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June 1, 1983

Mr. Bruce MacDonald
Air Force Engr. & Services Center
HQ AFESC/DEB
Tyndall AFB, Florida 32403

STATUS OF GEOTHERMAL WORK AT AIR FORCE BASES - RonH-76-83

Dear Bruce:

Attached is the monthly status report of Air Force projects at INEL. Subjects covered are geothermal, energy management, and energy from municipal solid waste.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'H. R. Hilker', is written over a horizontal line.

H. R. Hilker, Manager
Hydropower/Geothermal

jd

Attachment:
As Stated

cc: C. E. Gilmore, DOE-ID
D. Foley, UURI
R. W. Kiehn, EG&G Idaho (w/o Attach.)

GEOHERMAL

The following are Air Force bases at which INEL has had active contact with DOD personnel:

BASEBACKGROUNDCURRENT STATUS

Ascension Island
Patrick Air Force Base
Systems Command
Melbourne, FL

Geothermal Potential:
Excellent

Phase I work consisting of a preliminary geology study, a baseline system design, and an economic analysis have been completed using Air Force funding (\$80K). The Air Force has funded Phase II which includes additional geophysical surveys, slim hole drilling, and a reevaluation of project economics (\$650K). If approved, Phase III will consist of the drilling of a deep production well (\$3.5M). The DOE will manage drilling of the well for the Air Force.

Permission has still not been received to drill the slim holes on Ascension Island. The drilling permission is apparently tied in with an overall reassessment of the U.S. lease at Ascension. The schedule for the next boat to Ascension will be determined on the first of June and after the schedule is announced, a drop-dead date for permission to drill will be determined.

On June 06, ESL/UURI will return to Ascension Island to conduct a resistivity survey. Analysis of the aeromagnetic survey is still in progress.

A proposal to drill a water well in conjunction with the slim hole drilling has been submitted to the Air Force by ESL/UURI. The Air Force has verbally indicated they will fund drilling the water well and the British have expressed an interest in having a water well drilled.

A letter report was transmitted which covered the effect of varying economic parameters used in the preliminary evaluation. The combined effect of reduced drilling costs, a more favorable drilling location, and sales of excess potable water to the British were considered in the report.

BASEBACKGROUNDCURRENT STATUS

Ellsworth AFB
SAC
Rapid City, SD

Geothermal Potential:
Good

Ellsworth AFB has a geothermal potential similar to Minot AFB, and it is in the same command. If the Air Force decides to pursue the Minot AFB project and it is successful, Ellsworth AFB will likely follow.

No follow-up will be made until the Minot AFB heat pump study is completed.

No change in status.

Hill AFB
Logistics Air Command
Ogden, UT

Geothermal Potential:
Low

A geothermal exploratory well was drilled at Hill AFB in 1979. The well was dry and showed no indication of the presence of a resource. A groundwater heat pump has a fair probability of being economical at Hill AFB. No further work will be done on this base until the heat pump study is complete.

No change in status.

BASEBACKGROUNDCURRENT STATUS

Holloman AFB
TAC
Alamogordo, NM

Holloman AFB has a good geothermal potential. A study on the economics of a geospace and domestic hot water heating system was completed and mailed to the base energy officer. The discounted payback period was 9.4 years, which reflects relatively high costs projected for resource exploration and recovery. Holloman is in the same command as Mountain Home AFB (TAC). There currently is a proposal into the TAC on Mt. Home and it has not been approved. It has a payback slightly better than Holloman, and the probability of finding a resource is considered to be better. Therefore, no additional action will be taken on Holloman unless they request additional information.

No change in status.

Geothermal Potential:
Good

Kelley AFB
LAC
San Antonio, TX

Kelley AFB is adjacent to Lackland AFB where an exploratory well will be drilled. Base personnel are currently waiting for results of the Lackland drilling prior to proceeding with a geothermal development. There have been some indications at the command level that there is an interest in proceeding without waiting for the Lackland results.

No change in status.

Geothermal Potential:
Good

Kingsley Field
TAC
Kingsley, OR

Kingsley Field, located on the south side of Klamath Falls, is currently a reserve base. However, TAC is considering a major change of mission by the installation of long range radar. The field is near a good direct heat geothermal resource. If a major change in the base is planned, it may be an ideal time to install a geothermal system.

No change in status.

Geothermal Potential:
Good

BASE

BACKGROUND

CURRENT STATUS

Kingsley Field (cont'd)

Faulting exists in the area, and with proper investigation, a resource should be found with about 120°F water. Water with temperatures of 160°F exist about a mile north of the base. Air National Guard is increasing its activity and moving in perhaps 250 to 300 people.

