 2,807 298,584   117 4,150 4,565 485,550   117 2,348 2,583 274,716   117 3,606 3,967 421,902   117 2,276 2,504 266,292   117 3,480 3,828 407,160	GHG Emission Heat Input (IB/MMBtu) Heat Input (IMMBtu/h [LHV]) Heat Input (IMMBtu/h [HHV]) GHG Emissions from LHV (Ib/h) GHG Emissions (Ib/h)   117 2,716 2,988 317,772 349,549   117 2,716 2,988 317,772 349,549   117 4,492 4,941 525,564 578,120   117 2,552 2,807 298,584 328,442   117 4,150 4,565 485,550 534,105   117 2,348 2,583 274,716 302,188   117 3,606 3,967 421,902 464,092   117 2,276 2,504 266,292 292,921   117 3,480 3,828 407,160 447,876	GHG Emission Factor (lb/MMBtu) Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) GHG Emissions from LHV (lb/h) GHG Emissions (lb/h) Capacity (MW)   117 2,716 2,988 317,772 349,549 427   117 2,716 2,988 317,772 349,549 427   117 4,492 4,941 525,564 578,120 765   117 2,552 2,807 298,584 328,442 401   117 4,150 4,565 485,550 534,105 714   117 2,348 2,583 274,716 302,188 360   117 3,606 3,967 421,902 464,092 616   117 2,276 2,504 266,292 292,921 351   117 3,480 3,828 407,160 447,876 595	Calculated GHG   GHG Emission GHG Emission Rate   Factor Heat Input (MMBtu/h [LHV]) Heat Input (MMBtu/h [HHV]) from LHV (Ib/h) Emissions (Ib/h) Capacity (MW) from LHV (Ib/MWh)   117 2,716 2,988 317,772 349,549 427 744   117 4,492 4,941 525,564 578,120 765 687   117 2,552 2,807 298,584 328,442 401 745   117 4,150 4,565 485,550 534,105 714 680   117 2,348 2,583 274,716 302,188 360 763   117 3,606 3,967 421,902 464,092 616 685   117 2,276 2,504 266,292 292,921 351 759   117 3,480 3,828 407,160 447,876 595 684	Calculated GHGGHG EmissionGHG EmissionsGHGEmission RateCalculated GHGFactorHeat InputHeat Inputfrom LHVEmissionsCapacityfrom LHVEmission RateCalculated GHG(lb/MMBtu)(lMMBtu/h [LHV])(MMBtu/h [HHV])(lb/h)(lb/h)(lb/h)(lb/MW)HHV (lb/MWh)1172,7162,988317,772349,5494277448191174,4924,941525,564578,1207656877561172,5522,807298,584328,4424017458191174,1504,565485,550534,1057146807481172,3482,583274,716302,1883607638391173,6063,967421,902464,0926166857531172,2762,504266,292292,9213517598351173,4803,828407,160447,876595684753	GHG EmissionGHG EmissionGHG EmissionsGHGEmission RateCalculated GHGProvided GHGFactorHeat InputHeat Inputfrom LHVEmissionsCapacityfrom LHVEmission RateFrom Sion Rate