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UNIVERSITY OF UTAH RESEARCH INSTITUTE

UURI


EARTH SCIENCE LABORATORY
420 CHIPETA WAY, SUITE 120
SALT LAKE CITY, UTAH 84108
TELEPHONE 801-581-5283

MEMORANDUM

September 2, 1982

TO: Susan M. Prestwich, Program Manager
FROM: Carl A. Ruscetta, Technical Program Coordinator
SUBJECT: North Dakota Geothermal Resource Assessment
Contract DE-FC07-79ID12030

Enclosed please find the completed contract and deliverables summary for the subject contract. All deliverable requirements have been met for this contract and copies of all maps and reports listed are on file at ESL/UURI and/or DOE Idaho Falls.


Carl A. Ruscetta

CAR:gm

enclosure

cc: D. Foley

2/16/83

NOTE: CONTRACT REOPENED 12/15/83 WITH MOD 008
N.C.T.E. TO 9/30/83, SPECIAL PROJECT BY W. GOSNOLD - ADD'L
HEAT FLOW AND DEEP WELL TEMP. GRAD. STUDIES. PROPOSAL
ACCEPTED BY DOE/ID. C. RUSCETTA

UURI

EARTH SCIENCE LABORATORY
420 CHIPETA WAY, SUITE 120
SALT LAKE CITY, UTAH 84108
TELEPHONE 801-581-5283

August 20, 1982

TO: Ken L. Harris
North Dakota Geological Survey
Grand Forks, ND 58202

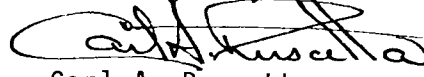
FROM: C. A. Ruschetta, Technical Program Coordinator

SUBJECT: 1. Draft of N.D. Phase III Final Report Direct Heat Program
2. Return of Roundup Conference Paper Original

I have completed my review of your phase III report and have no corrections or modifications to suggest. I wish to extend my personal congratulations to you and your team for a job well done. Dr. Foley and Susan Prestwich will be conducting separate reviews. From my standpoint, it would appear that the phase III report satisfies the deliverables required in your contract DE-FC07-79ID12030 MOD A006. When you publish the report, please send 3 copies bound and 1 copy unbound to Ms. Prestwich and one copy to us.

Please also find enclosed the original manuscript and exhibits for the paper presented at the RA Program Roundup Conference. My thanks to you for helping to make that meeting a success.

Best regards,



Carl A. Ruschetta

CAR:jp

cc: S. M. Prestwich
D. Foley

- 11/Mod6 - Fox Hills and Hell Creek Formation maps have been put together by Ray Butler, formerly with the USGSWRD in Bismarck. Ray's maps describe structural, chemical, and piezometric aspects of important Cretaceous and Tertiary aquifers. These maps are being jointly published by the USGS, North Dakota State Health Department and the NDGS. The time schedule for publication is uncertain. If these maps are published in time to be incorporated in our Phase III report we will summarize them there, if not they will be referenced as a separate source.
- 12/Mod6 - Most of our existing water quality data was summarized in the Phase II report. The Phase III report will add water quality data on Pleistocene aquifers and summarize all existing water quality data in our computer files.
- 13/Mod6 - The Phase II report will contain an aquifer "catalog" of our depth, thickness, water quality and expected temperature data. A project summary is scheduled to be presented at the AAPG International Convention in Calgary, Alberta, Canada in June of 1982. We feel that this will satisfy the published report requirement.
- 14/Mod6 - We maintain a cooperative relationship with the North Dakota Commercialization Team as well as other interested parties desiring site specific data.
- 15/Mod? - We have initiated a NCTE to 8/1/82.

PUBLICATIONS ENCLOSED

- Harris, Kenneth L., Winczewski, Laramie M., Umphrey, Howard R., and Anderson Sidney B., 1980, An Evaluation of Hydrothermal Resources of North Dakota; Phase I Final Technical Report: University of North Dakota Engineering Experiment Station Bulletin Number 80-03-EES-02, 176 pages.
- Harris, Kenneth L., Anderson, Sidney B., Umphrey, Howard R., Howell, Francis L., Winczewski, Laramie M., and Gaugler, Bruce A., 1981, Geothermal Resources of North Dakota: North Dakota Geological Survey, Grand Forks, Map Scale 1:500,000.
- Harris, Kenneth L., Howell, Francis L., Winczewski, Laramie M., Wartman, Brad L., Umphrey, Howard R., and Anderson, Sidney B., 1981, An Evaluation of Hydrothermal Resources of North Dakota; Phase II Final Technical Report: University of North Dakota Engineering Experiment Station Bulletin Number 81-05-EES-02.
- Harris, Kenneth L., Winczewski, Laramie M., Umphrey, Howard R., 1982, Computer Management of Geologic and Petroleum Data at the North Dakota Geological Survey: North Dakota Geological Survey Report of Investigation No. 74, 34 pages.

NORTH DAKOTA

L. L. Mink

File

M 2.7

February 8, 1979

RECEIVED
FEB 12 1979
GEOTHERMAL ENERGY
BRANCH

University of North Dakota
University Station
Grand Forks, North Dakota 58202

Attention: Kenneth L. Harris, Principal Investigator

Subject: COOPERATIVE AGREEMENT NO. DE-FC07-79ID12030

Gentlemen:

We are enclosing four copies of the above-subject Cooperative Agreement. If satisfactory to you, please have three copies signed by an authorized official, have this signature witnessed by two persons, and affix your legal seal. These three signed copies should then be returned to this office for signature by the Contracting Officer (at which time the "entered into date" will be filled in). The fourth copy is for your files pending receipt from this office of one fully executed copy.

Very truly yours,

/s/ Kent R. Hastings, Attg.

Lois D. Anderson, Chief
Contract Negotiation Branch
Contracts Management Division

CM

Enclosures:
Cooperative Agreement (4)

bcc w/encl:
L. L. Mink
Mary Parks
J. P. Anderson
Ms. Ann Hill, Office of Congressional Affairs, DOE-HQ

CNB
AGDixon:mh
2/8/79

CNB
LDAnderson

U. S. DEPARTMENT OF ENERGY COOPERATIVE AGREEMENT PURSUANT TO AUTHORITY OF PL. 93-418, PL. 93-438, PL. 93-473, PL. 93-577, and PL. 93-91		1 a. Agreement No DE-FC07-79ID12030	1 b. Modification No								
3 Participant Name and Address University of North Dakota University Station Grand Forks, ND 58202		2 Agreement Period From Jan. 15, 1979 to Jan. 14, 1980									
5 Project Title Hydrothermal Resources of North Dakota		4 Participant Type <input checked="" type="checkbox"/> Educational <input checked="" type="checkbox"/> Nonprofit <input type="checkbox"/> State or Local Government <input type="checkbox"/> Profit									
6 Principal Investigator(s) or Program Director(s) Name and Address Kenneth L. Harris Engineering Experiment Station University of North Dakota University Station P.O. Box 8103 Grand Forks, ND 58202		8 Project Will Be Conducted For See Article <u>I</u>									
10 Accounting and Appropriation Data		7 Technical Reports Are Required See Article <u>V</u>									
12 Submit Vouchers, if any, to Agreements Officer Unless Otherwise Specified in this Block Director, Contracts Management Division, 550 Second Street Idaho Falls, ID 83401		9 DOE Program Officer (Name and Address) Leland L. Mink, E&T Division Idaho Operations Office, DOE 550 Second Street, Idaho Falls, ID 83401 Telephone No (208)526-0638									
13 Funding Sources <table border="1"> <thead> <tr> <th>Source</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>DOE</td> <td>\$ 41,597.00</td> </tr> <tr> <td>Participant</td> <td>\$ 9,547.00</td> </tr> <tr> <td>Total Funding</td> <td>\$ 51,144.00</td> </tr> </tbody> </table>		Source	Amount	DOE	\$ 41,597.00	Participant	\$ 9,547.00	Total Funding	\$ 51,144.00	11 Method of Payment <input type="checkbox"/> % At Award % When Requested 5% Upon Receipt of Final Report <input type="checkbox"/> Letter of Credit <input type="checkbox"/> Reimbursement <input checked="" type="checkbox"/> Other (specify) See Article <u>III</u>	
Source	Amount										
DOE	\$ 41,597.00										
Participant	\$ 9,547.00										
Total Funding	\$ 51,144.00										
14 Amount obligated by this action \$ 41,597.00		14 Remarks									
15 DOE Issuing Office (Name and Address) Idaho Operations Office 550 Second Street Idaho Falls, Idaho 83401		18 Participant Acceptance By <u>Earl J. Freise</u> Signature of Authorized Official									
16 GOF Cooperative Agreements Officer _____ (Signature) _____ (Date) Name (typed) R. E. Simonds Title Director, Contracts Mgmt. Division Telephone No (208) 526-1347		Name (typed) Earl J. Freise Title Office - Research & Program Development									

<p>ID FORM-182 (Rev. 10-77)</p> <p align="center">U. S. DEPARTMENT OF ENERGY</p> <p align="center">COOPERATIVE AGREEMENT</p> <p align="center">PURSUANT TO AUTHORITY OF PL 93-410, PL 93-438, PL 93-473, PL 93-577, and PL 95-91</p>	<p>1.a. Agreement No. DE-FC07-79ID12030</p>	<p>1.b. Modification No.</p>								
<p>3. Participant Name and Address</p> <p>University of North Dakota University Station Grand Forks, ND 58202</p>	<p>2. Agreement Period</p> <p>From: Jan. 15, 1979 To: Jan. 14, 1980</p>									
<p>5. Project Title</p> <p>Hydrothermal Resources of North Dakota</p>	<p>4. Participant Type</p> <p><input checked="" type="checkbox"/> Educational <input checked="" type="checkbox"/> Nonprofit <input type="checkbox"/> State or Local Government <input type="checkbox"/> Profit</p>									
<p>8. Principal Investigator(s) or Program Director(s) Name and Address</p> <p>Kenneth L. Harris Engineering Experiment Station University of North Dakota University Station P.O. Box 8103 Grand Forks, ND 58202</p>	<p>6. Project Will Be Conducted Per</p> <p>See Article <u>I</u></p>									
<p>10. Accounting and Appropriation Data</p>	<p>7. Technical Reports Are Required</p> <p>See Article <u>V</u></p>									
<p>12. Submit Vouchers, if any, to Agreements Officer, Unless Otherwise Specified in this Block</p> <p>Director, Contracts Management Division, 550 Second Street Idaho Falls, ID 83401</p>	<p>9. DOE Program Officer (Name and Address)</p> <p>Leland L. Mink, E&T Division Idaho Operations Office, DOE 550 Second Street, Idaho Falls, ID 83401 Telephone No. (208)526-0638</p>									
<p>13. Funding Sources</p> <table border="0"> <thead> <tr> <th>Source</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>DOE</td> <td>\$ <u>41,597.00</u></td> </tr> <tr> <td>Participant</td> <td>\$ <u>9,547.00</u></td> </tr> <tr> <td>Total Funding</td> <td>\$ <u>51,144.00</u></td> </tr> </tbody> </table>	Source	Amount	DOE	\$ <u>41,597.00</u>	Participant	\$ <u>9,547.00</u>	Total Funding	\$ <u>51,144.00</u>	<p>11. Method of Payment</p> <p><input type="checkbox"/> % At Award. <input type="checkbox"/> % When Requested. <input type="checkbox"/> 5% Upon Receipt of Final Report <input type="checkbox"/> Letter of Credit <input type="checkbox"/> Reimbursement</p> <p><input checked="" type="checkbox"/> Other (specify) See Article <u>III</u></p>	
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Participant	\$ <u>9,547.00</u>									
Total Funding	\$ <u>51,144.00</u>									
<p>15. Amount Obligated By This Action \$ <u>41,597.00</u></p>	<p>14. Remarks:</p>									
<p>16. DOE Issuing Office (Name and Address)</p> <p>Idaho Operations Office 550 Second Street Idaho Falls, Idaho 83401</p>	<p>17. DOE Cooperative Agreements Officer</p> <p>_____ (Signature) _____ (Date)</p> <p>Name (typed) <u>R. E. Simonds</u></p> <p>Title <u>Director, Contracts Mgmt. Division</u></p> <p>Telephone No. <u>(208) 526-1347</u></p>									
<p>18. Participant Acceptance</p> <p>By _____ Signature of Authorized Official</p> <p>Name (typed) _____</p> <p>Title _____</p>										

