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GEOHERMAL DEVELOPMENT

QUARTERLY REPORT

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DOE/ET/27196
APR 20 1982
RECEIVED

October 1 to December 31, 1981

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October 1 to December 31, 1981

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IMPERIAL COUNTY
GEOTHERMAL QUARTERLY REPORT
October 1 to December 31, 1981

INTRODUCTION

This Quarterly Report will show the current progress on Cooperative Agreement DE-FC03-79ET27196 and Geothermal progress in Imperial County. It was prepared by the Director of Public Works and the Geothermal Coordinator in partial fulfillment of this Cooperative Agreement. This report will discuss the highlights of geothermal development activities during October, November, and December, 1981. The report follows the format suggested by the Department of Energy, Cooperative Agreement DE-FC03-79ET27196, consisting of three major headings: Geothermal Administration; Geothermal Planning; and Other Geothermal Activities.

Geothermal Administration will address the status of the Imperial Valley Environmental Project (IVEP) transfer, update on the Geothermal Resource Center, and findings of Geothermal field inspections.

Geothermal Planning will address activities of the Geothermal Planner during the quarter, including applications for geothermal permits and processing of EIR's.

Other Geothermal Activity will discuss geothermal waste disposal, changes in California's regulation of hazardous waste that may affect geothermal

waste disposal, the status of the County direct heat study, and participation by County representatives in meetings related to geothermal development.

I. Geothermal Administration:

Geothermal administration is the task of the Geothermal Office based within the Department of Public Works, under the direction of the Director of Public Works. It is responsible for the transfer of the Imperial Valley Environmental Project (IVEP), updating of the geothermal resource center, conducting geothermal field inspections, and monitoring geothermal development.

A. Status of the IVEP Transfer:

Transfer of the IVEP data and development of a future monitoring program have been discussed with Lawrence Livermore Laboratory (LLL) representatives. LLL and County representatives are eager to continue the monitoring program but funding for this effort is not available at this time. The County hopes to apply for funding from the California Energy Commission under their Geothermal grants program during the next application process in the second quarter of 1982. LLL staff has promised to assist Imperial County in the development of the transfer and monitoring programs.

Imperial County has applied for Energy Commission funding to support an update of vertical subsidence leveling in

to expand. This section will discuss power plant development, current exploration, and planned or potential direct heat development.

1. Power Plant Projects, See Appendix 1 for Locations of Projects:

- a. Magma Power is doing extensive refitting of their East Mesa binary power plant. The new equipment will enable the facility to produce 10 megawatts nominal output in the summer and perhaps 13 megawatts in the winter. The refitting is proceeding as planned.
- b. The Union Geothermal/Southern Cal Edison plant in Brawley resumed operations November 15th. The facility is operating at 4 megawatts while a new well is being drilled to replace one that was abandoned.
- c. The Union/Southern Cal Edison/Southern Pacific 10 megawatt power plant, under construction at Salton Sea, is on schedule. The power facility is about 50% complete, the resource delivery equipment is about 20% complete. Union has been experimenting with various processes and technologies for handling the problems caused by the Salton Sea brines. Geothermal waste produced

selected areas of the county. Areas to be resurveyed are those which experienced the greatest amount of change in the 1979 earthquake and areas where a geothermal production project is operating or coming on-line in the immediate future. The National Geodetic Survey and Imperial County surveyors have determined that two years is the optimum interval between resurveys. The last survey was completed in winter 1980-81. The proposed project would resurvey selected areas during winter 1982-83. Funding sources available for past efforts are not available for this update.

B. Update on the Geothermal Resource Center:

The Geothermal Coordinator has contacted technical information specialists at Lawrence Livermore Laboratory for assistance in designing a more useful cataloging process. We hope to meet with LLL representatives in February regarding this process.

Books and magazines are being received by Imperial County and are filed in the resource center. Seismic data is being collected for use in a future seismic monitoring program.

C. Field Inspections and Status of Geothermal Development:

Geothermal development in Imperial County is continuing

by the Salton Sea facility is expected to be about 50% solids. This represents a substantial technological advance over the Brawley facility, which produces a waste product of about 3% solids.

