PALOMAR ENERGY PROJECT (01-AFC-24)
CEC STAFF DATA REQUEST NUMBER 110

Technical Area: Visual Resources **Response Date: April 8, 2002**

REQUEST:

Please provide the name of the assumed vendor for the plume-abated cooling, tower and design data and drawings for the type of plume-abated cooling tower selected for this project. The design data should include a plume-abated design point. Other recent projects that have specified plume-abated towers have provided this design point in terms of the ambient conditions under which plume will first begin to form (such as 38F and 80% relative humidity). Other specific design data that is required is the design heat rejection rate of the tower (wet and dry sections), and specifics on how the tower's control system will be set to minimize plume formation.

RESPONSE:

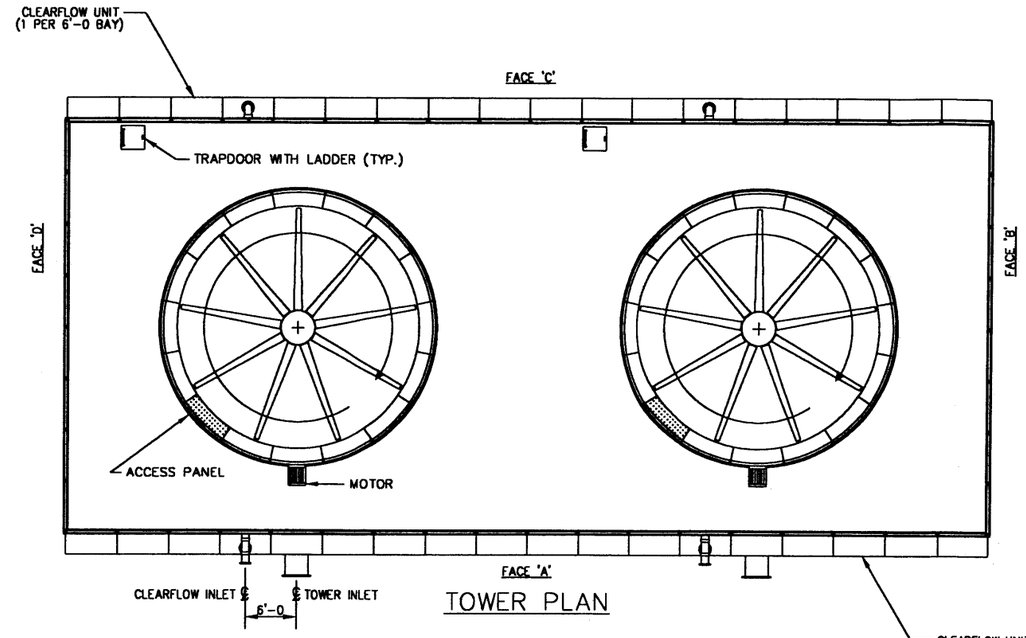
The cooling tower vendor has not been selected at this time. Potential suppliers that will be considered for the project include Marley, GEA, Hamon, Balcke Durr, and Psychrometrics. Conceptual design data for the cooling tower is as follows:

Design Duty: 1,250 MMBtu/hr
Water Return Temperature: 110 F
Water Supply Temperature: 90F
Design Ambient Wet Bulb Temperature: 77 F
Design Ambient Dry Bulb Temperature: 110 F
Maximum Plume Abatement Design Point: 52F / 73% relative humidity

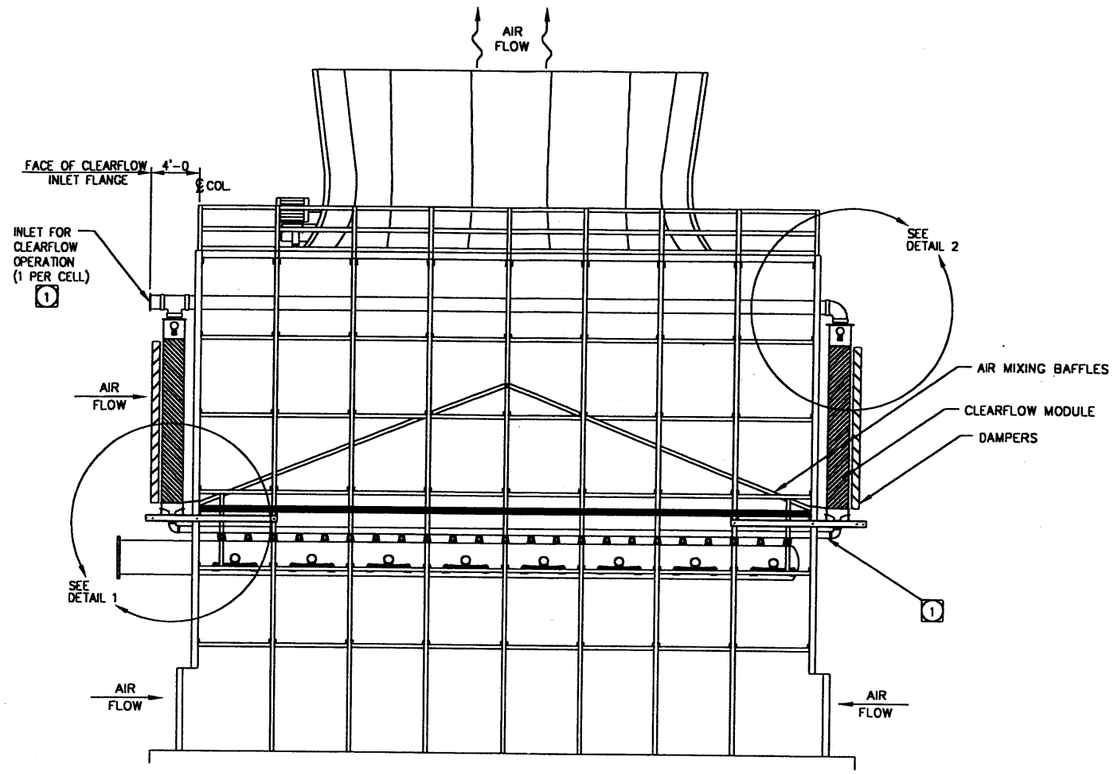
With the exception of the maximum plume abatement design point, the information indicated above is conceptual and subject to change as the detailed design of the project progresses. The maximum plume abatement design point has been selected on the basis that the plume will not exceed 60 meters long x 60 meters tall x 30 meters wide for more than 1.5% of the non-rain, non-fog, annual hours assuming continuous operation of the facility (equivalent to approximately 5% of the non-rain, non-fog, annual, winter, daylight hours). This design point will not be exceeded for the actual design.