COOPERATIVE AGREEMENT

THIS AGREEMENT, entered into the 7th day of March 1979 (effective as of the 15th day of January 1979), by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), acting through the DEPARTMENT OF ENERGY (hereinafter called "DOE") with its Idaho Operations Office located at 550 Second Street in Idaho Falls, Idaho 83401, and the UNIVERSITY OF NORTH DAKOTA (hereinafter called the "Participant") located at Grand Forks, North Dakota;

WITNESSETH THAT:

WHEREAS, the Government is interested in the evaluation and development of hydrothermal resources in North Dakota; and

WHEREAS, the Participant has proposed to undertake such a program and DOE desires to provide certain financial assistance for the accomplishment of such a program; and

WHEREAS, this Agreement is authorized by the Department of Energy Organization Act (Public Law 95-91), Sections 7(a)(2) and 8 of Public Law 93-577, and Sections 103(5) and 107(a) of Public Law 93-438;

NOW, THEREFORE, DOE and the Participant agree as follows:

ARTICLE I - STATEMENT OF JOINT OBJECTIVE

The direct application of hydrothermal energy at various sites located within North Dakota can be a significant factor in the Government's efforts to achieve energy independence. The research provided for in this Agreement is important to both the Government and the Participant for estimating the potential of hydrothermal energy utilization and for fostering its use in North Dakota.

ARTICLE II - DESCRIPTION OF RESPONSIBILITIES

The Participant is responsible to assure that the research is accomplished in a manner consistent with the provisions of this Agreement. The Participant's proposal identified as an evaluation of hydrothermal resources of North Dakota, as it may have been amended, is made part of this Agreement by this reference; however, if there is any conflict between the content of the proposal and the content of this Agreement, the content of this Agreement governs. The tasks provided for in the proposal are to be accomplished, and are to result in, a final report which will include, as a minimum, the following information:

ARTICLE II - DESCRIPTION OF RESPONSIBILITIES (Cont'd)

Task 1

Summarize existing bottom hole data from approximately 6,500 oil and gas well logs on file with the North Dakota Geological Survey (NDGS) to evaluate the geothermal potential in North Dakota.

Task 2

Produce computer generated maps showing location, depth and expected temperatures of potential hydrothermal reservoirs.

Task 3

Using existing information evaluate the water quality of the Madison aquifer and other potential hydrothermal reservoirs in North Dakota.

Task 4

Publish and make available final reports and maps generated indicating the geothermal potential of North Dakota.

The Participant is also responsible for cost-sharing to the extent provided for in Article III, "Financial Support of the Project."

ARTICLE III - FINANCIAL SUPPORT OF THE PROJECT

A. The total estimated cost of performing the work under this Agreement is Fifty-One Thousand One Hundred Forty-Four Dollars (\$51,144.00). For performance of work under this Agreement, the agreed share ratio is 81.33% DOE, 18.67% Participant of total allowable costs. The Participant shall be reimbursed by DOE for not more than 81.33% of the costs of the project determined to be allowable in accordance with Article A-I of the General Provisions entitled "Allowable Costs." The remaining 18.67% or more of the costs of the project so determined shall constitute the Participant's share for which it will not be reimbursed by DOE. The total cost to DOE is hereby established as Forty-One Thousand Five Hundred Ninety-Seven Dollars (\$41,597.00), and this amount is also the maximum amount of the project which is subject to reimbursement by DOE unless such maximum cost is changed in writing by the Contracting Officer.

B. As regard to any increase or decrease in the total estimated cost of this Agreement as a result of any change in the original Statement of Work as may be agreed upon by the parties during the term of this Agreement, the appropriate sharing of the funding, if any, of such increase or decrease shall be shared at the ratio of 81.33% DOE, 18.67% Participant, as agreed upon above.

ARTICLE III - FINANCIAL SUPPORT OF THE PROJECT (Cont'd)

C. The amount of funds obligated under this Agreement by DOE for the period from January 15, 1979 through January 14, 1980 is Forty-One Thousand Five Hundred Ninety-Seven Dollars (\$41,597.00).

ARTICLE IV - METHOD AND BASIS OF PAYMENT

A. The Participant shall receive 25% of DOE's share Ten Thousand Three Hundred Ninety-Nine Dollars (\$10,399.00) at the time this Agreement is executed. The balance becomes payable in periodic installments as requested by the Participant and approved by DOE. Requests for payment shall not be more frequent than monthly, and the request should contain a cost breakdown showing the amount requested, the total amount requested to date, and the total cost of the project to date, including the value of the Participant's cost-sharing as provided for in Article III of this Agreement. The total amount paid by DOE will not exceed the amount specified in Article III.

B. Final payment will not be made until the Final Report is received and accepted by the Contracting Officer. In no event will the final 5% of the amount of obligated funds be paid to the Participant until DOE has received the Final Report and the Final Cost Report described in Article VII.A.1 of this Cooperative Agreement.

ARTICLE V - TERM OF AGREEMENT

Work under this Agreement shall be accomplished during the period from January 15, 1979 through January 14, 1980. The period of this Agreement may be extended as mutually agreed upon by DOE and the Participant.

ARTICLE VI - PROJECT MANAGEMENT

A. In addition to DOE personnel, the Participant agrees to permit non-DOE personnel who are under contract with DOE, and identified from time to time by the Contracting Officer, to assist the DOE representative in performance of his duties and to have necessary access to the Participant's and major subcontractors' records pertaining to the project. DOE correspondence, if any, with subcontractors shall be routed through the Participant.

B.1. DOE's Program Officer on this project and the person who shall be the Participant's contact for all matters pertaining to this Agreement shall be the following-named person or such other person(s) as may be designated by the Contracting Officer:

ARTICLE VI - PROJECT MANAGEMENT (Cont'd)

Leland L. Mink
Energy and Technology Division
Idaho Operations Office, DOE
550 Second Street
Idaho Falls, Idaho 83401
Telephone 208-526-0638

2. The Participant's Project Director for the work under this Agreement will be the following person or such other person(s) as may be mutually acceptable to the parties:

Mr. Kenneth L. Harris
Principal Investigator
Engineering Experiment Station
University of North Dakota
University Station P.O. Box 8103
Grand Forks, ND 58202
Telephone 701-777-2231

C. The term "DOE" means the United States Department of Energy or any duly authorized representative thereof, including the Contracting Officer, except for the purpose of deciding an appeal under the article entitled "Disputes."

D. The term "Contracting Officer" means the person executing this Agreement on behalf of DOE, and includes his successors or any duly authorized representative of such person.

ARTICLE VII - PROJECT INFORMATION

A. Project Information Reports, as required by DOE Uniform Contractor Reporting System, Volume 1, February 1978, and as indicated on the attached DOE Form CR-537, January 1978, shall be submitted to the DOE Program Officer in accordance with the special instructions.

B. Quarterly progress meetings will be held which the Participant is required to attend. DOE will fund travel expenses for one member of the Participant's team.

ARTICLE VIII - CHANGES AND MODIFICATIONS

Any changes or modifications to this Agreement or in the scope of work to be performed shall be made by mutual written agreement of the parties. A change may be initiated by either party to this Agreement. The Contracting Officer shall have the authority to determine what constitutes a change.

ARTICLE IX - TERMINATION

A. It is the express intent of DOE and the Participant to fund their respective cost participation for the project.

B. Notwithstanding the foregoing, it is understood that the Participant may at any time upon giving sixty (60) days prior written notice to DOE terminate this Agreement for its convenience for any reason.

C. In the event of termination, it is expected that the parties will cooperate with each other to reasonably phase out the Participant's costs and cost commitments, including cost liabilities to third parties; provided, however, that the total amount obligated by the Government under this Agreement shall not be exceeded. Moreover, upon any such termination the Participant agrees to promptly, upon DOE's request, transfer to DOE all information resulting from the work performed to the date of the termination notice.

D. In the event of termination, the Government agrees to pay the Participant 81.33% of all allowable costs incurred prior to termination, and the Participant shall:

1. Place no further orders or subcontracts for materials, services, or facilities intended to be invoiced to the Government for its contribution.

2. Cancel all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination and intended to be invoiced to the Government for its contribution.

3. Notwithstanding 1. and 2. above, the Participant has the right to proceed with such orders and subcontracts should it decide to continue performance of the work at its expense only.

E. After a termination, the Participant shall submit to the Contracting Officer its termination claim. Such claim shall be submitted promptly but in no event later than one (1) year from the effective date of termination unless one or more extensions in writing are granted by the Contracting Officer. Upon failure of the Participant to submit its termination claim within the time allowed, the Contracting Officer may determine, on the basis of information available to him, the amount, if any, due to the Participant by reason of the termination and shall thereupon pay to the Participant the amount so determined.

F. Costs claimed, agreed to, or determined pursuant to this article must constitute allowable costs as defined in Article A-1 of the Appendix A of this Agreement.

ARTICLE IX - TERMINATION (Cont'd)

G. Any termination notice rendered by either DOE or the Participant shall be sent by registered mail with return receipt requested.

H. If in the opinion of the Contracting Officer, the Participant fails to substantially perform under this Agreement, and does not cure such failure within a reasonable time, after written notice of such failure by the Contracting Officer, DOE may by written notice to the Participant terminate this Agreement. Such termination notice, signed by the Contracting Officer, shall be effective upon receipt by the Participant. The Government shall not be liable for the incurrence of any obligations under this Agreement from the date of the receipt of such termination notice. Upon any such termination, the Participant agrees to promptly, upon DOE's request, transfer to DOE all information resulting from the work performed to the date of the termination notice.

I. Except with respect to defaults of subcontractors, the Participant shall not be in default by reason of failure to substantially perform under this Agreement if such failure arises out of causes beyond the control and without the fault or negligence of the Participant. Such causes may include, but are not restricted to, acts of God or of the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather, but in every case the failure to perform must be beyond the control and without the fault or negligence of the Participant. If the failure to substantially perform is caused by the failure of a subcontractor to perform or make progress, and if such failure arises out of causes beyond the control of both the Participant and a subcontractor, and without the fault or negligence of either of them, the Participant shall not be deemed to be in default unless the supplies or services to be furnished by the contractor were reasonably obtainable from other sources. Upon request of the Participant, if the Contracting Officer shall determine that failure to perform was occasioned by any one or more of the said causes, this Agreement shall be revised accordingly, subject to the rights of DOE under paragraph B. above.

ARTICLE X - LIABILITY AND INDEMNIFICATION

The Government will not be liable for payment of damages for injuries to any person, or loss of life or personal property, or loss suffered or sustained and arising from the work performed under this Agreement. The Participant agrees to indemnify and save the Government harmless from any and all claims, demands, damages, actions, costs, or charges against the Government arising as the result of the above-mentioned injuries, damages, or loss, except for any such damages or claims arising out of the negligent act of the Government or its employees in the course of their official duties.

ARTICLE XI - USE OF INFORMATION

All data and information generated, derived or obtained from the activities provided for herein, and this Agreement, will be public information.

ARTICLE XII - ADDITIONAL CONTRACT PROVISIONS

Appendix A, attached hereto and made a part hereof, sets forth additional general provisions of this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this document as of the day and year first above written.