- d. The new 28 megawatt Magma Power facility at Salton Sea is scheduled to begin construction in April of 1982. Magma is continuing to test wells and plans to drill four more. Plant engineers are working on power plant design.
- e. The 49 megawatt flash facility planned by Chevron and Southern Cal Edison for the Heber anomaly may begin construction in early 1982. Decisions by the Imperial Irrigation District and the Imperial County Planning Commission regarding the use of canal water for cooling tower purposes by this facility are expected to be made in January 1982.
- f. Plans for the Heber Binary Demonstration Project have continued. The 1982 Federal budget includes money for the Heber project. All major procurements for the project should be completed over the next six to eight months. The turbine is being chosen now. The project is expected to move into Imperial Valley in the last quarter of 1982.
- g. Magma Power has applied for a Conditional Use

Permit for the construction and operation of a 47 megawatt geothermal power plant in the Salton Sea anomaly.

- h. Republic Geothermal has an application for a permit from the U.S. Geological Survey for a 19 megawatt dual binary power plant at the East Mesa KGRA. A decision on this permit is expected in early February 1982. Republic is attempting to find additional funding for the project.
- i. MCR Geothermal and California's Department of Water Resources are continuing planning for a 45 megawatt power plant in East Brawley. The EIR is expected to be initiated in early 1982. A production permit from Imperial County is expected to be applied for at about that time.

2. Current Exploration Activities:

- a. Union Geothermal has an East Brawley exploration program. They have one well drilled so far, East Highline Unit #1, and are in the process of drilling a second.
- b. Phillips Petroleum Company is drilling up to six geothermal wells in the Truckhaven area.

- c. Chevron is doing heat testing on Federal land near the Superstition Mountains.

3. Current and Potential Direct Heat Development:

- a. City of El Centro: The DOE funded project to heat and cool the El Centro Community Center completed drilling of a 4,000 foot injection well in late December. Drilling of the production well began following the completion of the injection well. The drilling program should be completed by the end of February, well testing is scheduled to begin in March.
- b. Holly Sugar: Holly intends to continue their direct heat project, but funding and geothermal development expertise are needed to continue the project. Proponents are looking for other geothermal developers in Imperial Valley who might want to assist them with the project.
- c. Ultra Systems: Ultra Systems hopes to develop an alcohol plant at the East Mesa. They are in the process of submitting environmental information to the USGS on the proposed project. They hope to start development in 1982 if adequate funding can be obtained. Union Geothermal would be the resource provider for the project.

- d. Magma Power: Magma has proposed a dehydration plant to be constructed on their East Mesa lease. The plant would dry onions and garlic. They are hoping to begin construction in 1982, but so far have taken no action on obtaining permits from the USGS.
- e. Imperial County: Six applications for funding under the California Energy Commission's Geothermal Development Grant Program for Local Governments were submitted by local governments in Imperial County. Funds were requested for four direct use projects, including methane production, a desalinization facility, a chemical processing plant, and a geothermal industrial park.

II. Geothermal Planning:

Geothermal planning is the task of the Geothermal Planner based within the Planning Department under the direction of the Planning Director. Responsibilities are: Geothermal applications; Hearings; Preparing draft environmental impact reports; and implementing the Geothermal Element to the general plan.

A. Applications for Geothermal Permits:

1. An application for a geothermal exploration permit was submitted by Pioneer Livestock for the drilling and testing of 4 wells in South Brawley. A decision on this permit will be made in January.

2. Chevron Resources applied for an extension of time for the construction and operation of a water treatment facility for the plant at the Heber anomaly. A Hearing to consider the extension will be held in January.
3. Southern California Edison has applied for a permit to use canal water for their planned power plant in Heber, rather than water that would have been supplied by the water treatment facility mentioned above.

B. Processing of EIR's:

1. The Planning Department has continued the processing of the Salton Sea Master Environmental Impact Report which will be considered by the Planning Commission in January. Appendix 2 is a summary of the Salton Sea MEIR from the final draft of this report.
2. The Truckhaven EIR was finalized. Appendix 3 contains a summary of this EIR.

