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06-AFC-5
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CALIFORNIA ENERGY COMMISSION

REPORT OF CONVERSATION *Page 1 of 2*

Energy Facilities Siting and Environmental Protection Division

FILE: 06-AFC-5			
PROJECT TITLE: Panoche Energy Center			
☐ Telephone	(408) 224-4987	☐ Meeting Location:	
NAME:	Andrew Delgado – Senior Account Manager.	DATE: 8/27/07	TIME: 10:30 AM
WITH:	Siemens Water Technologies Corp., Industrial Water & Wastewater		
SUBJECT:	Pre-treatment alternative for Process Water Use of Upper Aquifer		

Via an email from, and in a telephone discussion with Mr. Andrew Delgado – Senior Account Manager of Siemens Water Technologies, I obtained information to explore and establish an alternative water treatment approach to utilize groundwater that could be supplied from the semi-confined (upper) aquifer (Well MW-3). The applicant's water quality data (Table 3.2 of the 3/2/07 Technical Memorandum) and design criteria (AFC Table 5.5-8) served as the basis for developing the water treatment approach using common water treatment equipment.

The recommended equipment and its purpose, space requirements and feed/product flow rates are summarized as follows:

Equipment	Purpose	# of Units Needed for 150% Capacity	Dimensions of Each Unit (feet)	Feed Flow Rate per Unit (gpm)	Product Flow Rate per Unit (gpm)
Multi-media Filtration, Horizontal Pressure Filter	Removes suspended solids	3	10' Diameter x 24' Long	1000	1000
Scale Inhibitor Injection	Keeps $CaCO_3$ (hardness) in solution so that it does not foul Nano-filtration membrane	1	8'W x 8'L	3,000	3,000
Nano-filtration	Reduces hardness, silica and other dissolved solids	6	8'W x 24'L x 11'H	500	400
Membrane Cleaning Skid	For cleaning Nano-filters	1	7'W x 12'L x 8' H	Not Applicable	Not Applicable
Housing	Enclose Equipment	1	50'W x 120'L	N.A.	N.A.

Note: Total Product Flow Rate Capacity would be 2,400 gpm, 128% of the average flow for the hottest day of 1,872 gpm, and 162% of the average full load flow of 1,481 gpm based on flows needed for this type of treatment

The capital costs of the equipment are estimated as follows:

Equipment	# of Units	Unit Cost ($)	Item Cost ($)
Multi-media Filtration	3	$200,000	$600,000
Scale Inhibitor Injection	1	$20,000	$20,000
Nano-filtration	6	$300,000	$1,800,000
Membrane Cleaning Skid	1	$100,000	$100,000
Metal Housing (50' x 120')	6,000 sq. ft.	$50/sq. ft.	$300,000
Controls & Misc.			$100,000
Wastewater Tank – Increase from 20,000 to 100,000 gallons			$150,000
Subtotal - Equipment			$3,070,000
Contingency @ 10%			$307,000
Engineering & Construction @ 50% of Equipment Cost			$1,535,000

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Total – Equipment & Labor			**$4,912,000**

Note: Construction costs are representative of pre-assembled treatment units mounted on skids and a pre-fabricated housing kit, requiring primarily construction of foundations, assembly and integration of equipment, and testing.

The operating requirements and O&M costs are estimated as follows:

Equipment/Item	**Frequency/Descrip. of O&M**	**Parts ($)**	**Labor (Hours)**	**Labor Cost ($)**	**Annual Cost ($)**
Multi-media Filtration	Backwash Daily (worst case)		1	$100	(incl. in 1 full-time Operator cost)
Scale Inhibitor Injection	Purchase Scale Inhibitor Chemical	$100,000			$100,000
Nano-filtration	Chemically clean quarterly			$2,500 x 4	$10,000
Nano-filtration membranes	Replace membranes every 5 years	$350,000		$20,000	$74,000 (equiv. annual cost)
Membrane Cleaning Skid	N.A.				N.A.
Metal Housing (50' x 120')	N.A.				N.A.
Controls & Misc.	Calibrate annually				$10,000
Energy @ 5,000 hours/yr & $.080/kwh	435 kw x 5,000 hours/yr x $.080/kwh				$174,000
Operating Staff (including water treatment monitoring)	No additional labor needed	Assume 1 full-time operator as worst case			$100,000
Rapid Start/Stop Capability	<u>**Yes**</u>				
Total – Annual Costs					**$468,000**

Note: N.A. = Not Applicable

Other benefits of this water treatment approach would include:

1. Requirements for reverse osmosis and deionization treatment of the water used for air inlet cooling and NOx emission control will be reduced as a result of pre-treating all source water.
2. While average water supply would need to increase by 25% from 1,254 gpm to 1,570 gpm (an increase of 316 gpm) as attributable to the reject stream from multi-media and nano-filtration, this would be largely offset by increasing the cycles of concentration in the cooling water. With silica (SiO_2) concentration reducing from 47 to 5 mg/l, hardness reducing from 1,500 to 23 mg/l, and other similar reductions in dissolved solids as a result of this water treatment approach, the treated water could conservatively be used for 12 cycles of concentration. Compared to the proposed project's 3 - 6 cycles of concentration and cooling tower blowdown at a rate of 269 gpm, using this water treatment approach would result in reducing the blowdown by about 50%, and thus reducing water demands by about 135 gpm.
3. The average increase in water demands of using the upper aquifer associated with this water treatment approach as a result of pre-treating all source water would be 316 gpm less 135 gpm, for a net increase of about 180 gpm.

cc:	CEC: James Reede, Dick Anderson Andrew Delgado – Siemens Water Tech. Dockets	**Signed:** **Name:** John S. Kessler

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE PANOCHE ENERGY CENTER	**Docket No. 06-AFC-5** **PROOF OF SERVICE** **(Revised 7/12/07)**

<u>INSTRUCTIONS:</u> All parties shall 1) send an original signed document plus 12 copies <u>OR</u> 2) mail one original signed copy AND e-mail the document to the web address below, AND 3) all parties shall also send a printed <u>OR</u> electronic copy of the documents that <u>shall include a proof of service declaration</u> to each of the individuals on the proof of service:

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Attn: Docket No. 06-AFC-5
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DECLARATION OF SERVICE

I, April Esau, declare that on September 17, 2007, I deposited copies of the attached Report of Conversation in the United States mail at Sacramento, CA with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

April Esau

***Indicates change**