

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

600926
WALTER J. HICKEL, GOVERNOR

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FAIRBANKS, ALASKA 99709-3645
PHONE: (907) 474-7147
FAX: 479-4779

□ GEOLOGIC MATERIALS CENTER
P.O. BOX 772116
EAGLE RIVER, ALASKA 99577-2116
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X
400 WILLOUGHBY AVENUE, 3RD FLOOR
JUNEAU, ALASKA 99801
PHONE: (907) 465-2520

October 21, 1992

Mr. Joe Lee
U.S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

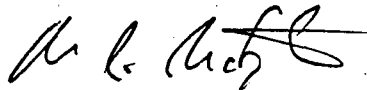
Rec 10/26/92
KPP
Maps not included

Dear Mr. Lee:

Please find enclosed five black and white copies of our final report "Geothermal Resource Assessment in the Aleutian Islands and Alaska Peninsula". This report is being submitted to you to complete our obligation under Grant No. DE-FG07-88ID122744.

As discussed in my previous letter, we expect to formally publish a four-color version of the report next year. Copies of the color version of the maps will be sent to DOE after they are published.

Sincerely,



Roman J. Motyka, Ph.D.
Geologist

cc Ms. Peggy Brookshier, DOE
Dr. Howard Ross, UURI



STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

September 10, 1992

Mr. Joe Lee
U.S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

Dear Mr. Lee:

Dr. Howard Ross of UURI requested that I appraise you of the current status of Grant No. DE-FG07-88ID122744, "Geothermal Resource Assessment in the Aleutian Islands and Alaska Peninsula".

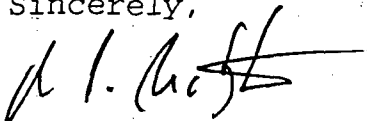
A draft of the final report, the "Geothermal Resources of the Aleutian Arc", was favorably reviewed by Dr. Ross and his colleagues at UURI last spring. After receiving UURI's comments, we submitted the report to our publications section and are now awaiting return of additional technical reviews. Because of the summer field season, these reviewers have been slow in completing their tasks. However, I have been assured that the reviews should be completed within the next week.

After we have reviewed their comments, we will complete the final draft of the report and redraft the maps. At this stage we propose to submit to DOE a black and white version of the geothermal resources maps in final fulfillment of our contractual obligations. My guess is we could do this within one month's time.

Because of scheduling in our publications section, the four-color version of the maps are unlikely to be completed and become available for several more months. Copies of the color version of the maps will be sent to DOE after they are published.

I hope this arrangement meets with your approval.

Sincerely,



Roman J. Motyka, Ph.D.
Geologist

cc Ms. Peggy Brookshier, DOE
Dr. Howard Ross, UURI

WALTER J. HICKEL, GOVERNOR

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*Rec 9/14/92
WJR*



STATE OF ALASKA

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Rec 4/08/92

April 3, 1992

Dr. Howard Ross
Earth Science Laboratory
University of Utah Research Institute
420 Chipeta Way, Suite 120
Salt Lake City, Utah 84108

Dear Dr. Ross,

You don't know how happy I am to finally be able to send you these three copies of the Geothermal Resources of the Aleutian Arc. Roman Motyka has sent you part of the information already. I've sent two parcels. The first with the letter contains the references and copies of the figures. The second - a map tube - contains the 3 map plates, 1:1,000,000 scale, along with two sheets of text and data. Since this is not the final color version, I've enclosed a copy of our previous publication "Geothermal Resources of Southeast Alaska" so you can get a better idea what the final product will look like. On the Aleutian maps, the overlapping patterns sometimes make it difficult to see all the information. On your copies, I've had the spring locations and geology colored so it stands out from the land status and the volcano locations have been darkened. If you have any questions contact Roman or myself.

Sincerely,



Shirley A. Liss



ALASKA

Grant No. DE-FG07-88ID12744
Part IV - Statement of Work
Page 3 of 4

evaluation will include improved estimates of the reservoir temperatures and of the magnitude of the energy available for development.

- 4.2 Preparation of a 1:1,000,000 scale technical geothermal energy resource map for the Aleutian Islands-Alaska Peninsula region, and supporting documentation.

- 4.2.1 Prepare and publish a four-color, geotechnically-oriented resource map of the Aleutian Islands-Alaska Peninsula region. The color-coded map will show locations of all known geothermal sites between Buildir Island on the west and Becharof Lake on the east. Map information for each site will include maximum surface temperatures, estimated convective heat discharge, estimated reservoir temperatures, total dissolved solids, and land status.

The map will include larger-scale, more detailed insets of three to five of the most promising geothermal prospects in this region.

- 4.2.2 Compile tables of all available geochemical data on geothermal fluids. These tables will contain water chemistry, gas chemistry and stable isotope compositions of thermal springs, geothermal wells, fumaroles, and thermal and local waters (as appropriate); isotopic compositions of gases; estimates of temperatures of thermal water based on chemical equilibria and appropriate geothermal gases based on geothermometers.

- 4.2.3 Prepare and publish a circular designed to accompany the Geothermal Resource Map (Task 4.2.1) which will contain brief descriptions of each geothermal site located on the resource map, with the more important sites receiving greater emphasis. The circular will include summaries of any site-specific investigations which have been conducted and relevant references. The circular will also contain comprehensive tables and brief discussion of pertinent geochemical data collected by the DGGs.

5.0 REPORTS, DATA, AND OTHER DELIVERABLES

5.1 Management Records

Reports will be due as indicated on the Federal Assistance Reporting Checklist and the Report Distribution List.

Review Copy in 3 weeks.

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

WALTER J. HICKEL, GOVERNOR

January 2, 1991

Mr. Ken Osborne
U. S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

- 3700 AIRPORT WAY (DNR Building)
FAIRBANKS, ALASKA 99709-4699
PHONE: (907) 451-2760, 474-7147
- P.O. BOX 772116
EAGLE RIVER, ALASKA 99577-2116
PHONE: (907) 696-0070
- 3601 "C" STREET, SUITE 1236
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ANCHORAGE, ALASKA 99510-7005
PHONE: (907) 762-2356
- 400 WILLOUGHBY AVENUE, 3RD FLOOR
JUNEAU, ALASKA 99801
PHONE: (907) 465-2520

*original grant Term data
was 4/11/90*

Dear Mr. Osborne:

I am requesting a no-cost time extension for Grant No. DE-FG07-88ID122744, "Geothermal resource assessment in the Aleutian Islands and Alaska Peninsula". We would like to extend our deadline to June 30, 1991.

The current statuses of the two tasks funded by this grant are as follows:

Task 1 - "Fluid geochemical study of the Geyser Bight KGRA on Umnak Island." This task has been completed.

Task 2 - "Technical geothermal resources map of the Aleutian Islands and the Alaska Peninnsula." Work on this map is about 55 per cent completed. Further work was temporarily suspended pending completion of the Umnak Island study. Target completion date is now June 30, 1991.

The reasons for the delays in project completion are lack of man power and other priority projects that required immediate attention. The Aleutian Arc geothermal resource map will now be made number one priority until it is completed.

Our revised time table is as follows:

February 28, 1991 - completion of data tables and first draft of accompanying circular for map; submission to publications section for editing and review and for map layout.

March 31, 1990 - completion of draft version of technical resources map for external and U.S. Department of Energy review.

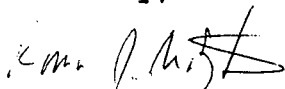
May 31, 1991 - incorporation of comments, submission for color reproduction, and project completion.

*areas claimed
by native owners; encroachment,
Act. asked for
March 18, 91
for Jan. 31, 92*

*Jan. 31, '92 - Fri. Apr 25th
Now in progress! M003 - copy of Jan 2 letter*

I apologize for the delays in completing this work. Please contact me if you have any questions or require clarification.