C. Other Geothermal Planning Activities:

The Planning Department has responded to several Notices of Intention and Environmental Analyses for activities to take place on Federal lands. The proposed projects have been mentioned in the preceeding sections on Power Plant Development and Potential Direct Heat Developments.

III. Other Geothermal Activities:

This section will cover four areas of activity. The topics are geothermal waste disposal, potential impacts of changes in California's hazardous waste regulations on geothermal waste disposal, the status of the sub-contract with VTN, and participation by County personnel in meetings considering various geothermal development issues.

A. Geothermal Waste Disposal:

During the quarter geothermal waste disposal again became a topic of prime concern to the County. The existing geothermal waste disposal facility tripled disposal prices on November 1st. This action imposes substantial costs on geothermal developers. The waste disposal firm offers a service that is indispensable to geothermal development. Imperial Valley geothermal development is currently unprofitable to developers since major technological problems are still being resolved. Excessive cost of waste disposal, in this circumstance, can serve to slow or halt development by increasing the financial investment required by development firms, and thus pricing geothermal energy above the cost of other energy sources.

Action by the County to increase competitive pricing by geothermal waste disposal firms, therefore, is particularly appropriate at this time in order to maintain a hospitable environment for geothermal development. To this purpose, on November 10, 1981, the Imperial County Board of Supervisors considered the desirability

of developing a second Class II-1 waste disposal facility for hazardous geothermal and pesticide wastes. The Supervisors directed the Planning and Public Works Departments to assess the feasibility of a second disposal site. A report was prepared that develops the issues of concern to the Supervisors, assesses the need for an additional geothermal disposal facility, and investigates alternative ownership options. This report will be presented to the Supervisors during the month of January 1982.

The DOE contract enabled the County to respond rapidly and knowledgeably to this need for action. The Geothermal Coordinator and the Geothermal Planner were the lead persons involved in the preparation of this report. The Coordinator assessed the need for geothermal waste disposal, the Planner analyzed the issues and alternatives.

B. Changes in California's Regulation of Hazardous Wastes that May Affect Geothermal Waste Disposal:

In October, Governor Brown signed an executive order which calls for the banning, from land disposal, of several categories of wastes. The California Department of Health Services is preparing a draft policy on the banning of land disposal for these particular toxic substances. Their policy document will contain a schedule for banning particular waste streams.

Minor amounts of these "high priority" wastes are found in geo-

thermal wastes. Prior to the availability of the policy document, the DOHS can provide no information on the implications for geothermal wastes. The County is concerned about potential effects on geothermal development if geothermal wastes are included in this change in regulation.

C. The VTN Subcontract:

During the quarter, VTN Consolidated completed work on Task 3 of the Geothermal Direct Heat Application Study. This task involved a socio-economic analysis. VTN is preparing to begin Task 4 of the study, this task involves the identification of particular industries that would be the most likely to locate in Imperial Valley. See Appendix 4 for the October to December, 1981, Quarterly Report from VTN.

D. Participation by County Personnel in Meetings Related to Geothermal Development:

1. On October 21, 1981, the Assistant County Surveyor participated in Lawrence Berkeley Laboratory's "Geothermal Subsidence Review Meeting" and made a presentation describing the subsidence monitoring network in Imperial Valley and the results of past surveys.
2. On November 17, 18, and 19, 1981, the Department of Energy, Geothermal Section, held their annual contractors meeting in Sacramento. This meeting provided an opportunity to share

with DOE contractors the knowledge learned in various geothermal development activities funded by the Department of Energy. The Geothermal Coordinator attended and discussed current geothermal activities in Imperial County.

3. On December 2, 3, and 4, 1981, the County Counsel attended a conference concerning the legal aspects of geothermal resources development sponsored by the American Bar Association and the Geothermal Resources Council. The County Counsel gave a talk on "Imperial County Planning Practices and Legal Framework".

SUMMARY

Geothermal development activities have increased during the October to December period. We have nine power plant projects proceeding, this includes two constructed facilities, one facility under construction, three facilities scheduled to begin construction in 1982, and three facilities in the planning or permitting stage.

Geothermal exploration activities are continuing with activities in East Brawley, Truckhaven, and near the Superstition Mountains.