Specific control of plume abated towers varies between manufacturer's. However, in concept the control of each will be similar. During operation in ambients when plume is not a concern, all of the water returning to the tower will be directed through the wet portion of the tower for cooling. Air dampers on the dry section of the tower will remain closed during this period such that nearly all air for cooling is drawn through the wet section. As ambient conditions change such that a plume begins to form, the appropriate portion of water from the wet section will be diverted to the dry section using balancing valves and possibly a booster pump. Air dampers on the dry section will be modulated as required to allow the appropriate amount of the cooling air to be pulled through the dry exchangers to minimize plume formation. This air will be heated by the water in the dry cooling section and will be blended back with the wet cool air coming from the wet section. This will afford some superheating of the wet air such that wet air can dissipate into the cold ambient and reach equilibrium with minimal plume formation. The air dampers continue to be controlled as the ambient conditions change to minimize plume formation. To facilitate adjustment of the air dampers, ambient conditions will be monitored with instrumentation on site and these conditions will be compared with an ambient plume conditions curve.

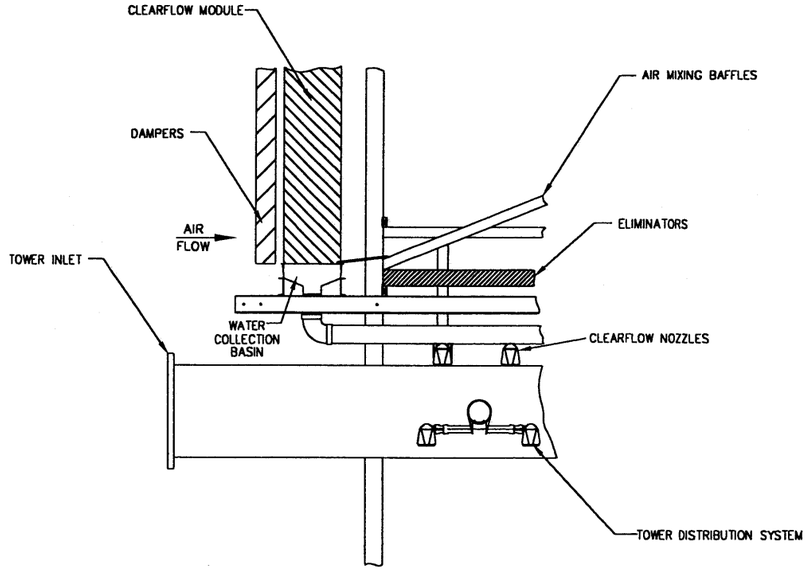
Attached to this response is a conceptual design drawing indicating plume abatement details for a plume abated tower from a proposed manufacturer for the tower. As indicated above, the cooling tower manufacturer has not been selected at this time. Therefore, this information is preliminary and subject to change as the detailed design progresses and the specific cooling tower manufacturer is selected.



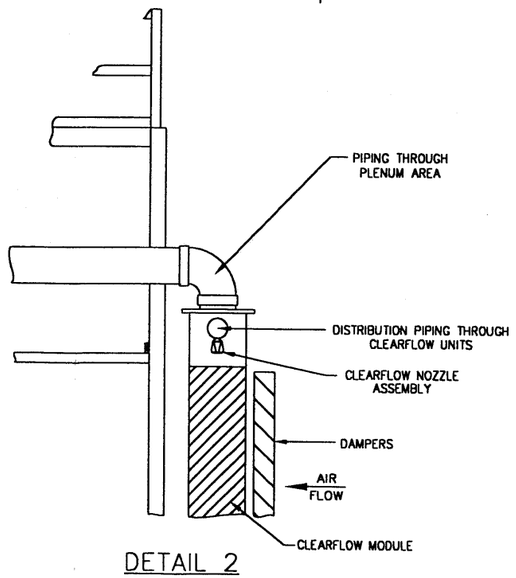
TOWER PLAN



TOWER ELEVATION
(FACE 'B')
(SCALE = 144)



DETAIL 1



DETAIL 2

GENERAL NOTES

[1] APPROACH PIPING (WITH SUPPORTS) TO CLEARFLOW INLETS IS BY PURCHASER.

This document is provided to convey the concept of the type of cooling tower abatement system to be provided only. Actual system may differ and manufacturer may differ from that indicated.

ECO NUMBER		SCHEMATIC VIEWS FOR A W400 TOWER WITH CLEARFLOW	Marley Cooling Tower, A United Dominion Company
REV. BY / CHECKED			
REV. DATE	DRAWN BY: S.GOWER	DATE: 09/25/1998	CHECKED / APPROVED / ORDER NUMBER / PLOT: 1=96 / DRAWING NUMBER / REV.