Sincerely,



Roman J. Motyka, Ph.D.
Geologist

cc Ken Taylor, US DOE
Dr. Howard Ross, UURI
Dr. Chris Nye, ADGGS and UAF
Paula Verosta, ADGGS

U.S. DEPARTMENT OF ENERGY
NOTICE OF FINANCIAL ASSISTANCE AWARD
(See Instructions on Reverse)

PL 93-410

Under the authority of Public Law _____ and
subject to legislation, regulations and policies applicable to (cite legislative program title):

Geothermal Energy Research, Development, and Demonstration Act of 1974

1. PROJECT TITLE Geothermal Resource Assessment in the Aleutian Island and Alaska Peninsula		2. INSTRUMENT TYPE <input checked="" type="checkbox"/> GRANT <input type="checkbox"/> COOPERATIVE AGREEMENT	
3. RECIPIENT (Name, address, zip code, area code and telephone no.) Alaska Department of Natural Resources Division of Geological and Geophysical Surveys 400 Willowby Center, 3rd Floor, Juneau, AK 99801		4. INSTRUMENT NO. DE-FG07-88ID12744	5. AMENDMENT NO.
8. RECIPIENT PROJECT DIRECTOR (Name and telephone No.) Roman J. Motyka (907) 465-2520		6. BUDGET PERIOD FROM: 4/11/88 THRU: 4/11/89	7. PROJECT PERIOD FROM: 4/11/88 THRU: 4/11/90
9. RECIPIENT BUSINESS OFFICER (Name and telephone No.) Sheri Daniels (907) 474-7147		10. TYPE OF AWARD <input checked="" type="checkbox"/> NEW <input type="checkbox"/> CONTINUATION <input type="checkbox"/> RENEWAL <input type="checkbox"/> REVISION <input type="checkbox"/> SUPPLEMENT	

11. DOE PROJECT OFFICER (Name, address, zip code, telephone No.) Kenneth J. Taylor (208) 526-9063 U.S. DOE, Idaho Operations Office 785 DOE Place, Idaho Falls, Idaho 83402		12. ADMINISTERED FOR DOE BY (Name, address, zip code, telephone No.) Trudy A. Thorne (208) 526-9519 U.S. Department of Energy Idaho Operations Office 785 DOE Place Idaho Falls, Idaho 83402	
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13. RECIPIENT TYPE

<input checked="" type="checkbox"/> STATE GOV'T	<input type="checkbox"/> INDIAN TRIBAL GOV'T	<input type="checkbox"/> HOSPITAL	<input type="checkbox"/> FOR PROFIT ORGANIZATION	<input type="checkbox"/> INDIVIDUAL
<input type="checkbox"/> LOCAL GOV'T	<input type="checkbox"/> INSTITUTION OF HIGHER EDUCATION	<input type="checkbox"/> OTHER NONPROFIT ORGANIZATION	<input type="checkbox"/> C <input type="checkbox"/> P <input type="checkbox"/> SP	<input type="checkbox"/> OTHER (Specify)

14. ACCOUNTING AND APPROPRIATIONS DATA				15. EMPLOYER I.D. NUMBER/SSN	
a. Appropriation Symbol 89X0224.91	b. B & R Number AM 1510000	c. FT/AFP/OC YA 410	d. CFA Number		

16. BUDGET AND FUNDING INFORMATION	
a. CURRENT BUDGET PERIOD INFORMATION	b. CUMULATIVE DOE OBLIGATIONS
(1) DOE Funds Obligated This Action \$ 72,000	(1) This Budget Period \$ 72,000 [Total of lines a. (1) and a. (3)]
(2) DOE Funds Authorized for Carry Over \$ -0-	(2) Prior Budget Periods \$ -0-
(3) DOE Funds Previously Obligated in this Budget Period \$ -0-	(3) Project Period to Date \$ 72,000 [Total of lines b. (1) and b. (2)]
(4) DOE Share of Total Approved Budget \$ 72,000	
(5) Recipient Share of Total Approved Budget \$ 40,469	
(6) Total Approved Budget \$ 112,469	

17. TOTAL ESTIMATED COST OF PROJECT \$ 112,469

(This is the current estimated cost of the project. It is not a promise to award nor an authorization to expend funds in this amount.)

18. AWARD/AGREEMENT TERMS AND CONDITIONS

This award/agreement consists of this form plus the following:

a. Special terms and conditions (if grant) or schedule, general provisions, special provisions (if cooperative agreement)

b. Applicable program regulations (specify) _____ (Date) _____

c. DOE Assistance Regulations, 10 CFR Part-600, as amended, Subparts A and B (Grants) or C (Cooperative Agreements).

d. Application/proposal dated June 15, 1987 as submitted with changes as negotiated

19. REMARKS This Grant consists of this NFAA (DOE F 4600.1), Part I - Budget Plan, Part II - Special Conditions, Part III - General Conditions, Part IV - Statement of Work, and Part V - Reporting Requirements. DOE Financial Assistance Rules (10 CFR Part 600), OMB Circular A-102, OMB A-87, and OMB Circular A-128 "Audits of State and Local Governments" are hereby incorporated by reference.

20. EVIDENCE OF RECIPIENT ACCEPTANCE <u>Robert B Forbes</u> <u>4/18/88</u> (Signature of Authorized Recipient Official) (Date) <u>ROBERT B. FORBES</u> (Name) <u>DIRECTOR AND STATE GEOLOGIST</u> (Title)	21. AWARDED BY <u>J.P. Anderson</u> <u>4/88</u> (Signature) (Date) <u>P. Anderson, Contracting Officer</u> (Name) <u>Chief, R&D Contracts Branch</u> (Title)
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FEDERAL ASSISTANCE BUDGET INFORMATION FORM

FORM EIA-459C
(10/80)FORM APPROVED
OMB No. 1900-0127

1. Program/Project Identification No. DE-FG07-88ID12744	2. Program/Project Title Geothermal Resource Assessment in the Aleutian Islands and Alaska Peninsula
3. Name and Address State of Alaska, Division of Geological and Geophysical Survey, 400 Willoughby Center, 3rd Floor, Juneau, AL	4. Program/Project Start Date April 11, 1988
	5. Completion Date April 11, 1990

SECTION A - BUDGET SUMMARY						
Grant Program, Function or Activity (a)	Federal Catalog No. (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. 12693	81.087	\$	\$	\$	\$	\$
2. First Year				52,366	27,442	79,808
3. Second Year				19,634	13,027	32,661
4.						
5. TOTALS		\$	\$	\$	\$	\$

SECTION B - BUDGET CATEGORIES					
6. Object Class Categories	DOE Cost Share		Alaska Cost Share		Total (5)
	(1) First Yr.	(2) Second Yr.	(3) First Yr.	(4) Second Yr.	
a. Personnel	\$ 31,843	\$ 11,634	\$ 21,109	\$ 9,252	\$ 73,838
b. Fringe Benefits 30%	9,553	3,490	6,333	2,775	22,151
c. Travel	5,360				5,360
d. Equipment					
e. Supplies	1,460	260			1,720
f. Contractual					
g. Construction					
h. Other	4,150	4,250		1,000	9,400
i. Total Direct Charges	52,366	19,634	27,442	13,027	112,469
j. Indirect Charges 0%					
k. TOTALS	\$52,366	\$19,634	\$27,442	\$13,027	\$112,469
7. Program Income	\$	\$	\$	\$	\$

NOTE: This Grant is for a two-year period at a total estimated DOE cost of \$72,000 and a total estimated Grantee cost of \$40,469 for a total of \$112,469.

This will be funded as follows:

First Year: DOE - \$52,366 Grantee - \$27,442
 Second Year: DOE - \$19,634 Grantee - \$13,027

Special Terms and Conditions for Research Grants

The requirements of this attachment take precedence over all other requirements of this grant found in regulations, the general terms and conditions, DOE orders, etc. except requirements of statutory law. Any apparent contradiction of statutory law stated herein should be presumed to be in error until the Grantee has sought and received clarification from the Contracting Officer, whose signature appears on the face page of this award.

1. Payments

- a. The Grantee may request advance payment of cost to be incurred. Such requests should not exceed the expected outlays by the Grantee in the succeeding 30-day period.
- b. Payments to the Grantee shall equal the Federal share of actual allowable costs of performance of this grant, provided however, and notwithstanding any other provision of this grant, that the Government's monetary liability under this grant shall not exceed the Government share of the total approved budget or an amount equal to the Federal share of actual allowable costs, whichever is less. The Grantee shall be obligated to perform under this grant throughout the agreed-upon period of performance, and to bear all costs which DOE has not agreed to pay. However, the Grantee shall have the right to cease to perform when or after the Federal share of actual allowable costs equals or exceeds the Government share of the total approved budget and if prior written notice to that effect has been provided to DOE.
- c. The Government obligations may be increased unilaterally by DOE by written notice to the Grantee and may be increased or decreased by written agreement of the parties.
- d. Upon termination or expiration of the total period of performance, the Grantee shall promptly refund to DOE (or make such disposition as DOE may in writing direct) any sums paid by DOE to the Grantee under this grant in excess of the cumulative Government allowable cost incurred in performance under the grant.
- e. Method of Payment - Payments due for amounts properly invoiced in accordance with the terms and conditions specified elsewhere in the grant shall be made either by Treasury check(s) payable to the Grantee or designee or by electronic funds transfer(s) to a financial institution designated by the Grantee for that purpose. The method of payment shall be determined by the Government at the time of payment in accordance with applicable Treasury Department requirements.

