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August 4, 2011

John McKenzie
San Luis Obispo County Planning and Building
976 Osos Street, Room 300
San Luis Obispo, CA 93408

Subject: Comments on Water Resources Section 4.14 of the EIR, Huasna Oil Field Project

Dear Mr. McKenzie:

I have reviewed the water resources section of the Draft Environmental Impact Report and present my comments referenced to the Section, paragraph and line.

In general, the occurrence of groundwater within the alluvial "basin" and within the underlying older sedimentary beds need to be better differentiated and understood and presented by the environmental impact consultant to support any findings and conclusions regarding potential impacts and mitigation measures.

My qualifications for reviewing the DEIR water resources section are presented in my resume, attached to this letter.

Sincerely,

A handwritten signature in black ink that reads 'Timothy S. Cleath'. The signature is fluid and cursive, with a long horizontal stroke at the end.

Timothy S. Cleath, Certified Hydrogeologist #81



Section	Paragraph	Line	Comment
4.14	2	5,6	I don't know why this sentence is stated, I don't think it is particularly true. It would be important to note if the project proposes to use surface water.
4.14	3		What is meant by "large amounts of water" and what is meant by "the majority of the produced water" how about the minority?
4.14.1.1	2	4	Delete the word "existing" because they do not exist anymore. Also, these wells were not purely exploration because some produced oil.
4.14.1.2	1		The term "groundwater basin" used for Huasna Valley by the California Department of Water Resources Bulletin 118 and Bulletin 18 (on which the SLOCPWD Hydrologic Report is based) include water bearing formations of Pleistocene and Recent age: these formations in the Huasna area only include the Recent age alluvial deposits (the sediments deposited by Huasna Creek, that generally are less than 50 feet thick)-no Pleistocene age formations (Paso Robles Formation) are present- and not the underlying Pliocene age Santa Margarita Formation beds. Therefore, the second sentence is not correct and the final sentence may also not be correct.
4.14.1.2	2	4,5,6	This description, while adequate, would be aided a great deal by having a geologic map and cross section to go with it, as are found in our July 21, 2009 letter on Water Resources Impacts. The Dibblee geologic map in the geology section does not provide as much detail as the Hall and Corbato geologic map (1967). The main point to be made by the last sentence should be that the beds overlying the structural trap not only do not store nor transmit groundwater but also confine the oil (and associated oil field waters) and prevent it from migrating into shallow permeable strata.
4.14.1.2	3	2,3,4	Awkward sentences. Delete and replace with: "The fault is the western boundary of the Santa Margarita Formation sedimentary beds and acts as a barrier to subsurface flow due to low permeability clays that form along fault surfaces."
4.14.1.2	4	1,2	Redundant (see two paragraphs above) delete.
4.14.1.2	4	3,4,5	Not necessarily true. Future groundwater extractions could be for domestic water. Explain what surface impoundments are being referred to.
4.14.1.2	5	3	The "potential for pre-existing" is contradictory wording.



4.14.1.2 6 This paragraph is not particularly helpful without including the actual results and well locations and well construction, some of which is in Appendix H. Well WH03 clearly produces water that contains some hydrocarbons already. Well WH02 is not near any of the drainages directly leading from the oil well pads and is not likely to be influenced by any activities at the project site. The other tested wells adjacent to or on the other side of Huasna Creek are too far away to have any relevance to the project. The analyses performed are very minimal and do not allow for proper chemical characterization of the water.

4.14.1.2 7 This paragraph verifies the difficulty of using the water quality analyses performed. It shows that there is some variability to the hydrocarbons in Well WH03. The presence of ammonia (often occurring near oil bearing sediments) and the measured TPH of 0.6 indicate that this well taps some aquifer that contains oil residuals. More information should be provided regarding the water bearing strata tapped by this well to determine if it would be a good reference point for any future project impact. The water quality results from this well indicate that there are strata nearer to the valley that can contain hydrocarbons that may not be at all related to the project.

4.14.1.2 8 The quality of water in Well WH03 cannot be disregarded when discussing the nearby wells. The shallowness of the wells tested in Huasna Valley is not established by any of the information provided in Appendix H or in this section.

Figure 4.14-1 This figure is illegible and unnecessary.

4.14.1.3 2 3 add...recharge the **Santa Maria Valley** groundwater basin. What is the relevance of this discussion?