A previous evaluation was completed several years ago when the facility was under the Air Defense Command. Three exploratory wells were drilled and a report prepared. An appraisal of this study will be performed.

BASEBACKGROUNDCURRENT STATUS

Lackland AFB
ATC
San Antonio, TX

Geothermal Potential:
Excellent

The Air Force has accepted a Department of Energy proposal to drill an exploratory deep well at Lackland AFB. The total project cost is \$620K. The project will be developed in two phases, with a USAF decision point for withdrawal following Phase I in the event that early indicators from literature searches are not encouraging. Phase I will consist of an environmental assessment, compilation, integration and interpretation of available geologic and hydrologic data to select the well location and design of the well. Additionally, the permitting process will be initiated. During Phase II, the permitting process will be completed, subcontractors will be solicited for well drilling and logging, the well will be drilled and logged, test equipment will be procured and the well will be tested. If the well is not successful, the well will be capped according to local regulations and the site restored to original grade.

A second draft of the environmental report has been completed and reviewed within EG&G. It was decided to limit the scope of the environmental report to the actual drilling of the exploratory well due to uncertainties of test effluent disposal. For the preferred method of effluent disposal, surface discharge through a storm sewer, possibly with dilution, we will need a surface discharge permit from the Texas Railroad Commission, which will not be issued until water quality information is obtained from the specific well under consideration. The permitting process is proceeding smoothly since the Air Force has agreed to be the operator for the well drilling. A purchase request has been processed through to contracts for the project drilling engineer to file for the drilling permit. A proposed drill site has been selected, and discussion has begun with the Air Force on its suitability. The briefing to the Air Force on Phase I is scheduled for June 14 at Lackland AFB. The Air Force expects to be able to make a decision for Phase II (drilling and testing) within 2-3 weeks of the briefing, as the funding has already been committed.

Lajes AFB
MAC
North Atlantic

Geothermal Potential:
Excellent

Lajes appears to have the best geothermal potential of all Air Force bases. It is on an island in the Azores which has hot springs and which has had volcanic activity within the last two hundred years. There is a geothermal power plant on an adjacent Azore Island.

Proposal for Phase I surface geology work to be submitted for incorporation into an MIPR. Work will probably not start prior to FY-1984.

BASEBACKGROUNDCURRENT STATUS

Lajes AFB (cont'd)

The Air Force is interested in proceeding with the project but the current agreement with Portugal has not been extended by Congress and the Air Force will most likely wait until this problem is resolved. They will then have to negotiate an agreement with Portugal on resource utilization.

After these are accomplished, they have expressed an intent to request Department of Energy support in implementing a geothermal program at the base.

Minot AFB
SAC
Minot, ND

Under the Federal Building Program INEL conducted a study to develop a heating system at Minot AFB. Headquarters SAC decided not to pursue the project as the economics were marginal and they thought our estimated costs for portions of the project would be higher than we predicted.

No change in status.

Geothermal Potential:
Good

In doing the preliminary study we did not visit the base and we could not properly address the items they questioned. Because of funding limits we have not done any additional work on this project. The design we proposed utilized heat pumps in conjunction with a very low temperature resource. We believe that with additional design work we could convince the Air Force to proceed with this project. If this project were to proceed, it would open the way for a number of other Air Force base projects and would be a real boost for geothermal utilization.

We are conducting an in-house study of a heat pump application which could improve the Minot economics. We will not recontact Minot until the heat pump study is completed.

BASE

Mountain Home AFB
TAC
Mountain Home, ID

Geothermal Potential:
- Good

BACKGROUND

Mountain Home has excellent potential for a direct heating system. A preliminary economic analysis has been prepared and a proposal submitted to the base.

Mountain Home AFB has submitted the EG&G proposal for Phase I work on a geothermal space heating system to TAC HQ in VA. The project has a strong supporter at TAC HQ and he is trying to get the proposal funded in FY-83.

Mountain Home AFB has requested EG&G advise them on the feasibility of generating electric power on the resource thought to exist on the gunnery range south of the base. They would like to go into a third party contract similar to the Navy approach at the COSO geothermal site at China Lake. UURI is investigating the resource potential. If it is of potential electric quality, a proposal will be prepared.

CURRENT STATUS

Mt. Home AFB has requested \$400K for Phases 1 & 2. No action has been taken at TAC HQ yet.