After award but no later than fourteen (14) days before an invoice or bill is submitted for payment, the Grantee shall designate a financial institution for the receipt of electronic funds transfer payments hereunder; and provide the appropriate Government representative (contracting officer or finance official as determined by the Government) with the name of the designated financial institution, financial institution's or correspondent financial institution's 9-digit American Bankers Association identifying number, telegraphic abbreviation of such financial institution, and account number at the designated financial institution to be credited with funds.

In the event the Grantee during the performance of this grant elects to designate a different financial institution for the receipt of any payment made using electronic funds transfer procedures, notification of such change and the information as specified in paragraph (b) above must be received by the appropriate Government representative thirty (30) days prior to the date such change is to become effective.

The document furnishing the information required above must be dated and contain the signature, title, and telephone number of the Grantee official authorized to provide it, as well as the Grantee's name and grant number.

Grantee failure to properly designate a financial institution or to provide appropriate payee bank account information may delay payments of amounts otherwise properly due.

- f. Cost-Share Arrangement - The cost-share will be in accordance with Part I - Budget Plan. Invoices must include in-kind contributions and DOE's reimbursed costs. To be an invoiced cost, a cash or in-kind contribution must be allowable under the terms and conditions of the award and meet the applicable cost principle tests of allowability in 10 CFR 600.103.

Allowable costs incurred under this grant will be cost-shared on the basis of 64% DOE and 36% Grantee.

- g. Applicable Credits. The Grantee agrees that any refunds, rebates, credits, or other amounts (including any interest thereon) accruing to or received by the Grantee or any assignee under this grant shall be paid by the Grantee to the Government, to the extent that they are properly allocable to costs for which the Grantee has been reimbursed by the Government under this grant. Reasonable expenses incurred by the Grantee for the purpose of securing such refund, rebates, credits, or other amounts shall be allowable costs hereunder when approved by the Contracting Officer.

- h. Audit Adjustments. The Contracting Officer may have invoices or vouchers and statements of cost submitted under this grant audited at any time prior to the end of the required retention period for the grant records. Each payment made shall be subject to reduction for amounts included in the related invoice or voucher which are found by the Contracting Officer, on the basis of audit, not to constitute allowable cost. If a final audit of costs has not been performed prior to closeout of the grant, DOE or its successor agency, shall have the right to recover an appropriate amount after fully considering the recommendations on disallowed costs resulting from the final audit when conducted.
- i. Cognizant Office. Invoices should be sent to the individual designated in Block 12. of the Notice of Financial Assistance Award Form (NFAA). In addition to the initial supply of forms made available with this award, appropriate payment forms and instructions will be provided by this office upon request.

2. Budget Flexibility and Limitation of DOE Liability

- a. Under the terms of this award, Grantee may obligate up to 110% of the amount awarded by DOE for a budget period, during that period, without prior authorization by DOE. Obligations in excess of 110% of the amount awarded by DOE require prior DOE authorization. (A prior approval made in accordance with the provisions of paragraph b. of this clause would constitute such prior approval.) Such authorized grantee obligations in excess of the amount awarded by DOE for a budget period shall be funded from unobligated funds remaining from the prior budget period to the extent they are available; or such obligations may be incurred at Grantee's own risk, subject to the following conditions:
 - (1) If Grantee receives a continuation or renewal award, the amount obligated in excess of 100% may be charged against the subsequent continuation or renewal award to the extent not funded from any unobligated balance from an earlier budget period.
 - (2) Even if prior authorization required by this paragraph has been obtained, Grantee shall not be entitled to reimbursement, or have any claim against DOE, for any amount obligated by Grantee in excess of the total funds obligated by DOE, if a continuation or renewal award is not made.

- b. When the funds remaining unobligated by the Grantee in any given budget period are 10% or less of the amount awarded by DOE for the subsequent budget period, Grantee may use the unobligated funds during the subsequent budget period to pay for costs (1) budgeted for in either budget period and (2) subject to any applicable prior approval requirements. If funds remaining unobligated by the Grantee at the end of a budget period exceed 10% of the amount awarded for the subsequent budget period, use of the amount in excess of 10% must receive the prior approval of the Contracting Office.
- c. Nothing in paragraphs a. or b. of this article shall in any way require DOE to increase the total obligated for the project period or to make any additional supplemental, continuation, renewal, or other award for the same or any purpose.

3. Reporting Program Technical Performance

- a. Copies. Copies of reports and all other related data and information generated under this grant shall be submitted in accordance with the attached Federal Assistance Reporting Checklist (DOE Form EIA-459A).
- b. Publication of Results. The Grantee may publish the results of its work. However, publications and reports prepared under this grant shall contain the following acknowledgment statement, "This (material) was prepared with the support of the U.S. Department of Energy (DOE) Grant No. DE-FG07-88ID12740. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of DOE."
- c. Reporting Requirements. The Federal assistance recipient shall prepare and submit (postage prepaid) the plans and reports indicated on the Federal Assistance Reporting Distribution List. Preparation of the specified plans and reports shall be in accordance with DOE Order 1332.2. The level of detail the recipient provides in the plans and reports shall be commensurate with the scope and complexity of the task and shall be as delineated in Block 4 - Reporting Requirements and Block 5 - Special Instructions.

All reports delivered to DOE shall be the sole property of the DOE. The Grantee shall not claim that any report contains any trade secrets or commercial or financial information deemed by the Grantee to be privileged or confidential, or that the Grantee has any proprietary interest in any report.

4. Designated Key Personnel

The following individual is designated key personnel in accordance with General Condition No. 14:

Roman J. Motyka

5. Project Completion Date

The project completion date identified in Block 7. of the Notice of Financial Assistance Award includes an additional 90 days for completion of the final report. All R&D effort must be completed 90 days prior to the project completion date. Only costs associated with preparation of the final report will be allowed during the 90 days prior to the project completion date.

6. Technical Data

Except for technical data contained in pages N/A of the recipient's application, dated N/A, which are asserted by the Grantee as being proprietary data, it is agreed that as a condition of this award, and notwithstanding the provisions of any notice appearing on the application, the Government shall have the right to use, duplicate, disclose and have others do so for any purpose whatsoever the technical data not identified in the above blanks contained in the application upon which this award is based.

7. Prior Approval

The following actions or costs specified in the application require prior approval of DOE and are specifically disapproved in accordance with General Condition No. 3:

None

8. General Procurement Prior Approval

Article 17 of the General Terms and Conditions for Research Grants is hereby revoked. The Grantee must receive prior approval from DOE before entering into any sole source contract or a contract where only one bid or proposal is received, when the value of the contract in the aggregate is expected to exceed \$25,000.

9. Patent Clauses

The following patent clauses and technical data requirements are applicable to this grant award:

600.118(b)(2) "Patent Rights (Short Form)"

600.118(b)(3) "Rights in Technical Data (Short Form)"

600.118(b)(5) "Authorization and Consent"

600.118(b)(6) "Notice and Assistance"

600.118(c) "Reporting of Royalties"

10. Title to Equipment

a. Title to the following items of equipment shall vest with the Grantee upon completion of this grant:

None

b. Title to the following items of equipment shall vest with the Government at the end of the grant project period:

None

11. Annual Budget Review

The Budget Plan included in this grant is subject to annual review by DOE. The Grantee shall submit to the DOE Contracting Officer: 1) the status of progress on the research effort; 2) the actual costs to date; 3) the estimated cost to complete the research effort being supported; and 4) any proposed charges to the current budget plan. This information shall be submitted annually in the same level of detail as the original proposal. The annual submission date shall be within 15 days of the day identified as the start date of the budget period in Block 6. of the Notice of Financial Assistance Award. Items 1) and 2) above may be provided as part of the Financial Assistance Management Summary Report (FAMSR) if the annual submission date and the normal FAMSR due date coincide.

12. Audit Requirements

In addition to the terms and conditions identified in blocks 18.b. and 18.c. of the Notice of Financial Assistance Award and those attached to this award, if any, the recipient shall comply with the audit requirements contained in the DOE Financial Assistance Rules, 10 CFR 600, Subpart D, Audits of State and Local Governments.

General Terms and Conditions for Research Grants

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General Terms and Conditions for Research Grants

1. Explanation

These general terms and conditions do not restate all the provisions of applicable statutes and regulations nor do they represent an exhaustive listing of all requirements applicable to this grant. Rather they highlight and are consistent with those requirements which are especially pertinent to research grants in general. They are being emphasized by inclusion here either because they are invoked with high frequency, their violation is a matter of especially serious concern (e.g., use of human subjects), and/or they have been restated in the research context to be more easily understood by the research community.

In addition to these general terms and conditions, the grantee must comply with all governing requirements, including those identified in Block 18 of the Notice of Financial Assistance Award and those included in the Special Terms and Conditions attached to this grant award.