4.14.2.1 2 3 correct the spelling of “radionuclides”

4.14.2.2 1 6,7 Delete this sentence.

4.14.2.3 1 2,3 Refer to the “Public Works Department” Water Resources Division. The agency may not have this authority to ensure sustainable water..... It may be more appropriate that the Regional Water Quality Control Board has some of the enforcement authority in these matters.

4.14.4 2 Use “could” instead of “would” since it is followed by “potentially”. “Would” infers more than a potential occurrence.

5 4 add....contents **due to**...

4.14.4 6 5 Suggesting “significant, long-term contamination of groundwater” should be qualified with “if no remedial measures are taken”. Every highway in America has this same potential for oil spills.

4.14.4 7 What is the reason for this paragraph, since the operator is mandated to dispose of the brine back into the same or similar non-freshwater zones tapped by the oil wells.

4.14.4 after Mitigation Measures WR/WM in Residual Impacts, line 4- using the term “help” suggests that there are other measurements necessary, delete “help”.

Page 4.14-12, paragraph 4: delete “include the and/layers that” and delete the sentence- “Available test home data reports are dry (Cleath-Harris 2009)”

Page 4.14-12 paragraph 5: add ...was performed on “**water from**” a seep



Page 4.1413 Paragraph 2 addhave to be fully cased “**and sealed to below the fresh water aquifers**”,

Page 4.14-14 Mitigation Measure WR3-3 The details of the groundwater monitoring plan should be developed by a professional hydrogeologist and reviewed and approved by County Engineering staff. The details required in this mitigation measure may not be appropriate for this project.

Chapter 7 Summary of Water Resources Mitigation Measures

WR 3-3.a. requires groundwater monitoring for the Huasna Valley basin area (and not for Tim O'Leary Canyon where the closest wells to the sites are found). Justification for the recommendation of three monitoring wells there should be provided. It doesn't make sense to me since the project will not be pumping from the groundwater basin. An alternate monitoring well array could include the closest existing well and/or one project monitoring well in the Huasna groundwater basin at the mouth of the canyon leading from the drilling pads and shipping site could be required to monitor impact to the Huasna Basin groundwater resulting from the project.

WR3-3.b. requires quarterly testing for hydrocarbons and other compounds expected from oil production operations. Alternately, the testing program could require quarterly during construction and annually during operations with a review after 5 years to determine if it is necessary to continue, or it could just be said that contamination of the Huasna Valley groundwater by the project would be monitored based on the approved plan and leave the monitoring details out of the mitigation measure.

WR3-3.d. This mitigation measure is very severe and should be modified to allow for alternative remedial actions.

These monitoring and mitigation measures are repeated in 4.14.7. and any changes to the recommended measures should be made in this section as well.



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PROFESSIONAL REGISTRATION

Certified Hydrogeologist in California, CHg 81
Certified Engineering Geologist in California, CEG 1102
Registered Geologist in California, RG 3675

EDUCATION

Master of Science in Geology, California State University, Los Angeles, 1978.
Bachelor of Arts in Geology, California State University, Fresno, 1974.

EXPERIENCE

Cleath-Harris Geologists, Inc.
President, 2009 to present
Cleath & Associates
Owner, 1984-2008
James M. Montgomery, Consulting Engineers, Inc.
Senior Hydrogeologist, 1977-1984

CAPABILITIES

Ground Water Basin Management: Water rights, hydrologic inventories, safe yield estimates, water conservation methods, basin yield optimization, institutional approaches, water quality monitoring.

Studies and Investigations: Feasibility, environmental impact, hydrogeologic, basin yield availability, ground water contamination, hazardous waste site assessment.

Design and Construction Management Services for Water Wells: Site evaluation, preliminary designs, engineer's cost estimates, contract and specifications documents, monitor work progress and contractual compliance, record drawing.

Field Exploration: Pumping tests, drilling programs, geophysical surveys, fluid level measurements, ground water sampling, geologic mapping.

Geotechnical Investigations: Sea cliff retreat estimates, seismic hazard assessments, subsidence assessment and mitigation, shrink-swell phenomena, landslide studies, dam siting.

PROFESSIONAL ASSOCIATIONS

Association of Engineering Geologists
National Ground Water Association