THE UNITED STATES OF AMERICA

BY THE DEPARTMENT OF ENERGY

By *R. E. Simonds*

R. E. Simonds, Director
Contracts Management Division
Idaho Operations Office
Contracting Officer

Witnesses as to signature of Participant:

Brenda L. Dunn
(Signature)

Brenda L. Dunn
Name (typed)

VPAA Office, University of ND
(Address)

Terry A. Eastland
(Signature)

Terry A. Eastland
Name (typed)

VPAA Office, University of ND
(Address)

UNIVERSITY OF NORTH DAKOTA

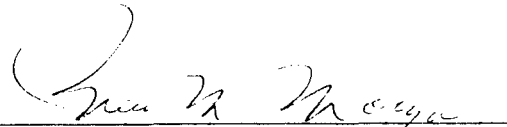
By *Conny E. Nelson*

Conny E. Nelson
Name (typed)

Title Vice President for Academic Affairs
University Station
Grand Forks, ND 58202
(Business Address)

I, Ruth Morgan, certify that I am the Director of Grants and Contracts of the Participant named under this document, that Conny E. Nelson, who signed this document on behalf of the Participant, was then Vice President for Academic Affairs of said Participant; that said document was duly signed for and in behalf of said Participant by authority of its governing body, and is within the scope of its legal powers.

(SEAL)



Ruth Morgan
Ruth Morgan
Director of Grants and Contracts
University of North Dakota

APPENDIX A
GENERAL PROVISIONS
COOPERATIVE AGREEMENTS

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APPENDIX A

GENERAL PROVISIONS

COOPERATIVE AGREEMENTS

ARTICLE A-I - ALLOWABLE COST

Costs shall constitute allowable costs as specified in Title 41, Code of Federal Regulations Part 1-15 of the Code of Federal Regulations in effect on the date of this Agreement.

ARTICLE A-II - APPROVAL OF SUBCONTRACTS

All subcontracts and purchase orders in excess of \$10,000 shall require the written approval of the Contracting Officer.

ARTICLE A-III - PUBLIC INFORMATION RELEASES

The parties agree that public disclosure or dissemination of new data or information arising out of the feasibility assessment will be coordinated by the parties, it being understood that the intent of both the Participant and DOE is to release all data and information to the greatest practicable extent in order to achieve the objective of obtaining maximum public value from the results of this project. It is understood that the foregoing is not intended to afford either party the right to prevent a public release by the other; however, nothing in this article shall impair the rights of the parties set forth elsewhere in this Agreement, including but not necessarily limited to the article entitled "Patent Rights."

ARTICLE A-IV - AUDIT

A. The Participant shall maintain, and the Contracting Officer or his representative shall have the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this Agreement. Such right of examination shall include inspection at all reasonable times of the Participant's plants, or such parts thereof, as may be engaged in the performance of this Agreement.

B. The materials described above, shall be made available at the office of the Participant, at all reasonable times, for inspection, audit or reproduction, until the expiration of three (3) years from the date of final payment under this Agreement or such lesser time specified in Title 41, Code of Federal Regulations Part 1-20 and for such lesser period, if any, as is required by applicable statute, or by other articles of this Agreement, or by (1) and (2) below:

ARTICLE A-IV - AUDIT (Cont'd)

(1) If this Agreement is completely or partially terminated, the records relating to the work terminated shall be made available for a period of three (3) years from the date of any resulting final settlement.

(2) Records which relate to appeals under the "Disputes" article of this Agreement, or litigation or the settlement of claims arising out of the performance of this Agreement, shall be made available until such appeals, litigation, or claims have been disposed of.

ARTICLE A-V - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.

ARTICLE A-VI - COVENANT AGAINST CONTINGENT FEES

The Participant warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon an agreement or understanding for a commission, percentage brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Participant for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this Agreement without liability or in its discretion to deduct from the Agreement price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE A-VII - EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

A. The Participant agrees that the Comptroller General of the United States or any of his duly authorized Government employees shall, until the expiration of three (3) years after final payment under this Agreement, unless DOE authorizes their prior disposition, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Participant involving transactions related to this Agreement.

ARTICLE A-VII - EXAMINATION OF RECORDS BY COMPTROLLER GENERAL (Cont'd)

B. The Participant further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized Government employees shall, until the expiration of three (3) years after final payment under the subcontract, or such lesser time specified in either Appendix M of the Armed Services Procurement Regulation or the Federal Procurement Regulations Part 1-20, as appropriate, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this article excludes (1) purchase orders not exceeding \$10,000 and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

C. The periods of access and examination described in A. and B., above, for records which relate to (1) appeals under the "Disputes" article of this Agreement, (2) litigation or the settlement of claims arising out of the performance of this Agreement, or (3) costs and expenses of this Agreement as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigation, claims or exceptions have been disposed of.

ARTICLE A-VIII - ASSIGNMENT OF CLAIMS

Pursuant to the provisions of the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), claims for moneys due or to become due the Participant from the Government under this Agreement may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this Agreement and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Unless otherwise provided in this Agreement, payments to assignee of any moneys due or to become due under this Agreement shall not, to the extent provided in said Act, as amended, be subject to reduction or setoff.

ARTICLE A-IX - PERMITS

Except as otherwise directed by the Contracting Officer, the Participant shall procure all necessary permits or licenses and abide by all applicable laws, regulations, and ordinances of the United States and of the State, territory, and political subdivision in which the work under this Agreement is performed.

ARTICLE A-X - DISPUTES

A. Except as otherwise provided in this Agreement, any dispute concerning a question of fact arising under this Agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Participant. The decision of the Contracting Officer shall be final and conclusive unless within thirty (30) days from the date of receipt of such copy, the Participant mails or otherwise furnishes to the Contracting Officer a written appeal addressed to DOE. The decision of DOE or its duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this article, the Participant shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Participant shall proceed diligently with the performance of this Agreement and in accordance with the Contracting Officer's decision.

B. This "Disputes" article does not preclude consideration of law questions in connection with decisions provided for in paragraph A, above: Provided, That nothing in this Agreement shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

ARTICLE A-XI - PAYMENT OF INTEREST ON PARTICIPANT'S CLAIMS

A. If an appeal is filed by the Participant from a final decision of the Contracting Officer under the "Disputes" article of this Agreement, denying a claim arising under the Agreement, simple interest on the amount of the claim finally determined owed by the Government shall be payable to the Participant. Such interest shall be at the rate determined by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat. 97, from the date the Participant furnishes to the Contracting Officer its written appeal under the "Disputes" article of this Agreement, to the date of (1) a

ARTICLE A-XI - PAYMENT OF INTEREST ON PARTICIPANT'S CLAIMS (Cont'd)

final judgment by a court of competent jurisdiction, or (2) mailing to the Participant of a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of a board of contract appeals.

B. Notwithstanding A., above, (1) interest shall be applied only from the date payment was due, if such date is later than the filing of appeal, and (2) interest shall not be paid for any period of time that the Contracting Officer determines the Participant has unduly delayed in pursuing its remedies before a board of contract appeals or a court of competent jurisdiction.

ARTICLE A-XII - SEX DISCRIMINATION PROHIBITED

No person shall on the ground of sex be excluded from participation in, be denied a license under, be denied the benefits of, or be subjected under any program or activity carried on or receiving Federal assistance under any title of this Act (P. L. 93-438).

ARTICLE A-XIII - CIVIL RIGHTS

The Participant agrees that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity for which the Participant receives Federal financial assistance from DOE.

ARTICLE A-XIV - DISCRIMINATION AGAINST HANDICAPPED PROHIBITED

The Participant agrees that no otherwise qualified handicapped individual in the United States [as defined in Section 7(6) of the Act], shall, solely by reason of his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

ARTICLE A-XV - SMALL AND MINORITY BUSINESS PARTICIPATION

It is the policy of DOE to ensure that small and minority businesses have a reasonable opportunity to participate in the projects which it supports. In accordance with this policy, the Participant will make a reasonable effort to ensure fair consideration and utilization of small and minority businesses in purchases and subcontracts awarded by the Participant under this Agreement.

ARTICLE A-XVI - PREFERENCE FOR U. S. FLAG AIR CARRIERS

A. It is the policy of the United States that all Federal agencies and Government contractors and subcontractors utilize U. S. flag air carriers for international air transportation of personnel and cargo.

B. The Participant agrees to utilize U. S. flag air carriers to the maximum extent practicable in connection with the performance of this Agreement in the transportation by air of any personnel and cargo between the United States and a foreign country, or between foreign countries.

C. The terms used in this article have the following meanings:

(1) "International air transportation" means transportation by air of personnel and cargo from the United States to a foreign country, between two or more foreign countries, and between a foreign country and the United States.

(2) "U. S. flag air carrier" means one of a class of air carriers holding a certificate of public convenience and necessity issued by the Civil Aeronautics Board, approved by the President, authorizing operations between the United States and/or its territories and one or more foreign countries.

(3) The term "United States" includes the fifty States, Commonwealth of Puerto Rico, possessions of the United States and the District of Columbia.

(4) "Practicable" includes (i) satisfactory servicing of agency programs, and (ii) timely deliveries at fair and reasonable prices.

D. The Participant shall include the substance of this article, including this paragraph D. in each subcontract or purchase order hereunder which may involve air transportation between the United States and a foreign country, or between foreign countries.

ARTICLE A-XVII - CLEAN AIR AND WATER

A. The Participant agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by P. L. 91-604) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251, et seq., as amended by P. L. 92-500), respectively, relating to inspection, monitoring, entry, reports and information, as

ARTICLE A-XVII - CLEAN AIR AND WATER (Cont'd)

well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this Agreement.

(2) That no portion of the work required by this Agreement will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date when this Agreement was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use its best efforts to comply with clean air standards and clean water standards at the facility in which the Agreement is being performed.

(4) To insert the substance of the provisions of this article into any nonexempt contract, including this subparagraph A.(4).

B. The terms used in this article have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by P. L. 91-604).

(2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by P. L. 92-500).

(3) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110(d) of the Clean Air Act [42 U.S.C. 1857c-5(d)], an approved implementation procedure or plan under section 111(c) or section 111(d), respectively, of the Air Act (42 U.S.C. 1157(c)-6(c) or (d), or an approved implementation procedure under section 112(d) of the Air Act [42 U.S.C. 1857c-7(d)].

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or

ARTICLE A-XVII - CLEAN AIR AND WATER (Cont'd)

by local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

(5) The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an air or water pollution control agency in accordance with the requirements of the Air Act or Water Act and regulations issued pursuant thereto.

(6) The term "facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor or subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

ARTICLE A-XVIII - RIGHTS IN TECHNICAL DATA

A. Definitions

(1) "Technical Data" means recorded information regardless of form or characteristic, of a scientific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work, or be usable or used to define a design or process, or to procure, produce, support, maintain, or operate materiel. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design type documents or computer software (including computer programs, computer software data bases, and computer software documentation). Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification, and related information. Technical data as used herein does not include financial reports, cost analyses, and other information incidental to contract administration.

ARTICLE A-XVIII - RIGHTS IN TECHNICAL DATA (Cont'd)

(2) "Proprietary Data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

(i) Are not generally known or available from other sources without obligation concerning their confidentiality.

(ii) Have not been made available by the owner to others without obligation concerning its confidentiality, and

(iii) Are not already available to the Government without obligation concerning their confidentiality.

(3) "Contract Data" means technical data first produced in the performance of the Agreement, technical data which are specified to be delivered in the Agreement, technical data that may be called for under the "Additional Technical Data Requirements" article of the Agreement, if any, or technical data actually delivered in connection with the Agreement.

(4) "Unlimited Rights" means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

B. Allocation of Rights

(1) The Government shall have:

(i) Unlimited rights in contract data except as otherwise provided below with respect to proprietary data.

(ii) The right to remove, cancel, correct or ignore any marking not authorized by the terms of this Agreement on any technical data furnished hereunder, if in response to a written inquiry by DOE concerning the propriety of the markings, the Participant fails to respond thereto within 60 days or fails to substantiate the propriety of the markings. In either case DOE will notify the Participant of the action taken.

ARTICLE A-XVIII - RIGHTS IN TECHNICAL DATA (Cont'd)

(iii) No rights under this Agreement in any technical data which are not contract data.