UURI researched the literature to determine if there is potential for an electric quality resource on the Mountain Home gunnery range. It is their conclusion that there is almost no potential for a commercial electric power generation resource. This requires a temperature of approximately 400°F. There is one well in the area with binary plant potential (300-350°F). If the Air Force was interested in a relatively high cost but secure power source, this could be pursued. Mountain Home Base personnel were informed and no additional work is planned in the area of the gunnery range.

BASEBACKGROUNDCURRENT STATUS

Norton AFB
 MAC
 San Bernardino, CA
 Geothermal Potential:
 Good

Norton AFB was evaluated as a part of the Federal Building Program. It is in the same command as Lajes and the command prefers to pursue Lajes first. If the Lajes project is successful, there is a good chance that Norton AFB personnel will also become enthusiastic for a project. We agree that Lajes is the best project and it should be pursued first.

No change in status.

We have made contact with Norton and they are interested. UURI's latest resource estimate makes Norton questionable. However, we will take another look at it.

Vandenberg AFB
 SAC
 Lompoc, CA
 Geothermal Potential:
 Good

A preliminary study was completed on the geothermal potential at Vandenberg. The economics are marginal and base personnel showed little enthusiasm for geothermal. No additional work is planned on this project.

No change in status.

Williams AFB
 ATC
 Chandler, AZ
 Geothermal Potential:
 Good

The Air Force had issued an RFP for a commercial development. We were on the review team and recommended against the one proposal received. Dick Steed, the Air Force project manager (and also the manager of the Lackland project) is still interested in proceeding with a geothermal development at Williams AFB. It is our opinion that if we had funding to study this project, we could develop a potentially economical geothermal concept and the Air Force would proceed with the recommended development.

No change in status.

BASE

The following are bases with good potential but we have not made contact with DOD personnel.

Luke AFB
Indian Springs AFB
Nellis AFB
Davis Monthan
March AFB
Keflavik
Sandia AFB

The following bases have some potential but we have not made contact with DOD personnel.

Army & Air Force Exchange - Dallas, TX
Clark AFB - Phillippines
Logistics Command - San Antonio, TX
Kirtland AFB - Albuq., NM
Carswell AFB - Fort Worth, TX
Fairchild AFB - Spokane, WA
Francis E. Warren - Cheyenne, WY
Griffins AFB - Rome, NY

ENERGY MANAGEMENT

<u>BASE</u>	<u>BACKGROUND</u>	<u>CURRENT STATUS</u>
Mountain Home	A presentation was made to the Mountain Home AFB Energy Committee on the approach taken at INEL on energy management. The base deputy commander was enthusiastic and requested a proposal from EG&G to perform a similar service at Mountain Home AFB.	A proposal is in preparation.
Tyndall AFB	TAC HQ suggested we contact Tyndall as it is their worst energy use base. R. Hilker contacted the base energy officer when he was at Tyndall. He was enthusiastic about our support but unfortunately he had just been relieved of the energy responsibility. We will contact the new energy officer.	No change in status.
Hill AFB	A presentation was made to Hill AFB on overall INEL capabilities on February 16 and 17, 1983 by a team of EG&G personnel.	A list of projects of interest to Hill AFB has been developed. The logistics of work between INEL and Hill are being established.
Langley AFB	A presentation to TAC HQ was made at Langley on March 23. The HQ is interested in a proposal for a MSW feasibility study at Seymour Johnson AFB.	No change in status.

ENERGY FROM MUNICIPAL SOLID WASTEBASEBACKGROUNDCURRENT STATUS

Tyndall AFB
(HQ AFESC)

We have submitted a preliminary concept paper entitled "Handbook for Solid Waste Energy Recovery Assessment." The contact for this task is Steve Hathaway at Tyndall. There is still interest on this item, but nothing will be done until summer.

No change in status.

Multifuel Boiler Study - The Air Force is interested in determining the current state of the technology in boilers that can burn many different types of solid fuels (low grade coal, lignite, wood chips, RDF, etc.) with little modification.

We have not yet received the MIPR that was promised. Efforts to contact Steve Hathaway have been unsuccessful.

Langley AFB
(TAC HQ)

We have submitted a preliminary concept paper entitled "Feasibility Study for Solid Waste Energy Recovery at Seymour Johnson AFB." The contact for this task is Willis Barrow at Langley.

Willis has submitted funding for doing this task in FY-1984.

There needs to be a study on using steam more effectively at the NASA Langley Refuse-Fired Steam generating facility.

A check with Willis Barrow to see if the Air Force could fund this study proved unsuccessful. The contact will have to be made through the City of Hampton.

Hill AFB

New item.

In a meeting with Hill AFB personnel at INEL on May 24, 1983, George Talovich indicated a strong interest in having us do a feasibility study on energy from solid waste.