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Alamitos Energy Center

(13-AFC-01)

Data Responses, Set 7

(Response to Data Request 169)

Submitted to

California Energy Commission

Prepared by

AES Southland Development, LLC

With Assistance from

CH2MHILL®

2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

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Contents

Introduction

Attached are AES Southland Development, LLC's (AES or the Applicant) responses to the California Energy Commission (CEC) Staff Data Request, Set 7 (number 169) regarding the Alamitos Energy Center (AEC) (13-AFC-01) Supplemental Application for Certification (SAFC).

Traffic and Transportation – Thermal Plume (169)

Thermal Plume Velocity Modeling Data

BACKGROUND

Staff will evaluate the thermal plume velocities for the Alamitos Energy Center (AEC) exhaust stacks and heat rejection devices. Exhaust parameters are needed to complete the analysis. This analysis is necessary to evaluate any potential thermal plume vertical velocity impacts on aircraft flying in the immediate vicinity of the project. Stack information was provided for the proposed combustion turbine and the auxiliary boiler exhaust stacks, however information for the air cooled condenser (ACC for the combined cycle) and fin fan coolers (for the LMS100 intercoolers) were not included.

DATA REQUEST

169. Please provide values to complete the tables below, and additional data as necessary for staff to determine how the heat rejection load varies with ambient conditions and operating scenarios. Also, please determine at what conditions cooling cells may be shut down. These data are needed to enable staff to model thermal plume vertical velocities. The ambient conditions included in these tables correspond to those in Supplemental AFC Appendix Table 5.1B for the combustion turbines and can be changed as necessary to represent the project site and operating scenarios. In addition please provide the distance between adjacent cells and the distances between the heat rejection devices in order to determine if the individual plumes will merge.

Parameter	**Combined Cycle Air Cooled Condenser**		
Number of Cells			
Cell Height (ft)			
Cell Diameter (ft)			
Distance Between Cells (ft)			
Ambient Temperature	28ºF	65.3ºF	107ºF
Ambient Relative Humidity	76%	87%	11%
Number of Cells in Operation			
Heat Rejection (MW/hr)			
Exhaust Air Temperature (F)			
Exhaust Velocity Per Cell (ft/s)			
Exhaust Flow Rate (lb/hr)			

Parameter	**Simple Cycle Fin Fan Coolers**		
Number of Cells (Fans)			
Cell Height (ft)			
Cell Diameter (ft)			
Distance Between Cells (ft)			
Ambient Temperature (ºF)	28ºF	65.3ºF	107ºF
Ambient Relative Humidity	76%	87%	11%
Number in Operation			
Heat Rejection (MW/hr)			
Outlet Air Temperature (ºF)			
Outlet Air Exit Velocity (ft/s)			
Outlet Air Flow (lb/hr)			

Response: Without expressing any opinion here on the Background section's statements that ACC and Fin Fan cooler heat rejection perimeters must be studied "to evaluate any potential thermal plume vertical velocity impacts on aircraft flying in the immediate vicinity of the project," Applicant provides the following requested information. Tables DR169-1 and DR169-2 present the combined-cycle air-cooled condenser and simple-cycle fin-fan cooler information requested. These tables also present the ambient conditions when cells will be shutdown. The spacing between the simple-cycle fin-fan coolers is approximately 35 feet.

Table DR169-1 AEC Combined-Cycle Air Cooled Condenser Thermal Plume Information

Parameter	Air Cooled Condensers			
Number of Cells	7 x 5 = 35			
Cell Height (ft)	Air Inlet: 53.1 ft (from grade) Fan Deck: 58.2 ft (from grade) Total Height: 97.2 ft (from grade) Cell Height: 39.0 ft (97.2 - 58.2)			
Cell Diameter (ft)	43.9 ft (L) x 42.1 ft (W)			
Distance Between Cells (ft)	0 ft (adjoining cells share a single column)			
Ambient Temperature	28°F	65.3°F	107°F	107°F
Ambient Relative Humidity	76%	87%	11%	11%
Evaporative Cooler	Off	Off	Off	On
Number of Cells in Operation	13	35	33	33
Heat Rejection (MW/hr)	369.6	378.8	369.7	388.9
Steam Exhaust Temperature (°F)	101.1	102.4	142.8	144.6
Outlet Air Exit Velocity (ft/s)	1.88	4.84	4.52	4.52
Outlet Air Temperature (F)	89.2	88.6	135.8	137.1

Table DR169-2 AEC Simple-Cycle Fin Fan Cooler Thermal Plume Information

Parameter	**Simple-Cycle Fin Fan Coolers**		
Number of Cells (Fans)	60 total, 20 bays (3 fan per bay)		
Cell Height (ft)	32		
Cell Diameter (ft)	12		
Distance Between Cells (ft)	11'-3"		
Ambient Temperature (°F)	28	65.3	107
Ambient Relative Humidity (%)	76	87	11
Number of Fans in Operation	24	60	60
Heat Rejection (MW/hr)	65.3	65.3	65.7
Outlet Air Temperature (°F)	72.3	72.3	114.3
Outlet Air Exit Velocity (ft/s)	~10.9	~11.0	~12.0
Outlet Air Flow (lb/hr)	19,674,564	49,186,410	49,186,410