2. Grantee Adherence to Grant Terms and Conditions

The grantee's signature on the application and on the Notice of Financial Assistance Award signifies the grantee's agreement to the terms and conditions of award. Should the grantee believe modification of any of the terms and conditions of this award is necessary, an authorized official of the grantee organization or, in the case of an individual, the grantee, must submit a written request on its own behalf or on behalf of any subgrant recipient or applicant to the Contracting Officer named on the face page of this award.

Following this procedure is very important because many of the terms and conditions of this grant are required by statute and must be enforced by the Department of Energy.

3. Definitions

Principal Investigator

As used herein, the scientist or other programmatic expert named in Block 8 of the Notice of Financial Assistance Award designated by the grantee organization to direct the scientific/technical efforts being supported (also called program director or project director/leader).

Prior Approval

A statement in writing, signed by the DOE Contracting Officer, that a cost may be incurred or an action may be taken. The approval may take the form of a letter or of a revision to the grant. If actions or

costs requiring prior approval are specified in the application and are not expressly disapproved by DOE in the attached Special Terms and Conditions, the award of the grant constitutes such prior approval.

4. Authorized Grantee Signatures for Prior Approval Requests

All requests for prior approval must be signed by an individual who is authorized to act for the grantee organization. The signature of the Principal Investigator (unless also a corporate officer or otherwise authorized) is insufficient to obtain action on a prior approval request, although countersignature by the Principal Investigator is not discouraged. Requests for budget revisions shall be made on the same budget format as used in applying for this grant and must be supported by a narrative justification. Other prior approval requests may be made by letter. Prior approval requests should be addressed to the Contracting Officer named on the face page of this award.

5. Allowable Costs/Applicable Cost Principles

In accordance with the applicable cost principles cited below and up to the amount shown on the face page of this award for the total approved budget for the current budget period (line 16.a.(6)), the allowable costs of this grant shall consist of the actual allowable direct costs incident to performance of this project plus the allocable portion of the allowable indirect costs, if any, of the organization less applicable credits.

The allowability of costs for work performed under this grant and any subsequent subaward will be determined in accordance with the Federal cost principles applicable to the grantee or subrecipient in effect on the date of award or, for any subaward, in effect as of the date of that subaward, except as modified by other provisions of this grant or the subaward.

The Federal cost principles applicable to specific types of grantees and subrecipients are:

1. Institutions of Higher Education. OMB Circular A-21, Cost Principles Applicable to Grants, Contracts and Other Agreements with Institutions of Higher Education, is applicable to both public and private colleges and universities.
2. State and local governments and Indian tribal governments. OMB Circular A-87, Cost Principles Applicable to Grants, Contracts and other Agreements With State and Local Governments, is applicable to state, local, and Indian tribal governments (and shall also be used to the extent appropriate for foreign governments).

3. Hospitals. 48 CFR Part 74, Appendix E, Principles for Determining Costs Applicable to Research and Development under Grants and Contracts with Hospitals, applies to nonprofit and for-profit hospitals.
4. Other nonprofit organizations and individuals. OMB Circular A-122, Cost Principles Applicable to Grants, Contracts, and other Agreements with Nonprofit Organizations, applies to nonprofit organizations and individuals except for nonprofits specifically exempted by the terms of the circular or those nonprofits covered by the cost principles cited in items 1.- 3. above.
5. Commercial firms and certain nonprofit organizations. 48 CFR Subpart 31.2, Contracts with Commercial Organizations, as supplemented by 48 CFR Subpart 931.2, applies to those nonprofit organizations not covered by OMB Circular A-122, as specified by the terms of that circular, and to all commercial organizations other than those covered by the cost principles in item 3. above.

6. Payment

Payments under this award will be made by an advance payment method unless DOE determines that the grantee's financial management system does not meet the requirements of 10 CFR 600.109 or the grantee has not maintained, or demonstrated the willingness and ability to maintain, procedures that will minimize the time elapsing between transfer of funds from the U.S. Treasury and their disbursement for grant-related purposes.

The appropriate advance payment method or the reimbursement method and the cognizant finance office are specified in the attached Special Terms and Conditions.

Advances by the grantee to subgrantee and contractor organizations must conform substantially to the same standards of timing and amount that govern advances made by the Federal Government to the grantee. Excess cash advances erroneously withdrawn from the U.S. Treasury shall be promptly refunded to DOE unless the funds will be disbursed within seven calendar days or the amount is less than \$10,000 and will be disbursed within 30 calendar days.

Interest earned on advance payments to other than state governments or their subgrantees shall be reported on the Report of Federal Cash Transactions (SF-272) and promptly remitted to the cognizant finance office (unless otherwise specified in the attached Special Terms and Conditions) by check payable to the Department of Energy.

7. Preaward Costs

Costs incurred prior to the beginning date of a new or renewal award are allowable only if they were approved in writing, prior to incurrence, by a DOE Contracting Officer. (Note - this provision does not apply to such bid and proposal costs as may be recovered through an indirect cost rate negotiated in accordance with the applicable Federal cost principles.)

8. Reporting Requirements

Attached to this grant award is EIA 459A, a checklist of the reports required under this grant.

The grantee shall submit a technical progress report (also called a performance report) as part of any application for continuation or renewal of DOE grant support. This report shall be in lieu of a separate annual performance report. Upon completion or termination of the project, the final technical report shall be prepared in accordance with the applicable program rule cited on the face page of this award or, in the absence of such program rule coverage, with the technical reporting format specified in the Uniform Reporting System for Federal Assistance (Grants and Cooperative Agreements) (DOE/MA-001).

The grantee shall submit an annual Financial Status Report (SF-269) within 90 days after the close of the budget period shown on the face page of this award. The grantee shall submit a final Financial Status Report within 90 days after the completion or termination of the project period shown on the face page of this award unless the project period is extended. In the latter case, the report for the last budget period of the existing project period shall be considered an annual report.

Instructions concerning reports to be submitted in conjunction with payment under this award are specified in the attached Special Terms and Conditions.

9. Cost-Sharing

Any cost-sharing as shown on the face page of this award shall defray allowable costs of the project only. Allowability of such costs shall be determined in accordance with the statutes, regulations, applicable cost principles, and other terms and conditions governing this award.

Cost-sharing contributions may be in the form of direct or indirect costs, including cash or in-kind contributions, incurred by the grantee, its subgrantees, or contractors. The cost sharing may be in any allowable budget category or combination of categories. When a direct cost item represents some or all of the non-Federal contribution, any associated indirect costs may not be charged to Federal funds but may be

counted as part of the cost-sharing. The treatment of a contributed cost as direct or indirect must be consistent with the classification of similar items charged to DOE funds.

Valuation of in-kind contributions and documentation of cost-sharing shall be in accordance with 10 CFR 600.107.

10. Continuations, Renewals, and Extensions

Grantees are responsible for assuring that properly completed applications for continuation awards are received no later than 4 months prior to the expiration date of the current budget period shown on the Notice of Financial Assistance Award.

If a grantee wishes to apply for a renewal award in order to receive funding beyond the scheduled expiration of the existing project period, a properly completed application must be submitted to DOE no later than four months prior to the scheduled expiration date of the project period as shown on the Notice of Financial Assistance Award.

Grantee requests for extensions (modifications extending an existing project period by 18 months or less in order to complete a project) must be submitted prior to the expiration date of the project period as shown on the face page of this award, and must include a budget for the use of any remaining funds or any additional funds requested. Any request for an extension, which includes a request for additional funds and any request for an extension of more than 90 days, should be submitted to DOE no later than four months prior to the scheduled expiration date of the project period.

11. Maximum DOE Obligation

This grant is subject to the requirement that the maximum DOE obligation to the recipient is the amount shown on the Notice of Financial Assistance Award as the amount of DOE funds obligated. DOE shall not be obligated to make any additional, supplemental, continuation, renewal or other award for the same or any other purpose.

12. Transfers of Funds Between Grants

Transfers of funds between DOE grants, and transfers of funds from a DOE grant to a project (or portion of a project) not supported by that grant require the prior approval of DOE. Transfer of funds into a DOE grant-supported project from a grant awarded by another Federal agency does not require DOE prior approval but may, of course, require the approval of the other Federal agency. Funds so transferred from the grant of another Federal agency may not be used to satisfy any cost-sharing requirement on a DOE grant.

13. Property

Real and Tangible Personal Property

No real property may be acquired under this award.

Title to any equipment (an article of tangible personal property that has a useful life of more than 2 years and an acquisition cost of \$500 or more) or supplies acquired by a nonprofit institution of higher education or a nonprofit organization whose primary purpose is the conduct of scientific research shall vest in the grantee and such equipment shall be exempt from accountability except that DOE has the right to transfer ownership of any item of equipment having a unit acquisition cost of \$1,000 or more under the conditions specified in 10 CFR 600.117(d)(2). This exemption is derived from Public Law 95-224. The Federal Grant and Cooperative Agreement Act of 1977, as amended.