(2) The Participant shall have:

(i) The right to withhold proprietary data in accordance with the provisions of this article.

(ii) The right to use for its private purposes, subject to patent, security or other provisions of this Agreement, contract data it first produces in the performance of this Agreement provided the data requirements of this Agreement have been met as of the date of the private use of such data. The Participant agrees that to the extent it receives or is given access to proprietary data or other technical, business or financial data in the form of recorded information from DOE or a DOE contractor or subcontractor, the Participant shall treat such data in accordance with any restrictive legend contained thereon, unless use is specifically authorized by prior written approval of the Contracting Officer.

(3) Nothing contained in this "Rights in Technical Data" article shall imply a license to the Government under any patent or be construed as affecting the scope of any licenses or other rights otherwise granted to the Government under any patent.

C. Copyrighted Material

(1) The Participant shall not, without prior written authorization of the Contracting Officer, establish a claim to statutory copyright in any contract data first produced in the performance of the Agreement. To the extent such authorization is granted, the Government reserves for itself and others acting on its behalf a royalty-free, non-exclusive, irrevocable, world-wide license for Governmental purposes to publish, distribute, translate, duplicate, exhibit and perform any such data copyrighted by the Participant.

(2) The Participant agrees not to include in the technical data delivered under the Agreement any material copyrighted by the Participant and not to knowingly include any material copyrighted by others without first granting or obtaining at

ARTICLE A-XVIII - RIGHTS IN TECHNICAL DATA (Cont'd)

no cost a license therein for the benefit of the Government of the same scope as set forth in paragraph C.(1) above. If such royalty-free license is unavailable and the Participant nevertheless determines that such copyrighted material must be included in the technical data to be delivered, rather than merely incorporated therein by reference, the Participant shall request the written authorization of the Contracting Officer to include such copyrighted material in the technical data without a license.

D. Subcontracting. It is the responsibility of the Participant to obtain from its subcontractors technical data and rights therein, on behalf of the Government, necessary to fulfill the Participant's obligations to the Government with respect to such data. In the event of refusal by a subcontractor to accept an article affording the Government such rights, the Participant shall:

(1) Promptly submit written notice to the Contracting Officer setting forth reasons for the subcontractor refusal and other pertinent information which may expedite disposition of the matter; and

(2) Not proceed with the subcontract without the written authorization of the Contracting Officer.

E. Withholding of Proprietary Data. Notwithstanding the inclusion of the "Additional Technical Data Requirements" article in this Agreement or any provision of this Agreement specifying the delivery of technical data, the Participant may withhold proprietary data from delivery, provided that the Participant furnishes in lieu of any such proprietary data, so withheld technical data disclosing the source, size, configuration, mating and attachment characteristics, functional characteristics and performance requirements ("Form, Fit and Function" data, e.g., specification control drawings, catalog sheets, envelope drawings, etc.) or a general description of such proprietary data where "Form Fit and Function" data are not applicable. The Government shall acquire no rights to any proprietary data so withheld except that such data shall be subject to the "Inspection Rights" provisions of paragraph F., and if included, the "Limited Rights in Proprietary Data" provisions of paragraph G. and the "Contractor Licensing" provisions of paragraph H.

F. Inspection Rights. Except as may be otherwise specified in this Agreement for specific items of proprietary data which are not subject to this paragraph, the Contracting Officer's representatives, at all reasonable times up to three (3) years after final payment under this Agreement,

ARTICLE A-XVIII - RIGHTS IN TECHNICAL DATA (Cont'd)

may inspect at the Participant's facility any proprietary data withheld under paragraph E. and not furnished under paragraph G. for the purposes of verifying that such data properly fell within the withholding provision of paragraph E., or for evaluating work performance.

ARTICLE A-XIX - REPORTING OF ROYALTIES

If this contract is in an amount which exceeds \$10,000 and if any royalty payments are directly involved in the contract or are reflected in the contract price to the Government, the Contractor agrees to report in writing to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) during the performance of this contract and prior to its completion or final settlement the amount of any royalties or other payments paid or to be paid by it directly to others in connection with the performance of this contract together with the names and addresses of licensors to whom such payments are made and either the patent numbers involved or such other information as will permit identification of the patents or other basis on which the royalties are to be paid. The approval of DOE of any individual payments or royalties shall not stop the Government at any time from contesting the enforceability, validity or scope of, or title to, any patent under which a royalty or payments are made.

ARTICLE XX - PATENT RIGHTS

A. Definitions

(1) "Subject Invention" means any invention or discovery of the Participant conceived or first actually reduced to practice in the course of or under this Agreement, and includes any art, method process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plants, whether patented or unpatented under the Patent Laws of the United States of America or any foreign country.

(2) "Contract" means any contract, grant, agreement, understanding or other arrangement, which includes research, development, or demonstration work, and includes any assignment or substitution of parties.

(3) "States and domestic municipal governments" means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and any political subdivision and agencies thereof.

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

(4) "Government agency" includes an executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the Executive Branch of the Government of the United States of America.

(5) "To the point of practical application" means to manufacture in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine and under such conditions as to establish that the invention is being worked and that its benefits are reasonably accessible to the public.

(6) "Patent Counsel" means the DOE Patent Counsel assisting the procuring activity.

B. Allocation of Principal Rights

(1) Assignment to the Government. The Participant agrees to assign to the Government the entire right, title, and interest throughout the world in and to each Subject Invention except to the extent that rights are retained by the Participant under paragraphs B.(2) and C. of this article.

(2) Greater Rights Determinations. The Participant or the employee-inventor with authorization of the Participant may request greater rights than the nonexclusive license and the foreign patent rights provided in paragraph C. of this article on identified inventions, in accordance with 41 CFR 9-9.109-6. Such requests must be submitted to Patent Counsel (with notification by Patent Counsel to the Contracting Officer) at the time of the first disclosure pursuant to paragraph E.(2) of this article, or not later than 9 months after conception or first actual reduction to practice, whichever occurs first, or such longer period as may be authorized by Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the Participant.

C. Minimum Rights to the Participant

(1) Participant License. The Participant reserves a revocable, nonexclusive, paid-up license in each patent application filed in any country on a Subject Invention and any resulting patent in which the Government acquires title. The license shall extend to the Participant's domestic subsidiaries and affiliates, if any,

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

within the corporate structure of which the Participant is a part and shall include the right to grant sublicenses of the same scope to the extent the Participant was legally obligated to do so at the time the Agreement was awarded. The license shall be transferable only with approval of DOE except when transferred to the successor of that part of the Participant's business to which the invention pertains.

(2) Revocation Limitations. The Participant's nonexclusive license retained pursuant to subparagraph C.(1) of this article and sublicenses granted thereunder may be revoked or modified by DOE, either in whole or in part, only to the extent necessary to achieve expeditious practical application of the Subject Invention under DOE's published licensing regulations (10 CFR 781), and only to the extent an exclusive license is actually granted. This license shall not be revoked in that field of use and/or the geographical areas in which the Participant, or its sublicensee, has brought the invention to the point of practical application and continues to make the benefits of the invention reasonably accessible to the public, or is expected to do so within a reasonable time.

(3) Revocation Procedures. Before modification or revocation of the license or sublicense, pursuant to subparagraph C.(2) of this article, DOE shall furnish the Participant a written notice of its intention to modify or revoke the license and any sublicense thereunder, and the Participant shall be allowed 30 days, or such longer period as may be authorized by the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) for good cause shown in writing by the Participant, after such notice to show cause why the license or any sublicense should not be modified or revoked. The Participant shall have the right to appeal in accordance with 10 CFR 781, any decision concerning the modification or revocation of its license or any sublicense.

(4) Foreign Patent Rights. Upon written request to Patent Counsel (with notification by Patent Counsel to the Contracting Officer), in accordance with subparagraph E.(2)(i) of this article, and subject to DOE security regulations and requirements, there shall be reserved to the Participant, or the employee-inventor with authorization of the Participant, the patent rights to a Subject Invention in any foreign country where the Government has elected not to secure such rights provided:

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

(i) The recipient of such rights, when specifically requested by DOE and three years after issuance of a foreign patent disclosing said Subject Invention, shall furnish DOE a report setting forth:

(a) The commercial use that is being made, or is intended to be made, of said invention, and

(b) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing.

(ii) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government (including any Government agency) and States and domestic municipal governments, unless the Administrator or his designee determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments.

(iii) Subject to the rights granted in C.(1), (2), and (3) of this article, the Secretary of DOE or his designee shall have the right to terminate the foreign patent rights granted in this subparagraph C.(4) in whole or in part unless the recipient of such rights demonstrates to the satisfaction of the Secretary of DOE or his designee that effective steps necessary to accomplish substantial utilization of the invention have been taken or within a reasonable time will be taken.

(iv) Subject to the rights granted in C.(1), (2), and (3) of this article, the Secretary of DOE or his designee shall have the right, commencing four years after foreign patent rights are accorded under this subparagraph.C.(4), to acquire the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances and in appropriate circumstances to terminate said foreign patent rights in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing:

(a) If the Secretary of DOE or his designee determines, upon review of such material as he deems relevant, and after the recipient of such rights, or other interested person, has had the

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

opportunity to provide such relevant and material information as the Secretary of DOE or his designee may require that such foreign patent rights have tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or

(b) Unless the recipient of such rights demonstrates to the satisfaction of the Secretary of DOE or his designee at such hearing that the recipient has taken effective steps or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

D. Filing of Patent Applications

(1) With respect to each Subject Invention in which the Participant or the inventor requests foreign patent rights in accordance with subparagraph C.(4) of this article, a request may also be made for the right to file and prosecute the U. S. application on behalf of the U. S. Government. If such request is granted the Participant or inventor shall file a domestic patent application on the invention within six (6) months after the request for foreign patent rights is granted, or such longer period of time as may be approved by the Patent Counsel for good cause shown in writing by the requester. With respect to the invention the requester shall promptly notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) of any decision not to file an application.

(2) For each Subject Invention on which a domestic patent application is filed by the Participant or inventor the Participant or inventor shall:

(i) Within two (2) months after the filing or within two (2) months after submission of the invention disclosure if the patent application previously has been filed, deliver to the Patent Counsel a copy of the application as filed including the filing date and serial number:

(ii) Within six (6) months after filing the application or within six (6) months after submitting the invention disclosure if the application has been filed previously, deliver

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

to the Patent Counsel a duly executed and approved Assignment to the Government, on a form specified by the Government;

(iii) Provide the Patent Counsel with the original patent grant promptly after a patent is issued on the application; and

(iv) Not less than 30 days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the Patent Counsel of any decision not to continue prosecution of the application.

(3) With respect to each Subject Invention in which the Participant or inventor has requested foreign patent rights, the Participant or inventor shall file a patent application on the invention in each foreign country in which such request is granted in accordance with applicable statutes and regulations and within one of the following periods:

(i) Eight months from the date of filing a corresponding United States application, or if such an application is not filed, six months from the date the request was granted;

(ii) Six months from the date a license is granted by the Commissioner of Patents and Trademarks to file the foreign patent application where such filing has been prohibited by security reasons; or

(iii) Such longer periods as may be approved by the Patent Counsel for good cause shown in writing by the Participant or inventor.

(4) Subject to the license specified in subparagraphs C.(1), (2) and (3) of this article, the Participant or inventor agrees to convey to the Government upon request the entire right, title, and interest in any foreign country in which the Participant or inventor fails to have a patent application filed in accordance with subparagraph D.(3) of this article, or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeiture of the patent application or patent the Participant or inventor shall not less than 60 days before the expiration period for any action required by any Patent Office notify the Patent Counsel of such failure or decision and deliver to the Patent Counsel the executed instruments necessary for the conveyance specified in this paragraph.