Interest in direct heat development seems to be increasing. The City of El Centro project is under construction and there are several direct heat projects in preliminary planning stages.

The Planning Department is processing several permits for geothermal

development activities and is completing consideration of the Salton Sea Master Environmental Impact Report. The department has also responded to several "Notices of Intention" for activities to take place on Federal lands.

The Geothermal Coordinator and the Geothermal Planner have become involved in the issue of geothermal waste disposal in the County. They have prepared a report that discusses the issues of concern to the County Supervisors, assesses the need for an additional geothermal disposal facility, and investigates alternative ownership options. The report is to be presented to the Supervisors during January 1982. The Geothermal Coordinator is also studying the impacts of changes in California's regulation of hazardous waste that could effect geothermal waste disposal.

VTN Consolidated completed work on Task 3 of the Geothermal Direct Heat Study and is preparing to begin Task 4.

County personnel have participated in meetings related to geothermal development, including the DOE annual contractors meeting in Sacramento, a Geothermal Subsidence Review meeting given by Lawrence Berkeley Laboratory, and a conference sponsored by the American Bar Association and the Geothermal Resources Council concerning the legal aspects of geothermal development.

APPENDIX 1

RIVERSIDE CO. CALIFORNIA
IMPERIAL CO. CALIFORNIA

Salton Sea

CHOCOLATE MOUNTAIN AERIAL GUNNERY RANGE

• Magma - PROPOSED 47 MW FLASH
• Magma - 28 MW FLASH (CONSTRUCTION TO BEGIN 1982)
• UNION/SCE/SP 10 MW FLASH (UNDER CONSTRUCTION)

• UNION/SCE 10 MW FLASH
- OPERATING -

• MCR/DWR 45 MW - PROPOSED

• REPUBLIC 19 MW - PROPOSED

• Magma 10 MW BINARY
- OPERATING -

• SCE/CHEVRON 49 MW - PLANNED
• HEBER BINARY DEMONSTRATION
49 MW - PERMITTED

UNITED STATES
MEXICO

APPENDIX 2

EXECUTIVE SUMMARY
SALTON SEA ANOMALY
MASTER ENVIRONMENTAL IMPACT REPORT
AND
MAGMA POWER PLANT #3 (49 MW)
ENVIRONMENTAL IMPACT REPORT
DRAFT

Prepared For
County of Imperial
Courthouse
El Centro, California

Prepared By
WESTEC Services, Inc.
3211 Fifth Avenue
San Diego, California 92103

15 May 1981

*removed
JHS
3/12/82*

APPENDIX 3

**TRUCKHAVEN PROSPECT
GEOTHERMAL EXPLORATORY WELLS
FINAL
ENVIRONMENTAL IMPACT REPORT**

Prepared By:

**County of Imperial
Planning Department**

**Environmental Data Prepared and
Submitted By:**

**WESTEC Services, Inc.
3211 Fifth Avenue
San Diego, California 92103**

August 1981

*Removed
JHS
3/12/82*

APPENDIX 4

Engineers • Architects • Planners

January 6, 1982

VTN CONSOLIDATED, INC.
Post Office Box C-19529
2301 Campus Drive
Irvine, California 92713
(714) 851-5200

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JAN 12 1982

IMPERIAL COUNTY
DEPT. OF PUBLIC WORKS

Ms. Margaret Rands
Planner
County of Imperial
Department of Public Works
Courthouse
El Centro, California 92243

Subject: Geothermal Direct Heat Application Study, Task 4

Dear Margaret:

As we discussed in our meeting, based on the analysis of Tasks 1 and 2, certain industries would appear to be the most likely candidates for locating in the Imperial Valley. Using the analysis for Tasks 1 and 2, and the Standard Industrial Classification (SIC) codes, a series of industries were developed for further analysis. These industries will be given to Dun & Bradstreet, Inc. (D&B) for record search for individual companies. The industries and the SIC codes are shown on the attached sheet.

These appear to be the most likely industries for the D&B record search. If additional industries should be added, please let me know. Upon agreement of the industries to be searched, I will forward the information to Dun & Bradstreet.