Title to equipment and supplies acquired by all other grantees shall vest in the grantee. However, such grantees shall be accountable for equipment with a unit acquisition cost of \$1,000 or more acquired under this grant as specified in 10 CFR 600.117(d)(2), (3) and (4). For such grantees, supplies need only be accounted for at closeout and then only if they are unused and exceed \$1,000 in total aggregate current fair market value. In this case accountability requires that DOE be compensated in an amount computed in accordance with Section 600.117(e) if the supplies are retained for use on non-Federal activities.

All grantees shall follow property management policies and procedures which provide for adequate control of the acquisition and use of assets acquired under the grant.

Intangible Property

Treatment, including reporting, of patent and data rights and copyrights shall be as specified in the Special Terms and Conditions of this grant.

14. Change or Absence of the Principal Investigator or Designated Key Personnel

Since the DOE decision to fund a project is based, to a significant extent, on the qualifications and level of participation of the Principal Investigator, a change of Principal Investigator or of the level of effort of the Principal Investigator is considered a change in the approved project. The approval of DOE must be obtained prior to any change of the Principal Investigator or, in certain cases, other key personnel who have been identified as key personnel in the Special Terms and Conditions of this grant. In addition, any continuous absence of the Principal Investigator in excess of three months or plans for the

Principal Investigator to become substantially less involved in the project than was indicated in the approved grant application requires DOE prior approval. Grantee is encouraged to contact DOE immediately upon becoming aware that any of these changes are likely to be proposed, but in any event must do so and receive DOE prior approval before effecting any such change.

15. Changes in Objectives or Scope

Any change in the objectives or scope of a grant-supported project requires the prior approval of DOE. Such changes include changes in the phenomenon or phenomena under study and in the methodology or experiment if they are a specific objective of the research work as stated in the application approved by DOE.

16. Transfer of Substantive Programmatic Effort

None of the substantive effort of this project may be transferred by contract or subgrant to another organization or person without the prior approval of DOE. This provision does not apply to the procurement of equipment, supplies, materials, or general support services which may, however, be subject to other prior approval requirements as found, for example, in the applicable cost principles or procurement standards.

17. General Procurement Prior Approval Requirements

A grantee must receive prior approval from DOE before entering into any sole source contract or a contract where only one bid or proposal is received when the value of the contract in the aggregate is expected to exceed 1) \$10,000 and the grantee is a state, local, or Indian tribal government or 2) \$5,000 for all other grantees.

18. Equipment and Other Capital Expenditures

Expenditures for equipment and other capital assets having a unit acquisition cost of \$500 or more require the prior approval of DOE with one exception. For special purpose equipment, prior approval is required only when the unit acquisition cost is \$1,000 or more. (Special purpose equipment means equipment which is used only for research, medical, scientific, or other technical activities.)

19. Travel

Foreign Travel - DOE prior approval is required for each separate foreign trip. Foreign travel must be directly related to the project objectives. Foreign travel is any travel outside Canada and the United States and its territories and possessions or, for grantees located in another country, travel outside that country.

Domestic Travel - Such costs are allowable to the extent provided in the approved budget. In addition, grantees may exceed the approved budget amount for domestic travel by up to 25% or \$500 whichever is greater, without DOE prior approval. All other expenditures for domestic travel beyond these limits require prior approval.

20. Consultant Services

Costs of consultant services are allowable subject to satisfaction of the requirements of the applicable cost principles, including the requirement that the consultant not be an employee of the grantee organization. There is one exception to the requirement that the consultant not be an employee of the grantee organization which applies to colleges and universities only. For colleges and universities, in unusual cases, and only with the prior approval of DOE, intra-organizational consultation may be permitted where consultation is across departmental lines or involves a separate or remote operation.

21. Paperwork Reduction

This award is subject to the requirements of the Paperwork Reduction Act of 1980 as implemented by the Office of Management and Budget rules, "Controlling Paperwork Burdens on the Public," published at 5 CFR 1320. (48 FR 13666, 3/31/83) if the grantee will collect information from ten or more respondents either:

- A. At the specific request of DOE, or
- B. If the award requires specific DOE approval of the information collection or the collection procedures.

Any proposed sponsored information collection under item 21 B. above shall be submitted by the grantee to the Contracting Officer named on the face page of this award at least 90 days prior to the intended date of information collection. DOE will seek the requisite approval from the Office of Management and Budget and will promptly notify the grantee of the disposition of the request.

22. Generally Applicable Requirements

In accordance with 10 CFR 600.12, this grant is subject to a number of statutory and other generally applicable requirements. Those requirements most pertinent to research projects are highlighted below:

Animal Welfare

Any grantee performing research on warm-blooded animals shall comply with the Laboratory Animal Welfare Act of 1966 (Public Law 89-544, as amended)

and the regulations promulgated thereunder by the Secretary of Agriculture at 9 CFR Chapter 1, Subchapter A, pertaining to the care, handling, and treatment of warm-blooded animals held or used for research, teaching, or other activities supported by Federal awards. The grantee is expected to ensure that the guidelines described in Department of Health and Human Services (DHHS) Publication No. [NIH] 78-23, "Guide for the Care and Use of Laboratory Animals," are followed (Copies are available from the Superintendent of Documents, Government Printing Office, Washington, DC 20024, Stock No. 017-040-00427-3).

Research Involving Recombinant DNA Molecules

Any grantee performing research involving recombinant DNA molecules and/or organisms and viruses containing recombinant DNA molecules agrees by acceptance of this grant to comply with the National Institutes of Health "Guidelines for Research Involving Recombinant DNA Molecules," June 1983 (48 FR 24556) or such later revision of those guidelines as may be published in the Federal Register.

Use of Human Subjects in Research, Development, and Related Activities

Any DOE grantee performing research, development, or related activities involving any use of human subjects must comply with DOE regulations found at 10 CFR Part 74S "Protection of Human Subjects" and any additional Provisions which may be included in the Special Terms and Conditions of this grant. Such provisions are intended to safeguard the rights and welfare of human subjects at risk of possible physical, psychological, or social injury as a consequence of their participation.

23. Nondiscrimination

This grant is subject to the provisions of 10 CFR Part 1040 "Nondiscrimination in Federally Assisted Programs."

24. Public Access to Information

The Freedom of Information Act, as amended, and the DOE implementing regulations (10 CFR Part 1004) require the release by DOE of certain documents and records regarding grants upon written request by any member of the public. The intended use of the information will not be a criterion for release. These requirements apply to information held by DOE, and do not require grantees, their subgrantees, or their contractors to permit public access to their records.

Records maintained by DOE with respect to grants are subject to the provisions of the Privacy Act and the DOE implementing regulations (10 CFR Part 1008) if those records constitute a "system of records" as defined in the Act and the regulations. Generally, records maintained by grantees, their subgrantees, or their contractors are not subject to these requirements.

25. Acknowledgement of Support

Publication of the results of this grant, subject to any applicable restrictions in 10 CFR 600.118 ("Patents, data, and copyrights"), is encouraged. Any article which is published shall include an acknowledgement that the research was supported, in whole or in part, by a DOE grant (including the grant number), but that such support does not constitute an endorsement by DOE of the views expressed in the article.

26. National Security

It is not expected that activities under this grant will generate or otherwise involve classified information (i.e., Restricted Data, Formerly Restricted Data, National Security Information).

However, if in the opinion of the grantee or DOE such involvement becomes expected prior to the closeout of the grant, the grantee or DOE shall notify the other in writing immediately. If the grantee believes any information developed or acquired may be classifiable, the grantee shall not provide the potentially classifiable information to anyone, including the DOE officials with whom the grantee normally communicates, except the Director of Classification, and shall protect such information as if it were classified until notified by DOE that a determination has been made that it does not require such handling. Correspondence which includes the specific information in question shall be sent by registered mail to U.S. Department of Energy, Attn: Director of Classification, DP-32, Washington, DC 20545. If the information is determined to be classified the grantee may wish to discontinue the project, in which case the grantee and DOE shall terminate the grant by mutual agreement. If the grant is to be terminated, all material deemed by DOE to be classified shall be forwarded to DOE, in a manner specified by DOE, for proper disposition. If the grantee and DOE wish to continue the grant, even though classified information is involved, the grantee shall be required to obtain both personnel and facility security clearances through the Office of Safeguards and Security. Costs associated with handling and protecting any such classified information shall be negotiated at the time the determination to proceed is made.

27. Liabilities and Losses

DOE assumes no liability with respect to any damages or loss arising out of any activities undertaken with the financial support of this grant.