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

E. Invention Identification, Disclosures and Reports.

(1) The Participant shall establish and maintain active and effective procedures to ensure that Subject Inventions are promptly identified and timely disclosed. These procedures shall include the maintenance of laboratory notebooks or equivalent records and any other records that are reasonably necessary to document the conception and/or the first actual reduction to practice of Subject Inventions, and records which show that the procedures for identifying and disclosing the inventions are followed. Upon request, the Participant shall furnish the Contracting Officer a description of these procedures so that he may evaluate and determine their effectiveness.

(2) The Participant shall furnish the Patent Counsel (with notification by Patent Counsel to the Contractor Officer) on a DOE-approved form:

(i) A written report containing full and complete technical information concerning each subject Invention within six (6) months after conception or first actual reduction to practice whichever occurs first in the course of or under this Agreement, but in any event prior to any on sale, public use or public disclosure of such invention known to the Participant. The report shall identify the Agreement and inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains a clear understanding of the nature, purpose, operation, and to the extent known, the physical, chemical, biological, or electrical characteristics of the invention. The report should also include any request for foreign patent rights under subparagraph C.(4) of this article and any request to file a domestic patent application under D.(1) of this article. However, such requests shall be made within the period set forth in subparagraph B.(2) of this article. When an invention is reported under this subparagraph E.(2)(i), it shall be presumed to have been made in the manner specified in Section 9(a)(1) and (2) of 42 U.S.C. 5908 unless the Participant contends it was not so made in accordance with subparagraph G.(2)(ii) of this article.

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

(ii) Upon request, but not more than annually, interim reports on an DOE-approved form listing Subject Inventions and subcontracts awarded containing a Patent Rights article for that period and certifying that:

(a) The Participant's procedures for identifying and disclosing Subject Inventions as required by this paragraph E. have been followed throughout the reporting period;

(b) All subject inventions have been disclosed or that there are no such inventions; and

(c) All subcontracts containing a Patent Rights article have been reported or that no such subcontracts have been awarded.

(iii) A final report on an DOE-approved form within three (3) months after completion of the Agreement work listing all Subject Inventions and all subcontracts awarded containing a Patent Rights article and certifying that:

(a) All Subject Inventions have been disclosed or that there were no such inventions; and

(b) All subcontracts containing a Patent Rights article have been reported or that no such subcontracts have been awarded.

(3) The Participant shall obtain patent agreements to effectuate the provisions of this article from all persons in its employ who perform any part of the work under this Agreement except nontechnical personnel, such as clerical employees and manual laborers.

(4) The Participant agrees that the Government may duplicate and disclose Subject Invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this article. If the Participant is to file a foreign patent application on a Subject Invention, the Government agrees, upon written request, to use its best efforts to withhold publication of such invention disclosures until the expiration of the time period specified in subparagraph D.(1) of this article, but in no event shall the Government or its employees be liable for any publication thereof.

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

F. Publication. It is recognized that during the course of the work under this Agreement the Participant or its employees may from time to time desire to release or publish information regarding scientific or technical developments conceived or first actually reduced to practice in the course of or under this Agreement. In order that public disclosure of such information will not adversely affect the patent interests of DOE or the Participant, patent approval for release or publication shall be secured from Patent Counsel prior to any such release or publication.

G. Forfeiture of Rights in Unreported Subject Inventions.

(1) The Participant shall forfeit to the Government, at the request of the Secretary of DOE or his designee, all rights in any Subject Invention which the Participant fails to report to Patent Counsel (with notification by Patent Counsel to the Contracting Officer) within 6 months after the time the Participant:

(i) Files or causes to be filed a United States or foreign patent application thereon; or

(ii) Submits the final report required by subparagraph E.(2)(iii) of this article whichever is later.

(2) However, the Participant shall not forfeit rights in a Subject Invention if, within the time specified in (1)(i) or (1)(ii) of this paragraph G., the Participant:

(i) Prepared a written decision based upon a review of the record that the invention was neither conceived nor first actually reduced to practice in the course of or under the Agreement and delivers the same to Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or

(ii) Contending that the invention is not a Subject Invention the Participant nevertheless discloses the invention and all facts pertinent to this contention to the Patent Counsel (with notification by Patent Counsel to the Contracting Officer); or

(iii) Establishes that the failure to disclose did not result from the Participant's fault or negligence.

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

(3) Pending written assignment of the patent applications and patents on a Subject Invention determined by the Secretary of DOE or his designee to be forfeited (such determination to be a final decision under the "Disputes" article of this Agreement), the Participant shall be deemed to hold the invention and the patent applications and patents pertaining thereto in trust for the Government. The forfeiture provision of this paragraph G. shall be in addition to and shall not supersede other rights and remedies which the Government may have with respect to Subject Inventions.

H. Examination of Records Relating to Inventions.

(1) The Contracting Officer or his authorized representative, until the expiration of three (3) years after final payment under this Agreement, shall have the right to examine any books (including laboratory notebooks) records, documents, and other supporting data of the Participant which the Contracting Officer or his authorized representative, reasonably deem pertinent to the discovery or identification of Subject Inventions or to determine compliance with the requirements of this article.

(2) The Contracting Officer or his authorized representative shall have the right to examine all books (including laboratory notebooks) records and documents of the Participant relating to the conception on first actual reduction to practice of inventions in the same field of technology as the work under this Agreement to determine whether any such inventions are Subject Inventions. If the Participant refuses or fails to:

(i) Establish the procedures of paragraph E.(1) of this article; or

(ii) Maintain and follow such procedures; or

(iii) Correct or eliminate any material deficiency in the procedures within thirty (30) days after the Contracting Officer notifies the Participant of such a deficiency.

I. Withholding of Payment (Not Applicable to Subcontracts)

(1) Any time before final payment of the amount of this Agreement the Contracting Officer may, if he deems such action warranted, withhold payment until a reserve not exceeding \$50,000 or 5 percent of the amount of this Agreement, whichever is less, shall have been set aside if in his opinion, the Participant fails to:

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

(i) Establish, maintain and follow effective procedures for identifying and disclosing subject inventions pursuant to subparagraph E.(1) of this article; or

(ii) Disclose any Subject Invention pursuant to paragraph E.(2)(i) of this article; or

(iii) Deliver the interim reports pursuant to subparagraph E.(2)(ii) of this article; or

(iv) Provide the information regarding subcontracts pursuant to subparagraph J.(5) of this article; or

(v) Convey to the Government in a DOE-approved form the title and/or rights of the Government in each subject invention as required by this article.

The reserve or balance shall be withheld until the Contracting Officer has determined that the Participant has rectified whatever deficiencies exist and has delivered all reports, disclosures and other information required by the article.

(2) Final payment under this Agreement shall not be made by the Contracting Officer before the Participant delivers to Patent Counsel all disclosures of Subject Inventions and other information required by E.(2)(i) of this article, the final report required by E.(2)(iii) of this article, and Patent Counsel has issued a patent clearance certification to the Contracting Officer.

(3) The Contracting Officer may, in his discretion, decrease or increase the sums withheld up to the maximum authorized above. If the Participant is a nonprofit organization, the maximum amount that may be withheld under this paragraph shall not exceed \$50,000 or one percent (1%) of the amount of this Agreement, whichever is less. No amount shall be withheld under this paragraph while the amount specified by this paragraph is being withheld under other provisions of the Agreement. The withholding of any amount or subsequent payment thereof shall not be construed as a waiver of any rights accruing to the Government under this Agreement.

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

J. Subcontracts.

(1) For the purpose of this paragraph the term "Participant" means the party awarding a subcontract and the term "subcontractor" means the party being awarded a subcontract regardless of tier.

(2) Unless otherwise authorized or directed by the Contracting Officer, the Participant shall include the Patent Rights article of 41 CFR 9-9.107-5(a) or 41 CFR 9-9.107-6 as appropriate, modified to identify the parties in any subcontract hereunder having as a purpose the conduct of research, development, or demonstration work. In the event of refusal by a subcontractor to accept this article, or if in the opinion of the Participant this article is inconsistent with DOE's patent policies, the Participant:

(i) Shall promptly submit written notice to the Contracting Officer setting forth reasons for the subcontractor's refusal and other pertinent information which may expedite disposition of the matter; and

(ii) Shall not proceed with the subcontract without the written authorization of the Contracting Officer.

(3) Except as may be otherwise provided in this article, the Participant shall not, in any subcontract or by using a subcontract as consideration therefor, acquire any rights in its subcontractor's Subject Invention for the Participant's own use (as distinguished from such rights as may be required solely to fulfill the Participant's Agreement obligations to the Government in the performance of this Agreement).

(4) All invention disclosures, reports, instruments, and other information required to be furnished by the subcontractor to DOE, under the provisions of a Patent Rights article in any subcontract hereunder may, in the discretion of the Contracting Officer, be furnished to the Participant for transmission to DOE.

(5) The Participant shall promptly notify the Contracting Officer in writing upon the award of any subcontract containing a Patent Rights article by identifying the subcontractor, the work to be performed under the subcontract, and the dates of award and estimated completion. Upon the request of the Contracting Officer the Participant shall furnish him a copy of the subcontract.

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

(6) The Participant shall identify all Subject Inventions of the subcontractor of which it acquires knowledge in the performance of this Agreement and shall notify the Patent Counsel (with notification by Patent Counsel to the Contracting Officer) promptly upon the identification of the inventions.

(7) It is understood that the Government is a third party beneficiary of any subcontract article granting rights to the Government in subject inventions, and the Participant hereby assigns to the Government all rights that the Participant would have to enforce the subcontractor's obligations for the benefit of the Government with respect to Subject Inventions. The Participant shall not be obligated to enforce the agreements of any subcontractor hereunder relating to the obligations of the subcontractor to the Government regarding Subject Inventions.

K. Background Patents.

(1) "Background Patent" means a domestic patent covering an invention or discovery which is not a Subject Invention and which is owned or controlled by the Participant at any time through the completion of this Agreement:

(i) Which the Participant but not the Government, has the right to license to others without obligation to pay royalties thereon, and

(ii) Infringement of which cannot reasonably be avoided upon the practice of any specific process, method, machine, manufacture or composition of matter (including relatively minor modifications thereof) which is a subject of the research, development, or demonstration work performed under this Agreement.

(2) The Participant agrees to and does hereby grant to the Government a royalty-free, nonexclusive, license under any Background Patent for purposes of practicing a subject of this Agreement by or for the Government in research, development and demonstration work only.

(3) The Participant also agrees that upon written application by DOE, it will grant to responsible parties for purposes of practicing a subject of this Agreement, nonexclusive licenses under any

ARTICLE A-XX - PATENT RIGHTS (Cont'd)

Background Patent on terms that are reasonable under the circumstances. If however; the Participant believes that exclusive or partially exclusive rights are necessary to achieve expeditious commercial development or utilization, then a request may be made to DOE for DOE approval of such licensing by the Participant.

(4) Notwithstanding the foregoing subparagraph K.(3), the Participant shall not be obligated to license any Background Patent if the Participant demonstrates to the satisfaction of the Secretary of DOE or or his designee that:

(i) A competitive alternative to the subject matter covered by said Background Patent is commercially available or readily introducible from one or more other sources; or

(ii) The Participant or its licensees are supplying the subject matter covered by said Background Patent in sufficient quantity and at reasonable prices to satisfy market needs, or have taken effective steps or within a reasonable time are expected to take effective steps to so supply the subject matter.

L. Atomic Energy.

(1) No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted by the Participant or its employees with respect to any invention or discovery made or conceived in the course of or under this Agreement.

(2) Except as otherwise authorized in writing by the Contracting Officer, the Participant will obtain patent agreements to effectuate the provisions of subparagraph L.(1) of this article from all persons who perform any part of the work under this Agreement, except nontechnical personnel, such as clerical employees and manual laborers.

M. Limitation of Rights. Nothing contained in this Patent Rights article shall be deemed to give the Government any rights with respect to any invention other than a subject invention except as set forth in the Patent Rights article of this Agreement with respect to Background Patents and the Facilities License.