If you have any questions, please call me.

Very truly yours,

VTN CONSOLIDATED, INC.

John L. Sakaguchi
Project Manager

JLS:glw

TASK 1--Potential Applications

Agriculture

Crop Refrigeration	4222
Greenhouse	0182
Feedlot Operations	0211

Aquaculture

Malaysian Prawns	0279
Catfish	0279

Food Processing

Sugar Refining	2062
Cold Packing	4222, 4742, 0723
Vegetable Canning	2033
Freeze-Dry Operations	2037
Vegetable Dehydration	0723, 2034

Ethanol Production	2869
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Nursery	0181
---------	------

Engineers • Architects • Planners

VTN CONSOLIDATED, INC.
Post Office Box C-19529
2301 Campus Drive
Irvine, California 92713
(714) 851-5200

January 6, 1982

Ms. Margaret Rands
Planner
County of Imperial
Department of Public Works
Courthouse
El Centro, California 92243

Subject: Geothermal Direct Heat Application Study, Task 3
Socioeconomic Analysis

Dear Margaret:

This will confirm the discussion at our meeting of December 18, 1981. As I indicated to you, based on the employment factors developed in Tasks 1 and 2 for the industries which might locate in Imperial Valley, socioeconomic effects do not appear to be a significant area of concern. As the attached list indicates, the employment for the most part, is below 100 workers in any of the industries identified in Tasks 1 and 2. As I indicated to you, this scale of employment is substantially lower than any previous analysis done for the County on geothermal power plant projects. The power plants normally employed upwards of 150 to 200 workers during the construction and drilling phases of the project. Under these conditions, socioeconomic effects within the County could be a substantial consideration. However, the scale of employment indicated for direct use applications does not appear to be within an anticipated area of concern.

Moreover, analysis of employment and unemployment data for the County indicates a substantial level of unemployment within the County. The latest data available indicate the annual average unemployment rate in Imperial County in 1979 was 24.1% and 22.7% in 1980. Thus, there is a substantial number of unemployed persons within the County who could potentially be employed in any of the direct use industries. Based on this consideration, and the analysis of the type of employment and industry involved, it would not appear that a significant number of outside or non-local workers would be entering the Imperial County area. Under these conditions, socioeconomic effects which might be imposed on the County from an outside population would not be expected to occur.

Ms. Margaret Rands
January 5, 1982
Page Two

an incoming population. Thus, large scale public investment in facilities does not appear to be necessary at this time. The discussion with the County and the Cities of El Centro and Brawley on water, wastewater collection and treatment, and solid waste do not indicate critical shortage or capacity problems at this time. Given this consideration, it does not appear as if the County would face problems relative to investment in public facilities.

Based on the above factors, I would recommend further effort on Task 3, Socioeconomic Analysis, be deleted and work be concentrated in the remaining tasks. The data which has been collected and the information available to date will be furnished as part of the work on Task 3. The remaining work effort on Task 3 can be transferred to other remaining tasks.

If this recommendation appears to be acceptable to the County, please let me know. I will look forward to hearing from you.

Very truly yours,

VTN CONSOLIDATED, INC.

John L. Sakaguchi
Project Manager

JLS:glw

Summary of Direct Geothermal Heat Applications
Investment and Employment

<u>Use</u>	<u>Investment</u>	<u>Employment</u>
<u>Agriculture</u>		
o Greenhouse	\$ 4,800,000	18
o Crop Cooling & Packing		
- Vacuum	\$ 3,000,000	8
- Cold Room	\$ 1,200,000	8
o Alfalfa Dehydration	\$ 300,000	8
o Feedlot Operations		
- Biogas	\$ 5,560,000	7
- Residue Dehydration	\$ 300,000	6
<u>Aquaculture</u>		
o Malaysian Prawns	N/A	N/A
o Catfish	\$ 110,000	30
<u>Food Processing</u>		
o Vegetable Dehydration	\$ 4,600,000	75
o Vegetable Freezing	890,000	8
o Produce Canning	N/A	N/A
<u>Ethanol</u>	\$40,000,000	50
<u>Fertilizer Production</u>	\$ 9,500,000	N/A