28. Contracting Officer's Technical Representative (COTR)

The individual identified in Block 11. of the Notice of Financial Assistance Award as the DOE Project Officer is the Contracting Officer's Technical Representative (COTR). The COTR is responsible for 1) monitoring the research efforts being conducted by the Grantee under

the scope of this award; 2) advising the Contracting Officer on technical matters related to administration of the grant, including progress and status of the Grantee's research; and 3) providing technical advice and guidance to the Grantee in order to assist both the research efforts of the Grantee and the Grantee's adherence to the grant terms and conditions.

The COTR does not have the authority to:

Cause an increase or decrease in the total estimated cost of, or the time required for, the research effort being supported;

Cause any change in the express terms and conditions of the grant;

Cause any change in the objectives or scope of the effort being supported;

Act in the capacity of the Contracting Officer by issuing any approval or disapproval required by the terms and conditions of the grant;

Interfere with the Grantee's right to perform under the terms and conditions of the grant.

29. Interest

(a) Notwithstanding any other term or conditions of this grant, all amounts that become payable by the recipient to the Government under this grant shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of Treasury (Secretary) as provided in Section 11 of the Debt Collection Act of 1982 (31 U.S.C. 3717), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this provision, and then at the rate applicable for each three-month period as fixed by the Secretary until the amount is paid.

(b) Amounts shall be due at the earliest of the following dates:

(1) The date fixed under this grant.

(2) The date of the first written demand for payment consistent with this grant, including any demand resulting from a termination.

(3) The date the Government transmits to the recipient a proposed agreement to confirm completed negotiations establishing the amount of debt.

(c) The interest charge made under this provision may be reduced in accordance with the procedures prescribed in 4 CFR 102.13 or in accordance with agency regulations in effect on the date of original award of this grant.

STATEMENT OF WORK

1.0 INTRODUCTION

The goal of this grant is to support cost-shared research on geothermal resources in the State of Alaska. The Aleutian Islands-Alaska Peninsula region is known to be one of the largest geothermal energy resource areas of the United States, but the resource areas are remote and the population is scarce. The increased development of the American bottom-fish industry in the Bering Sea and the northern Pacific Ocean, and increased oil and gas exploration in the Bering Sea are generating an increased need for power in the region. The objectives of these resource assessment studies are to obtain new site specific data on one promising resource area, and to develop and document resource information for the entire region so that these data are available for future exploration and development activities.

Geothermal resource assessment will be conducted at the Geyser Bight KGRA which is the hottest and most extensive area of thermal springs in Alaska. A second task will involve the preparation and publication of a geotechnically-oriented geothermal resource map of the Aleutian Islands and the Alaska Peninsula region with supplemental information on fluid chemistry, temperatures, isotopic compositions, and geothermometry. This effort will document in new detail the state of knowledge of these geothermal resources.

2.0 SCOPE

Geyser Bight KGRA on Umnak Island is the hottest and most extensive area of thermal springs in Alaska but the resource has not been studied in detail. The Alaska DGGS will complete a detailed study of the fluid geochemistry of the Geyser Bight KGRA and will contribute to field geologic studies and mapping managed by the Geophysical Institute-University of Alaska under a separate grant. A detailed chemical model of fluid chemistry will be developed which will constrain deep reservoir temperatures, origins of fluids, and mixing between different fluids.

A second task will result in the preparation and publication of a four-color, geotechnically-oriented geothermal resource map of the Aleutian Islands and the Alaska Peninsula region. This map and accompanying circular will document maximum surface temperatures, estimated convective heat discharge and reservoir temperatures, and water and gas chemistry. A brief description will be provided for each geothermal resource site. The accessible heat energy base stored in the Aleutian arc volcanic systems will be discussed. The period of performance for these studies, including final reporting, will be 24 months.

3.0 APPLICABLE DOCUMENTS

The research described herein is abstracted from a proposal titled "Geothermal Resource Assessment in the Aleutian Islands and Alaska Peninsula," dated June 15, 1987, as revised on October 28, 1987. This proposal was submitted by the Geophysical Institute, University of Alaska and the Alaska Division of Geological and Geophysical Surveys in response to DOE-ID Program Research and Development Announcement (PRDA) for State Geothermal Research and Development - PRDA No. DE-PRO7-87ID12662.

4.0 TECHNICAL TASKS

The following tasks will be accomplished under this grant.

4.1 Geyser Bight KGRA Site-Specific Study

- 4.1.1 Contribute to field geologic mapping and interpretation to complete a 1:25,000-scale geologic map of Geyser Creek Valley and the surrounding area. Mapping information will include geological structures, quaternary valley-fill deposits, alteration, plutonic rocks, major contacts, and volcanic rocks. Information relating to volcanic hazards will be noted and evaluated. This task will be managed by the Geophysical Institute-University of Alaska (GI-UAK).
- 4.1.2 Fluid Chemistry Investigation of the Geyser Bight KGRA. Perform preliminary chloride-enthalpy and fluid-mineral equilibria analyses. Examine and evaluate results of chemical and isotopic geothermometers. Examine the results of analyses of stable isotope compositions. Collect additional water samples for geochemical and isotopic analyses during the 1988 field season and complete these analyses. Measure thermal spring flow rates and temperatures and estimate heat loss due to surface and near-surface discharge of thermal waters. Analyze water samples for major and minor and selected trace element constituents and for stable isotope composition. Refine a) the chloride-enthalpy model, b) the analyses of fluid mineral equilibria, c) estimates of reservoir temperatures, and d) the estimate of the source of reservoir recharge waters.
- 4.1.3 Analyze and interpret all new and existing geological and geochemical data, and then integrate with GI-UAK data to contribute to an integrated final report completed by GI-UAK data to contribute to an integrated final report completed by GI-UAK on the Geyser Bight geothermal study area. This

evaluation will include improved estimates of the reservoir temperatures and of the magnitude of the energy available for development.

4.2 Preparation of a 1:1,000,000 scale technical geothermal energy resource map for the Aleutian Islands-Alaska Peninsula region, and supporting documentation.

4.2.1 Prepare and publish a four-color, geotechnically-oriented resource map of the Aleutian Islands-Alaska Peninsula region. The color-coded map will show locations of all known geothermal sites between Buildir Island on the west and Becharof Lake on the east. Map information for each site will include maximum surface temperatures, estimated convective heat discharge, estimated reservoir temperatures, total dissolved solids, and land status.

The map will include larger-scale, more detailed insets of three to five of the most promising geothermal prospects in this region.

4.2.2 Compile tables of all available geochemical data on geothermal fluids. These tables will contain water chemistry, gas chemistry and stable isotope compositions of thermal springs, geothermal wells, fumaroles, and thermal and local waters (as appropriate); isotopic compositions of gases; estimates of temperatures of thermal water based on chemical equilibria and appropriate geothermal gases based on geothermometers.

4.2.3 Prepare and publish a circular designed to accompany the Geothermal Resource Map (Task 4.2.1) which will contain brief descriptions of each geothermal site located on the resource map, with the more important sites receiving greater emphasis. The circular will include summaries of any site-specific investigations which have been conducted and relevant references. The circular will also contain comprehensive tables and brief discussion of pertinent geochemical data collected by the DGGs.

5.0 REPORTS, DATA, AND OTHER DELIVERABLES

5.1 Management Records

Reports will be due as indicated on the Federal Assistance Reporting Checklist and the Report Distribution List.

5.2 Deliverables

Deliverables for this grant include the following: contributions to the GI-UAK geologic map of Geysers Creek Valley area; a report on the fluid geochemistry of the Geysers Bight KGRA (may be included as a chapter in the GI-UAK report); and contributions to the final report on the Geysers Bight KGRA study (Task 4.1). Deliverables for Task 4.2 include the four-color, 1:1,000,000 scale geothermal resource map for Aleutian Islands-Alaska Peninsula Region; tables of fluid geochemistry; and a circular accompanying the four-color resource map. A draft copy of all final deliverable items will be submitted to DOE-ID for review and comment not less than 45 days prior to the scheduled delivery of maps, tables or reports.

wp/Thorne

REPORT DISTRIBUTION LIST

Grant No. DE- FG07-88ID12744

Report/Plan	Form No.	Frequency	No. of Copies	Address
Federal Assistance Management Summary Report	EIA-459E	Q	1,1,1,1,1	a,b,c,d,e
Notice of Energy RD&D	DOE 538	O	1,1	a,f
Technical Progress Report	N/A	Q	1,1,1,1	a,b,d,e
Topical Report	N/A	A	1,4,1,1	a,b,d,e
Final Technical Report	N/A	F	1,4,1,1	a,b,d,e
Financial Status Report	SF 269	F	1,1,1	a,b,c

LIST OF ADDRESSEES

a. U.S. Department of Energy 785 DOE Place Idaho Falls, ID 83402 Attn: Trudy A. Thorne	f. U.S. Department of Energy Technical Information Center P.O. Box 62 Oak Ridge, TN 37830
b. Same as above Attn: Kenneth J. Taylor	
c. Same as above Attn: Earl Jones	
d. U.S. Department of Energy Forrestal Bldg., CE-342 1000 Independence Ave, SW Washington, DC 20585 Attn: Lew Pratsch	
e. University of Utah Research Institute Earth Science Laboratory 391 Chipeta Way, Suite C Salt Lake City, UT 84108-1295 Attn: Howard Ross	

U.S. DEPARTMENT OF ENERGY
FEDERAL ASSISTANCE REPORTING CHECKLIST

Grant No. DE-FG07-88ID12744
 Part V - Reporting Requirement

FORM EIA 453A
 (10/80)

FORM APPROVED
 OMB NO 1900-0127

1. Identification Number: DE-FG07-88ID12744	2. Program/Project Title: Geothermal Resource Assessment in the Aleutian Islands and Alaska Peninsula
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3. Recipient:
 State of Alaska, Geophysical Inst.