ARTICLE A-XXI - NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT
INFRINGEMENT

(The provisions of this article shall be applicable only if the amount of this Agreement exceeds \$10,000.)

A. The Participant shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this Agreement of which the Participant has knowledge.

B. In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this Agreement or out of the use of any supplies furnished or work or services performed hereunder, the Participant shall furnish to the Government when requested by the Contracting Officer, all evidence and information in possession of the Participant pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Participant has agreed to indemnify the Government.

C. This article shall be included in all subcontracts.

**U. S. DEPARTMENT OF ENERGY
REPORTING REQUIREMENTS CHECKLIST**

DOE Form CR-537
(1-78)

(See Instructions on Reverse)

FORM APPROVED
OMB NO. 38R-0190

1. IDENTIFICATION Hydrothermal Resources in North Dakota (State Coop Program)	2. OBLIGATION INSTRUMENT: Cooperative Agreement
--	--

3. REPORTING REQUIREMENTS

A. PROJECT MANAGEMENT	Frequency	B. TECHNICAL INFORMATION REPORTING	Frequency
1. <input type="checkbox"/> Management Plan		1. <input type="checkbox"/> Notice of Energy RD&D Project (SSIE)	
2. <input type="checkbox"/> Milestone Schedule & Status Report		2. <input checked="" type="checkbox"/> Technical Progress Report	10 S
3. <input type="checkbox"/> Cost Plan		3. <input type="checkbox"/> Topical Report	
4. <input type="checkbox"/> Manpower Plan		4. <input checked="" type="checkbox"/> Final Technical Report	10 F
5. <input checked="" type="checkbox"/> Contract Management Summary Report	5 M	C. PMS/MINI-PMS	
6. <input type="checkbox"/> Project Status Report		1. Cost Performance Report	
7. <input type="checkbox"/> Cost Management Report		<input type="checkbox"/> Format 1 WBS	
8. <input type="checkbox"/> Manpower Management Report		<input type="checkbox"/> Format 2 Functional	
9. <input checked="" type="checkbox"/> Conference Record	5 M	<input type="checkbox"/> Format 3 Baseline	
10. <input checked="" type="checkbox"/> Hot Line Report	A	<input type="checkbox"/> Format 5 Problem Analysis	
		2. <input type="checkbox"/> Cost/Schedule Status Report	
		3. <input type="checkbox"/> Management Control System Description	
		4. <input type="checkbox"/> Summary System Description	
		5. <input type="checkbox"/> WBS Dictionary	

FREQUENCY CODES:

A - As Required	Q - Quarterly
C - Contract Change	S - Semi-Annually
F - Final (End of Contract)	X - Mandatory for Delivery with Proposals/Bid
M - Monthly	Y - Yearly or Upon Contract Renewal
O - One Time (Soon After Contract Award)	

4. SPECIAL INSTRUCTIONS

Freq. Code	Definition	Due Date at DOE/DGE
A	- As Required	5 days after the event that initiates the report.
C	- Contract Change	15 days after receipt of contract modification.
F	- Final	45 days prior to the end (completion date) of the contract, submit in draft. Allow 30 days for DOE/DGE comment, then submit in final format.
M	- Monthly	Mail not later than the 20th calendar day after the end of the calendar month.
O	- One Time	15 days after contract award.
S	- Semi-Annually	Mail (draft format) not later than 10 working days after the end of each six months period measured from the contract start date. Allow 15 days for DOE/DGE comment and then submit in final form.
X	- Mandatory	With delivery of Proposals/Bid.
Y	- Yearly	Within 30 days after the end of each government fiscal year or upon contract renewal.
Q	- Quarterly	Within 20 calendar days after end of calendar quarter.

5. ATTACHED HEREWITH:

<input type="checkbox"/> Report Distribution List	<input type="checkbox"/>
<input type="checkbox"/> WBS/Reporting Category	<input type="checkbox"/>

6. PREPARED BY (Signature and date): <i>Arthur G. Dixon, Jr.</i>	7. REVIEWED BY (Signature and date):
---	--------------------------------------

RECEIVED

<p>10 FORM-182 (Rev. 10-77)</p> <p>U. S. DEPARTMENT OF ENERGY</p> <p>COOPERATIVE AGREEMENT</p> <p>PURSUANT TO AUTHORITY OF PL 93-410, PL 93-438, PL 93-473, PL 93-577, and PL 95-91</p>	<p>1.a. Agreement No. DE-FC07-79ID12030</p> <p>b. Modification No. MAR 12 1979</p>								
<p>3. Participant Name and Address</p> <p>University of North Dakota University Station Grand Forks, ND 58202</p>	<p>2. Agreement Period</p> <p>From: Jan. 15, 1979 To: Jan. 15, 1980</p> <p>GEOHERMAL ENERGY BRANCH</p>								
<p>5. Project Title</p> <p>Hydrothermal Resources of North Dakota</p>	<p>4. Participant Type</p> <p><input checked="" type="checkbox"/> Educational <input checked="" type="checkbox"/> Nonprofit <input type="checkbox"/> State or Local Government <input type="checkbox"/> Profit</p> <p>6. Project Will Be Conducted Per</p> <p>See Article <u>I</u></p> <p>7. Technical Reports Are Required</p> <p>See Article <u>V</u></p>								
<p>8. Principal Investigator(s) or Program Director(s) Name and Address</p> <p>Kenneth L. Harris North Dakota Geological Survey University of North Dakota University Station Grand Forks, ND 58202</p>	<p>9. DOE Program Officer (Name and Address)</p> <p>Leland L. Mink, E&T Division Idaho Operations Office, DOE 550 Second Street, Idaho Falls, ID 83401 Telephone No. (208)526-0638</p>								
<p>10. Accounting and Appropriation Data</p>	<p>11. Method of Payment</p> <p><input type="checkbox"/> % At Award. <input type="checkbox"/> % When Requested. 5% Upon Receipt of Final Report <input type="checkbox"/> Letter of Credit <input type="checkbox"/> Reimbursement <input checked="" type="checkbox"/> Other (specify) See Article <u>III</u></p>								
<p>12. Submit Vouchers, if any, to Agreements Officer Unless Otherwise Specified in this Block</p> <p>Director, Contracts Management Division, 550 Second Street Idaho Falls, ID 83401</p>	<p>14. Remarks:</p>								
<p>13. Funding Sources</p> <table border="0"> <thead> <tr> <th>Source</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>DOE:</td> <td>\$ 41,597.00</td> </tr> <tr> <td>Participant:</td> <td>\$ 9,547.00</td> </tr> <tr> <td>Total Funding:</td> <td>\$ 51,144.00</td> </tr> </tbody> </table>		Source	Amount	DOE:	\$ 41,597.00	Participant:	\$ 9,547.00	Total Funding:	\$ 51,144.00
Source		Amount							
DOE:		\$ 41,597.00							
Participant:	\$ 9,547.00								
Total Funding:	\$ 51,144.00								
<p>15. Amount Obligated By This Action \$ 41,597.00</p>									
<p>16. DOE Issuing Office (Name and Address)</p> <p>Idaho Operations Office 550 Second Street Idaho Falls, Idaho 83401</p>									
<p>17. DOE Cooperative Agreements Officer</p> <p>(Signature) _____ (Date) _____</p> <p>Name (typed) <u>R. E. Simonds</u></p> <p>Title <u>Director, Contracts Mgmt. Division</u></p> <p>Telephone No. <u>(208) 526-1347</u></p>	<p>18. Participant Acceptance</p> <p>By _____ Signature of Authorized Official</p> <p>Name (typed) _____</p> <p>Title _____</p>								

CONFORMED COPY

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. AMENDMENT/MODIFICATION NO. M001	2. EFFECTIVE DATE 7/14/80	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (if applicable)
5. ISSUED BY U.S. Department of Energy Idaho Operations Office 550 Second Street Idaho Falls, Idaho 83401	CODE	6. ADMINISTERED BY (if other than above)	CODE

File M.2.7

7. CONTRACTOR NAME AND ADDRESS University of North Dakota University Station P. O. Box 8103 Grand Forks, North Dakota 58202 ATTN: Kenneth L. Harris	CODE	FACILITY CODE	8. AMENDMENT OF SOLICITATION NO. DATED _____ (See block 9) <input checked="" type="checkbox"/> MODIFICATION OF CONTRACT/ORDER NO. DE-FC07-791012030 DATED 3/7/79 (See block 11)
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9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of offers is extended, is not extended. Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) by signing and returning _____ pages of this amendment to the issuing office; (b) by telephoning receipt of this amendment on each copy of the offer submitted or (c) by separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (if required)

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) This Supplemental Agreement is entered into pursuant to authority of Public Law 95-91 et al.
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

- The term of the agreement is hereby extended from January 14, 1980, to March 8, 1980.
- The following Article XIII is hereby added to and made a part of this Agreement:
ARTICLE XIII - GOVERNMENT PROPERTY
The following items of property procured or fabricated by the Participant are hereby listed as "Government property":

One remote computer terminal consisting of a MIME I Video Display and 300 Band Acoustic Coupler (MODEM) with connector cable -- \$1,175.20
- The attached Article B-VII - Property Items is hereby added to and made a part of this Agreement.
- The parties agree that this Modification No. M001 does not increase either the total estimated cost of \$51,144.00 or the maximum cost to DOE of \$41,597.00.

Contract or purchase order, all terms and conditions of the documents referenced in block 3, as herebefore changed, remain unchanged and in full force and effect.

13. CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT <input type="checkbox"/>		<input checked="" type="checkbox"/> CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN <u>3</u> COPIES TO ISSUING OFFICE	
14. NAME OF CONTRACTOR/OFFEROR <u>Earl J. Freise</u> Signature of person authorized to sign	15. UNITED STATES OF AMERICA <u>[Signature]</u> Signature of Contracting Officer	16. NAME AND TITLE OF SIGNER (Type in print) EARL J. FREISE DIRECTOR OF RESEARCH & PROGRAM DEV	17. DATE SIGNED 1-16-80
18. NAME OF CONTRACTING OFFICER (Type in print) J. P. Anderson, Chief Contract Administration Branch		19. DATE SIGNED 1/23/80	

ARTICLE B-VII PROPERTY ITEMS

A. Except as otherwise provided in this paragraph A. and paragraph B. of this Article B-VII, title to all materials, supplies and equipment purchased or otherwise acquired by the Participant in the performance of its research activities shall be and remain in the Participant. Said materials, supplies, and equipment shall be used for the benefit of research under this Agreement and any extensions or successor Agreements hereto and, provided there is no interference with said research, shall be made available for use by investigators working on any Federal research agreement at the same location. Subject to these priorities, the materials, supplies, and equipment may be used as the Participant wishes. Except as otherwise agreed in writing, title to any items of property listed as "Government property" shall pass directly to the Government; such property shall be subject to paragraphs B., C., D., E., and F. of this Article B-VII.

B. Subject to the mutual agreement of DOE and the Participant, the Government may furnish the Participant items of equipment, materials, supplies, or facilities for use by the Participant in the performance of the Agreement work; title to these items shall remain in the Government unless otherwise agreed in writing. Such items of property and the items of property listed elsewhere in this Agreement as Government property, are hereinafter referred to as "Government property." Title to Government Property shall not be affected by the incorporation or attachment thereof to any property not owned by the Government nor shall any such property, or any part thereof; be or become a fixture or lose its identity as personalty by reason of affixation to any realty.

C. To the extent practicable, the Participant shall cause all items of Government property to be suitably marked with an identifying mark or symbol indicating that the items are the property of the Government. The Participant shall maintain, at all times and in a manner satisfactory to DOE, records showing the use and disposition of Government property. Such records shall be subject to DOE inspection at all reasonable times and DOE shall at all reasonable times have access to the premises wherein any items of Government property are located. Unless otherwise authorized in writing by DOE, the Participant shall use Government property only for the purposes of this Agreement; provided, however, that the Participant is hereby authorized to use items of equipment constituting Government property for other Federal research contracts to the extent such use (1) does not interfere with its work under this Agreement, (2) is not prohibited by provisions of the other Federal contracts, and (3) is promptly reported by the Participant to DOE under this Agreement.

D. The Participant shall promptly notify DOE of any loss or destruction of or damage to Government property. It is understood that the Participant shall not be liable for any such loss, destruction, or damage, unless same results from wilful misconduct or lack of good faith on the part of any corporate officer of the Participant, or of one or more of the Participant's representatives having supervision or direction of all or substantially all of the activities under this Agreement. If the Participant is liable for any such loss, destruction, or damage, it shall promptly account therefor to the satisfaction of DOE; if the Contractor is not liable therefor, and is indemnified, reimbursed, or otherwise compensated for such loss, destruction, or damage, it shall promptly account therefor to the satisfaction of DOE.

E. With the written approval of DOE, the Participant may sell, transfer, or otherwise dispose of items of Government property to such parties and upon such terms as so approved, or itself acquire title to items of Government property upon such terms as may be mutually agreed upon in writing by the Participant and DOE. The proceeds of any such disposition, and any agreed price of any such Participant acquisition, shall be paid by the Participant to the Government, or credited on account of DOE payments to be made under this Agreement, as DOE may direct. Subject to the other provisions of this Agreement, the Participant shall deliver Government property to DOE upon request (suitably packed and shipped at the Government's expense).

F. The Participant shall utilize for the benefit of the work under this Agreement such items of property available to the Participant by reason of its activities under other Federal research Agreements as are appropriate for utilization under this Agreement pursuant to the provisions of the pertinent Federal Agreements.

1. AMENDMENT/MODIFICATION NO. A002 2. EFFECTIVE DATE 3/9/80 3. REQUISITION/PURCHASE REQUEST NO. 4. PROJECT NO. (If applicable)

5. ISSUED BY U.S. Department of Energy
Idaho Operations Office
550 Second Street
Idaho Falls, Idaho 83401 CODE 6. ADMINISTERED BY (If other than block 5) CODE

7. CONTRACTOR NAME AND ADDRESS CODE FACILITY CODE 8. AMENDMENT OF SOLICITATION NO. _____
University of North Dakota
University Station
P. O. Box 8103
Grand Forks, North Dakota 58202
Attn: Kenneth L. Harris

DATED _____ (See block 9)

MODIFICATION OF CONTRACT/ORDER NO. DE-FC07-79ID12030
 DATED 3/7/79 (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) This Change Order is issued pursuant to _____
 The Changes set forth in block 12 are made to the above numbered contract/order.

(b) The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) This Supplemental Agreement is entered into pursuant to authority of Public Law 95-91 et al.
 It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Article II - DESCRIPTION OF RESPONSIBILITIES is revised to incorporate the Participant's proposal entitled "An Evaluation of Hydrothermal Resources of North Dakota - Phase II" dated January 21, 1980 and to add the following tasks:

"Task 5

Thermal gradients will be obtained from holes of opportunity to verify validity of previously acquired data. In addition, heat flow calculations will be determined on holes of opportunity where core samples are available. A state-wide thermal gradient map will be prepared based on these and prior investigations.

Continued...

13. CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 3 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR
Earl J. Freise
 BY _____ (Signature of person authorized to sign)

17. UNITED STATES OF AMERICA
 BY J. P. Anderson
 (Signature of Contracting Officer)

15. NAME AND TITLE OF SIGNER (Type or print)
Earl J. Freise, Director
Office of Research & Prog. Dev.

16. DATE SIGNED
3-21-80

18. NAME OF CONTRACTING OFFICER (Type or print)
J. P. Anderson, Chief
Contract Administration Branch

19. DATE SIGNED
3/21/80

MAP product

Task 6

VARIETY OF MAPS

Detailed geologic maps of potential hydrothermal aquifers will be constructed for areas defined in the referenced proposal. The maps will contain detailed structural information, sand-shale ratios, expected temperatures of permeable sands, probabilities of encountering productive sands, and the proximity of population centers.

Task 7

Water quality data will be collected from county, city and local sources, as well as other state and federal agencies. Efforts will be concentrated in areas of geothermal interest as defined by previous work. These data will be entered into the data base system developed by this project.

Task 8

Any known thermal wells and corresponding geochemical information in the state will be forwarded to the USGS for incorporation in the GEOTHERM file."

2. Article II - FINANCIAL SUPPORT OF THE PROJECT is revised to read as follows:

- "A. The total estimated cost of performing the work under this Agreement is One Hundred Seventy-Three Thousand Four Hundred Eighty-Four Dollars (\$173,484.00). For performance of work under this Agreement, the agreed share ratio is 82.87% DOE, 17.13% Participant of total allowable costs. The Participant shall be reimbursed by DOE for not more than 82.87% of the costs of the project determined to be allowable in accordance with Article A-I of the General Provisions entitled 'Allowable Costs.' The remaining 17.13% or more of the costs of the project so determined shall constitute the Participant's share for which it will not be reimbursed by DOE. The total cost to DOE is hereby established as One Hundred Forty-Three Thousand Seven Hundred Sixty-Six Dollars (\$143,766.00) and this amount is also the maximum amount of the project which is subject to reimbursement by DOE unless such maximum cost is changed in writing by the Contracting Officer.
- B. With regard to any increase or decrease in the total estimated cost of this Agreement as a result of any change in the original Statement of Work as may be agreed upon by the parties during the term of this Agreement, the appropriate sharing of the funding, if any, of such increase or decrease shall be shared at the ratio of 82.87% DOE, 17.13% Participant, as agreed upon above.

C. The amount of funds obligated under this Agreement by DOE is One Hundred Thirty-Nine Thousand One Hundred Eighty-Eight Dollars (\$139,188.00). The balance of \$4,578.00 ~~represents equipment added as Government Property by this Modification No. A002 and will be obligated when and if funds become available. In no event will the Participant be reimbursed for this equipment unless and until the remaining funds are obligated.~~ At the 100% level of the obligated funds, the Participant shall stop all work." *E.S.F. JET*

The total shares, estimated cost and obligated funds are summarized as follows:

	<u>DOE Share</u>	<u>U of ND Share</u>	<u>Est. Cost</u>	<u>DOE Funds Obligated</u>
Original Contract	\$ 41,597	\$ 9,547	\$ 51,144	\$ 41,597
Inc. per Mod M001	-0-	-0-	-0-	-0-
Inc. per Mod A002	<u>102,169</u>	<u>20,171</u>	<u>122,340</u>	<u>97,591</u>
Total	\$143,766	\$ 29,718	\$173,484	\$139,188
% Share	82.87%	17.13%		

- Article IV - TERM OF AGREEMENT is revised to extend the term of the the Agreement from March 8, 1980 to March 7, 1981.
- Article VII - PROJECT INFORMATION, paragraph A. is revised to refer to the DOE Form CR-537 attached to this Modification No. A002.
- Article IX - TERMINATION, paragraph D. is changed to incorporate the Government's revised percentage share of 82.87%.
- Article XIII - GOVERNMENT PROPERTY is revised to add the following items of government property:

One Thermister Temperature Probe	\$ 263	<i>E.S.F. JET</i>
One Gamma Ray Logging Tool	-- \$1,350	
One Constant Temperature Bath	\$ 965	<i>E.S.F. JET</i>
One Four-Conductor Bore Hole Cable (2,000 ft.)	\$2,000	<i>E.S.F. JET</i>

U. S. DEPARTMENT OF ENERGY
REPORTING REQUIREMENTS CHECKLIST

DOE Form CR-537
 (1-78)

(See Instructions on Reverse)

FORM APPROVED
 OMB NO. 38R-019

1. IDENTIFICATION North Dakota Geological Survey	2. OBLIGATION INSTRUMENT: DE-FC07-79ID12030
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3. REPORTING REQUIREMENTS

A. PROJECT MANAGEMENT	Frequency	B. TECHNICAL INFORMATION REPORTING	Frequency
1. <input type="checkbox"/> Management Plan		1. <input checked="" type="checkbox"/> Notice of Energy RD&D Project (SSIE)	O
2. <input type="checkbox"/> Milestone Schedule & Status Report		2. <input checked="" type="checkbox"/> Technical Progress Report	Q
3. <input type="checkbox"/> Cost Plan		3. <input checked="" type="checkbox"/> Topical Report	Y
4. <input type="checkbox"/> Manpower Plan		4. <input checked="" type="checkbox"/> Final Technical Report	F
5. <input checked="" type="checkbox"/> Contract Management Summary Report	M	C. PMS/MINI-PMS 1. Cost Performance Report <input type="checkbox"/> Format 1 WBS <input type="checkbox"/> Format 2 Functional <input type="checkbox"/> Format 3 Baseline <input type="checkbox"/> Format 5 Problem Analysis 2. <input type="checkbox"/> Cost/Schedule Status Report 3. <input type="checkbox"/> Management Control System Description 4. <input type="checkbox"/> Summary System Description 5. <input type="checkbox"/> WBS Dictionary	
6. <input checked="" type="checkbox"/> Project Status Report	M		
7. <input type="checkbox"/> Cost Management Report			
8. <input type="checkbox"/> Manpower Management Report			
9. <input checked="" type="checkbox"/> Conference Record	A		
10. <input checked="" type="checkbox"/> Hot Line Report	A		

FREQUENCY CODES:

A - As Required	Q - Quarterly
C - Contract Change	S - Semi-Annually
F - Final (End of Contract)	X - Mandatory for Delivery with Proposals/Bid
M - Monthly	Y - Yearly or Upon Contract Renewal
O - One Time (Soon After Contract Award)	

4. SPECIAL INSTRUCTIONS

Submit all reports to the DOE Program Officer at Idaho Operations Office (ID) as indicated below:

A.5 and 6 - Six copies are due at ID within fifteen days after end of the calendar month.

B.1 - Two copies are due at ID within fifteen days after Cooperative Agreement Award.

B.2 - Six copies are due at ID within fifteen days after end of the calendar quarter.

B.3 - Six copies are due not less than forty-five days prior to completion of the yearly term.

B.4 - Submit in draft forty-five days prior to completion date of Cooperative Agreement. After thirty days for DOE review, submit eleven copies including one camera-ready copy.

5. ATTACHED HERewith:

<input type="checkbox"/> Report Distribution List	<input type="checkbox"/>
<input type="checkbox"/> WBS/Reporting Category	<input type="checkbox"/>

6. PREPARED BY (Signature and date): <i>Margaret P. Heidmayer 2/4/80</i>	7. REVIEWED BY (Signature and date):
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AMENDM^T OF SOLICITATION/MODIFICATION OF CONTRACT

1. AMENDMENT/MODIFICATION NO. A003	2. EFFECTIVE DATE 4-30-80	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
5. ISSUED BY U.S. Department of Energy Idaho Operations Office 550 Second Street Idaho Falls, Idaho 83401	6. ADMINISTERED BY (If other than block 5)	CODE	
7. CONTRACTOR NAME AND ADDRESS <i>(Street, city, county, state, and ZIP Code)</i> University of North Dakota University Station P. O. Box 8103 Grand Forks, North Dakota 58202 Attn: Kenneth L. Harris	8. FACILITY CODE	8. AMENDMENT OF SOLICITATION NO. _____ DATED _____ (See block 9) MODIFICATION OF CONTRACT/ORDER NO. DE-FC07-79ID12030 DATED 3-7-79 (See block 11)	

File M.2.7

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers is extended, is not extended. Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation date, etc.) set forth in block 12.

(c) This Supplemental Agreement is entered into pursuant to authority of Public Law 95-91 et al.
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

Article II - FINANCIAL SUPPORT OF THE PROJECT, Paragraph C., is revised to increase the obligated funds by \$4,578.00 to a new total of One Hundred Forty-Three Thousand Seven Hundred Sixty-Six Dollars (\$143,766.00).