4. Reporting Requirements:	Frequency	No. of Copies	Addressees
PROGRAM/PROJECT MANAGEMENT REPORTING			
<input type="checkbox"/> Federal Assistance Milestone Plan			
<input type="checkbox"/> Federal Assistance Budget Information Form			
<input checked="" type="checkbox"/> Federal Assistance Management Summary Report	Q	1,1,1,1,1	a,b,c,d,e
<input type="checkbox"/> Federal Assistance Program/Project Status Report			
<input checked="" type="checkbox"/> Financial Status Report, OMB Form 269	F	1,1,1	a,b,c
TECHNICAL INFORMATION REPORTING			
<input checked="" type="checkbox"/> Notice of Energy RD&D	O	1,1	a,f
<input checked="" type="checkbox"/> Technical Progress Report	Q	1,1,1,1	a,b,d,e
<input checked="" type="checkbox"/> Topical Report	A	1,4*,1,1	a,b*,d,e
<input checked="" type="checkbox"/> Final Technical Report	F	1,4*,1,1	a,b*,d,e

FREQUENCY CODES AND DUE DATES:

- A - As Necessary; within 5 calendar days after events.
- F - Final; 90 calendar days after the performance of the effort ends.
- O - Quarterly; within 30 days after end of calendar quarter or portion thereof.
- Q - One time after project starts; within 30 days after award.
- X - Required with proposals or with the application or with significant planning changes.
- Y - Yearly; 30 days after the end of program year. (Financial Status Reports 90 days).
- S - Semiannually; within 30 days after end of program fiscal half year.

5. Special Instructions:
 *3 copies plus a camera-ready copy

6. Prepared by: (Signature and Date) <i>Ken Taylor</i> 1-27-88	7. Reviewed by: (Signature and Date) <i>Stacy Thomas</i> 3/1/88
--	---

STATE OF ALASKA

Steve Cowper, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

400 Willoughby Bldg. 3rd fl

Juneau, Alaska 99801

(907) 465-2520

March 12, 1990

Dr. Howard Ross
University of Utah Research Institute
Earth Science Laboratory
391 Chipeta Way, Suite A
Salt Lake City, Utah 84108

Dear Howard:

Sorry for the delay in getting this information to you.
Call or write if I can be of any more help.

Sincerely,

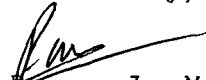

Roman J. Motyka
Geologist

Table. Population centers near known geothermal resources in Alaska.

Municipality	Population	Resource Name	Type	T, °C	Reservoir Est. T, °C
Incorporated:					
✓ Akutan	432	Hot Springs Bay	HS & fum	84	190
✓ Atka	90	Kiushof	HS & fum	50 - 100	170 - 300
Elie	294	Kuiniuk	HS	41	
"	"	Cleer Creek	HS	65	
✓ Tenakee Springs	108	Tenakee	HS	41	63
"	"	"	Well - 18 m	38	
✓ Unalaska	2,225	Summer Bay	HS	35	
"	"	"	Well - 30 m	50	
"	"	Hekushin	HS & fum	100 - 150	
"	"	"	Well - 600 m	95	225
Unincorporated:					
Adak	~2,000	Adak	HS	57	160 - 190
"	"	"	Well - 600 m	60	
Baranof Main Springs	unk.	Baranof	HS	50	93
Bell Island	unk.	Bell Island	HS	74	135
Chena Hot Spring	unk.	Chena	HS	63	130 - 145
Circle Hot Spring	unk.	Circle	HS	58	130 - 145
Manley	unk.	Manley	HS	59	70 - 130
Melzi	unk.	Melzi	HS	55	124

Type: HS = hot spring; fum = fumarole; Well-depth in meters.

Temperatures: maximum surface temperature of well temperature.

Reservoir temperatures: estimated from geothermometers.

unk. — probably less than 50

~ 6,500

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

March 19, 1990

Mr. Ken Osborne
U. S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

Dear Mr. Osborne:

I am requesting a no-cost time extension for Grant No. DE-FG07-88ID122744, "Geothermal resource assessment in the Aleutian Islands and Alaska Peninsula". Our present agreement calls for project completion by April 11, 1990. We would like to extend this deadline to January 31, 1991.

The current statuses of the two tasks funded by this grant are as follows:

Task 1 - "Fluid geochemical study of the Geyser Bight KGRA on Umnak Island." A draft of the final report on the fluids study is about 85 per cent completed. Work on integrating this study with the companion geologic study by U. of Alaska, Fairbanks project scientists is about 50 per cent completed. Target completion date for the final integrated report is April 15, 1990.

Task 2 - "Technical geothermal resources map of the Aleutian Islands and the Alaska Peninnsula." Work on this map is about 50 per cent completed. Further work has been suspended pending completion of the Umnak Island study. Target completion date is now January 31, 1991.

The reasons for the delays in project completion are as follows:

1. Man power shoratges. Deep cuts in state budget have resulted in reducing ADGGS staff by nearly half during the past three years. Priority projects and day to day operations have placed heavy burdens on remaining staff.
2. New staff. We were finally able to add new staff but not until December, 1990. Interviewing candidates and training of the new staff took up much of my time last fall and winter.

STEVE COWPER, GOVERNOR

- Rec'd 03/22/90
WMM
- 3700 AIRPORT WAY (DNR Building)
FAIRBANKS, ALASKA 99709-4609
PHONE: (907) 451-2760, 474-7147
 - P.O. BOX 772116
EAGLE RIVER, ALASKA 99577-2116
PHONE: (907) 696-0070
 - 3601 "C" STREET, SUITE 1236
P.O. BOX 107005
ANCHORAGE, ALASKA 99510-7005
PHONE: (907) 762-2356
 - 400 WILLOUGHBY AVENUE, 3RD FLOOR
JUNEAU, ALASKA 99801
PHONE: (907) 465-2520

3. Mt. Redoubt euption. One of the principle investigators, Dr. Chris Nye, was assigned to aid in directly monitoring the potentially hazardous eruptive activity of Mt. Redoubt volcano near Anchorage, Alaska. I have also been involved but only in an advisory capacity. The eruptive activity began last December just as Dr. Nye and I were planning to complete drafts and start intergration of the final Umnak report. Flooding associated with the eruptive activity threatens an oil tank farm and terminal near the shores of Cook Inlet. Ash plumes have disrupted air traffic in and out of Anchorage.

4. Juneau hydrogeologic study. The proposed reopening of a major gold mine in Juneau has raised public concerns about the potential impacts this mining operation may have on the city's ground-water supply. Last December, the City and Borough of Juneau requested the help of the ADGGS Juneau Office in assessing potential problems and asked that we prepare a proposal for any further studies that we felt were warranted. Because of the immediacy of the problem, dealing with this issue took precedence over other tasks. As senior geologist in the Juneau ADGGS office much of my time had to be spent dealing with this controversial issue.

Factors which will now allow fulfilling our obligations to the U.S. Department of Energy are as follows:

1. New staff has been added to the Juneau office. They will help in sharing office work loads, releasing my time to work on the Umnak and the Aleutian Islands map projects. These staff will also be able to assist in these geothermal projects.
2. Preliminary work on the Juneau hydrogeology study has now been completed and further work temporarily suspended. The Mt. Redoubt priority has been reduced. Top priority has now been given to completing Umnak report.
3. With completion of the Umnak report, and with added staff and re-arrangement of priorities, we can return to working on the completion of the technical resources map.

Our revised time table is as follows:

March 31, 1990 - completion of draft reports on Geyser Bight study.

April 15, 1990 - completion and submission of joint integrated Geyser Bight report; return to working on Aleutians geothermal technical resources map.

Summer, 1990 - field work for other ADGGS projects;
time off for mandatory leave without pay status.

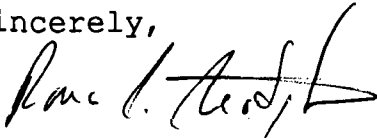
October 31, 1990 - completion of data tables and first
draft of accompanying circular for map; submission to
publications section for editing and review and for map
layout.

December 31, 1990 - completion of draft version of
technical resources map for external and U.S.
Department of Energy review.

January 31, 1991 - incorporation of comments,
submission for color reproduction, and project
completion.

I apologize for the delays in completing this work. Please
contact me if you have any questions or require
clarification.

Sincerely,



Dr. Roman J. Motyka
Senior Geologist

cc Ken Taylor, US DOE
Dr. Howard Ross, UURI
Dr. Chris Nye, ADGGS and UAF
Paula Verosta, ADGGS

UNIVERSITY OF UTAH RESEARCH INSTITUTE

UURI

EARTH SCIENCE LABORATORY
391 CHIPETA WAY, SUITE C
SALT LAKE CITY, UTAH 84108-1295
TELEPHONE 801-524-3422

M E M O R A N D U M

TO: Kenneth Taylor, DOE/ID DATE: March 27, 1989

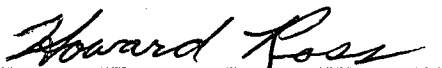
FROM: Howard P. Ross

RE: Annual Budget Review, Grant No. DE-FG07-88ID122744, State of Alaska, Division of Geological & Geophysical Surveys

The State of Alaska, Division of Geological & Geophysical Surveys (AK-DGGS) has completed the preliminary studies and field work of Task 1, Fluid geochemical study of the Geyser Bight KGRA on Unmak Island. Geochemical analyses of fluid samples has been largely completed and UURI is now completing comparative analyses of residual thermal water samples. The interpretation of fluid chemistry and isotope results is in progress and preliminary results have been reported in quarterly reports. One noteworthy result is the discovery of a previously unreported fumarole field south of Geyser Bight Valley, during field studies.

Work is on schedule for Task 2, Technical Geothermal Resources Map of the Aleutian Islands and the Alaska Peninsula. Map layouts, table formats and the content of the information circular have already been defined.

The DOE cost share through April 11, 1989, \$42,168 is appropriate to the work completed to date and the project should be completed within the total project cost to DOE of \$72,000.



Howard P. Ross
Project Manager

HPR:kr



ALASKA - Dept. Natural Resources

VOUCHER RECORD

Voucher #	Amount	# DOE Added	Σ \$ billed	# Left	billed thru	date of voucher	COMMENTS
0		\$72,000.-					4/18/1988
1	\$38,033.94		38,033.94	33,966.06	3/30/89	3/30/89	Rec. 5/01/89
2	14,078.56		52,112.50	19,887.50	4/11- 7/7/89	7/7/89	dur. vacat. Rec 8/01/89
3	13,839.62 <small>by phone pm B</small>		65,952.12	6,047.88	-12/31/90	1/29/91	by phone pm B 3/11/91 rec 3/25/91
4 th	6,047.88		72,000.00	0,000.00 -1,000	-1/31/92	3/5/92	Withheld 1,000.- pending final report.

Handwritten scribble or mark at the top center of the page.

Handwritten scribble or mark in the upper right quadrant of the page.

Final Payment Request
March 5, 1992

ROUTING AND TRANSMITTAL SLIP Date 3-18-92

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. <u>P. A. Brockshier</u> *	<u>PB</u>	<u>4/10</u>
2. <u>D. Hoffer</u>		
3.		
4.		
5.		

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS

State of Alaska
ID 13744

* See note under signature

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
<u>Bridget Shover</u> <i>etc.</i>	<u>619</u>
	Phone No.
	<u>6-5543</u>

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

INVOICE COVERSHEET

ADVANCE _____

D. Haffer
CONTRACTING OFFICER

P.A. Brookshier
TECHNICAL MONITOR

PAYEE State of Alaska

DUE DATE: 4/23/92

PROMPT PAYMENT ACT:
YES _____ NO P _____

CID FD 12744 LOG XID 661062 1 _____ 9 _____

FUNDS RECORD INPUT

CID: _____ MOD#: _____

ALLT. _____ FUND TYPE _____ FIN PLAN: _____ DCS: _____

CHECKSUM: _____

XID	STD MAP CODE*	REL XID	B&R	COST CTR	OBJ CLASS	OPI	AMOUNT	SUPPL DATA
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NOTES: _____

REQUEST FOR ADVANCE OR REIMBURSEMENT

Approved by Office of Management and Budget, No. 80-RO183 PAGE 1 OF 1 PAGES

1. TYPE OF PAYMENT REQUESTED	a. "X" one, or both boxes		2. BASIS OF REQUEST
	<input type="checkbox"/> ADVANCE	<input checked="" type="checkbox"/> REIMBURSEMENT	
	b. "X" the applicable box		
	<input checked="" type="checkbox"/> FINAL	<input type="checkbox"/> PARTIAL	<input type="checkbox"/> ACCRUAL

(See instructions on back)

3. FEDERAL SPONSORING AGENCY AND ORGANIZATIONAL ELEMENT TO WHICH THIS REPORT IS SUBMITTED U.S. DOE Idaho Operations Office	4. FEDERAL GRANT OR OTHER IDENTIFYING NUMBER ASSIGNED BY FEDERAL AGENCY DE-FG07-88ID12744	5. PARTIAL PAYMENT REQUEST NUMBER FOR THIS REQUEST 4
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6. EMPLOYER IDENTIFICATION NUMBER 92-6001185	7. RECIPIENT'S ACCOUNT NUMBER OR IDENTIFYING NUMBER GR 38114	8. PERIOD COVERED BY THIS REQUEST	
		FROM (month, day, year) 4/11/88	TO (month, day, year) 1/31/92

9. RECIPIENT ORGANIZATION Name : State of Alaska Department of Natural Resources Division of Geological & Geophysical Surveys Number and Street : 794 University Avenue, Suite 200 Fairbanks, Alaska 99709-3645 City, State and ZIP Code :	10. PAYEE (Where check is to be sent is different than item 9) Name : RECEIVED MAR 18 1992 Number and Street : City, State and ZIP Code :
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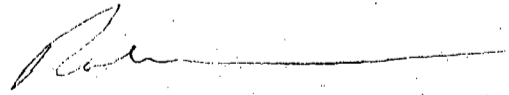
11. COMPUTATION OF AMOUNT OF REIMBURSEMENTS/ADVANCES REQUESTED

PROGRAMS/FUNCTIONS/ACTIVITIES ▶	(a)	(b)	(c)	TOTAL
Geothermal Resource Assessment				
a. Total program outlays to date (As of date) 1/31/92	\$ 112,469.00	\$	\$	\$ 112,469.00
b. Less: Cumulative program income	-0-			-0-
c. Net program outlays (Line a minus line b)	112,469.00			112,469.00
d. Estimated net cash outlays for advance period	-0-			-0-
e. Total (Sum of lines c & d)	112,469.00			112,469.00
f. Non-Federal share of amount on line e	40,469.00			40,469.00
g. Federal share of amount on line e	72,000.00			72,000.00
h. Federal payments previously requested	65,952.12			65,952.12
i. Federal share now requested (Line g minus line h)	6,047.88			6,047.88
j. Advances required by month, when requested by Federal grantor agency for use in making prescheduled advances	1st month			
	2nd month			
	3rd month			

12. ALTERNATE COMPUTATION FOR ADVANCES ONLY

a. Estimated Federal cash outlays that will be made during period covered by the advance	\$
b. Less: Estimated balance of Federal cash on hand as of beginning of advance period	
c. Amount requested (Line a minus line b)	\$

13. CERTIFICATION

I certify that to the best of my knowledge and belief the data above are correct and that all outlays were made in accordance with the grant conditions or other agreement and that payment is due and has not been previously requested.	SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL 	DATE REQUEST SUBMITTED March 5, 1992
	TYPED OR PRINTED NAME AND TITLE Robert R. Groner Accounting Technician	TELEPHONE (AREA CODE, NUMBER, EXTENSION) (907) 474-7147

This space for agency use

Total Invoiced \$ _____

Less Amount Withheld \$ _____

Total Approved \$ _____

Authorized Signature _____ Date _____

Work covered by this invoice was performed satisfactorily to the best of my knowledge.

Approved by 
Accounting Technician

Date: 4/10/92

They have submitted the cost report. It is still in review. I recommend that we withhold \$1,000 until we get the final report.