The total shares, estimated cost, and obligated funds are summarized as follows:

	DOE Share	U of ND Share	Est. Cost	DOE Funds Obligated
Original Contract	\$ 41,597	\$ 9,547	\$ 51,144	\$ 41,597
Inc. per Mod. M001	-0-	-0-	-0-	-0-
Inc. per Mod. A002	102,169	20,171	122,340	97,591
Inc. per Mod. A003	-0-	-0-	-0-	4,578
TOTAL	\$143,766	\$29,718	\$173,484	\$143,766
% Share	82.87%	17.13%		

ops } total obligated
CE } F4 80

13. CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 3 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR Earl J. Freise <i>(Signature of person authorized to sign)</i>	15. UNITED STATES OF AMERICA J. F. Marmo <i>(Signature of Contracting Officer)</i>
16. DATE SIGNED 4/30/80	17. DATE SIGNED 5/6/80
18. NAME AND TITLE OF SIGNER (Type or print) EARL J. FREISE DIRECTOR ORPD - UND	19. NAME OF CONTRACTING OFFICER (Type or print) J. F. Marmo, Acting Director Contracts Management Division

AMENDMENT SOLICITATION/MODIFICATION CONTRACT

1. AMENDMENT/MODIFICATION NO. M004		2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
5. ISSUED BY U.S. Department of Energy Idaho Operations Office 550 Second Street Idaho Falls, Idaho 83401		CODE	6. ADMINISTERED BY (If other than block 5) M.2.7	

7. CONTRACTOR NAME AND ADDRESS University of North Dakota University Station P. O. Box 8103 Grand Forks, North Dakota 58202 Attn: Kenneth L. Harris		CODE	FACILITY CODE	8. AMENDMENT OF SOLICITATION NO. DATED _____ (See block 9) MODIFICATION OF CONTRACT/ORDER NO. DE-FC07-79ID12030 DATED 3/7/79 (See block 11)
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9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers is extended, is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) This Supplemental Agreement is entered into pursuant to authority of Public Law 95-91 et al.
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

In accordance with the Participant's letter dated April 18, 1980:

1. Article II - DESCRIPTION OF RESPONSIBILITIES, is revised to add the following Task 9:

"Task 9

Design and develop a base map-location coordinate system which incorporates the land office grid system, decimal latitude and longitude, and the universal transverse mercator coordinate systems. Use this system to develop a North Dakota computer base map which is accurate to a scale of 1" = 1 mile. Modify the GEOSTOR computer library system to include latitude, longitude, and UTM coordinate values."

2. The parties agree that this Modification No. M004 does not increase either the total estimated cost of the project of \$173,484.00 or the total cost to DOE of \$143,766.00.

except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

3. CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE

4. NAME OF CONTRACTOR/OFFEROR	17. UNITED STATES OF AMERICA
Y _____ (Signature of person authorized to sign)	BY _____ (Signature of Contracting Officer)

5. NAME AND TITLE OF SIGNER (Type or print)	16. DATE SIGNED	18. NAME OF CONTRACTING OFFICER (Type or print) Nell W. Fraser, Acting Chief R&D Contracts Branch	19. DATE SIGNED
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M 2.7

MAR 9 1981

University of North Dakota
University Station
P. O. Box 8103
Grand Forks, North Dakota 58202

ATTENTION: Kenneth L. Harris

SUBJECT: MODIFICATION NO. M005 TO COOPERATIVE AGREEMENT
NO. DE-FC07-79ID12030

Gentlemen:

The subject modification is enclosed which extends the Agreement term to May 1, 1981. DOE understands that budget adjustments will be made as necessary; however, no increase in funding is authorized.

Very truly yours,

(s/d) William C. Drake

William C. Drake
Contracting Officer
Chief, R&D Contracts Branch
Contracts Management Division

Enclosure

bcc: E. G. Jones, w/enc.
R. L. Combs, w/enc.
H. A. Widmayer, w/enc.

RECORD NOTE: E&T concurred per the PR Budget concurrence is not required as no new FY will be impacted.

R&DCB
EMHyster:gn
3-9-81

R&DCB
WCDrake

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. AMENDMENT/MODIFICATION NO. M305	2. EFFECTIVE DATE 3-8-81	3. REQUISITION/PURCHASE REQUEST NO. 07-81ID12030.502	4. PROJECT NO. (If applicable)
5. ISSUED BY Department of Energy Operations Office Second Street Boise Falls, Idaho 83401		6. ADMINISTERED BY (If other than block 5)	

CONTRACTOR NAME AND ADDRESS University of North Dakota University Station P. O. Box 8103 Grand Forks, North Dakota 58202	8. AMENDMENT OF SOLICITATION NO. <input type="checkbox"/>	DATED _____ (See block 9)
	<input checked="" type="checkbox"/> MODIFICATION OF CONTRACT/ORDER NO. DE-FC07-79ID12030	DATED 3-7-79 (See block 11)

THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers is extended, is not extended.

You must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) Signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

FINANCING AND APPROPRIATION DATA (If required)

THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

This Change Order is issued pursuant to _____

The Changes set forth in block 12 are made to the above numbered contract/order.

The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

This Supplemental Agreement is entered into pursuant to authority of mutual agreement of the parties.

It modifies the above numbered contract as set forth in block 12.

DESCRIPTION OF AMENDMENT/MODIFICATION:

As requested by Participant's letter of February 23, 1981, the term of the Agreement is hereby extended to May 1, 1981 with no increase in the total estimated cost of \$173,484 or the DOE share of \$143,765.

As provided herein, all terms and conditions of the document referenced in block 3, as heretofore changed, remain unchanged and in full force and effect.

CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE

NAME OF CONTRACTOR/OFFEROR	17. UNITED STATES OF AMERICA
(Signature of person authorized to sign)	BY <u>William C. Drake</u> (Signature of Contracting Officer)
NAME AND TITLE OF SIGNER (Type or print)	16. DATE SIGNED
	18. NAME OF CONTRACTING OFFICER (Type or print) William C. Drake
	19. DATE SIGNED 3/9/81

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. AMENDMENT/MODIFICATION NO. A006	2. EFFECTIVE DATE 5-1-81	3. REQUISITION/PURCHASE REQUEST NO. 07-81ID12030.501	4. PROJECT NO. (If applicable)
5. ISSUED BY U. S. Department of Energy 550 Second Street Idaho Falls, ID 83401		6. ADMINISTERED BY (If other than block 5)	

7. CONTRACTOR NAME AND ADDRESS University of North Dakota University Station P. O. Box 8103 Grand Forks, North Dakota 58202	8. AMENDMENT OF SOLICITATION NO. MODIFICATION OF CONTRACT/ORDER NO. DE-FC07-79ID12030 DATED 3-7-79
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9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers is extended, is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

Appropriation 89x0224.91 Object Class 250
Allotment ID-14-91 B&R No. RM15100000 \$144,500.00

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) This Supplemental Agreement is entered into pursuant to authority of Public Law 95-91 et.al.
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Article II - DESCRIPTION OF RESPONSIBILITIES is revised to add the following tasks:

Task 10
All available wells in areas not previously studied will be logged for geothermal gradient information. The Participant will case and cement any available "holes-of-opportunity" to obtain reliable heat flow determinations. Such wells will be completed in areas requiring additional information as determined by the existing data base. About four "holes-of-opportunity" will be completed by the Participant.

Task 11
The Participant will develop structure and isopach maps (scale 1:500,000) for the Cretaceous Fox Hills and Hell Creek Formations in western North Dakota. The Participant will also characterize Pleistocene aquifers in eastern and northern North Dakota for location and depth to aquifers in order to augment existing hydro-thermal aquifer information in this program.

Task 12
The Participant will summarize available water quality data for the Inyan Kara

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. <input type="checkbox"/> CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT <input checked="" type="checkbox"/> CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN <u>2</u> COPIES TO ISSUING OFFICE			
14. NAME OF CONTRACTOR/OFFEROR BY <u>Earl J. Freise</u> (Signature of person authorized to sign)		17. UNITED STATES OF AMERICA BY <u>William C. Drake</u> (Signature of Contracting Officer)	
15. NAME AND TITLE OF SIGNER (Type or print) EARL J. FREISE DIRECTOR - ORPD	16. DATE SIGNED 5-28-81	18. NAME OF CONTRACTING OFFICER (Type or print) William C. Drake	19. DATE SIGNED 6/2/81

MODIFICATION NO. A006
DE-FC07-79ID12030

Formation and other select aquifers. This includes performing independent water analyses (about 30 samples) for select wells to verify the data base.

Task 13

The Participant will assemble a summary of the depth, thickness, expected water temperature, and water quality using available data. This summary will include data collected during this program and a detailed users guide for the design, implementation, and use of the computer library system used. Findings will be submitted by the Participant to a nationally recognized scientific journal for publication, after submission to DOE for approval.

Task 14

The Participant will coordinate activities and make data summaries available to the North Dakota geothermal commercialization team. The Participant will also respond to user assistance requests for data and for additional field studies where these requests are financially and practically possible. A file of all user assistance requests will be established and maintained by the Participant. A report of user assistance activities will accompany each monthly report submitted to DOE.

Monthly and annual reports will be submitted in accordance with Article VII - PROJECT INFORMATION.

2. Article III - FINANCIAL SUPPORT OF THE PROJECT is revised to read as follows:

- A. The total estimated cost of performing the work under this Agreement is Three Hundred Forty-Seven Thousand Two Hundred Sixty-Five Dollars (\$347,265.00). For performance of the work under this Agreement, the agreed share ratio is 83% DOE, 17% Participant of total allowable costs. The Participant shall be reimbursed by DOE for not more than 83% of the costs of the project determined to be allowable in accordance with Article A-I of the General Provisions entitled "Allowable Costs." The remaining 17% or more of the costs of the project so determined shall constitute the Participant's share for which it will not be reimbursed by DOE. The total cost to DOE is hereby established as Two Hundred Eighty-Eight Thousand Two Hundred Sixty-Six Dollars (\$288,266.00) and this amount is also the maximum amount of the project which is subject to reimbursement by DOE unless such maximum cost is changed in writing by the Contracting Officer.
- B. With regard to any increase or decrease in the total estimated cost of this Agreement as a result of any change in the original Statement of Work as may be agreed upon by the parties during the term of this Agreement, the appropriate sharing of the funding, if any, of such increase or decrease shall be shared at the ratio of 83% DOE, 17% Participant, as agreed upon above.
- C. The total amount of funds obligated under this Agreement by DOE is Two Hundred Eighty-Eight Thousand Two Hundred Sixty-Six Dollars (\$288,266.00).

The total shares, estimated cost, and obligated funds are summarized as follows:

MODIFICATION NO. A006
DE-FC07-79ID12030

	<u>DOE Share</u>	<u>UND Share</u>	<u>Est. Cost</u>	<u>Obligated</u>
Basic Agreement	\$41,597	\$9,547	\$51,144	\$41,597
Inc. per Mod M001	-0-	-0-	-0-	-0-
Inc. per Mod A002	102,169	20,171	122,340	97,591
Inc. per Mod A003	-0-	-0-	-0-	4,578
Inc. per Mod M004	-0-	-0-	-0-	-0-
Inc. per Mod M005	-0-	-0-	-0-	-0-
Inc. per Mod A006	<u>144,500</u>	<u>29,281</u>	<u>173,781</u>	<u>144,500</u>
Total	\$288,266	\$58,999	\$347,265	\$288,266
% Share	83%	17%		

3. Article IV - TERM OF AGREEMENT is revised to extend the term of the Agreement from May 1, 1981 to May 1, 1982.
4. Article VII - PROJECT INFORMATION, paragraph A. is revised to refer to the DOE Form CR-537 attached to this Modification No. A006.
5. Article IX - TERMINATION, paragraph D. is changed to incorporate the Government's revised percentage share of 83%.
6. Article XIII - GOVERNMENT PROPERTY is revised to read as follows:

"The following items of property procured or fabricated by the Participant are hereby listed as "Government property":

NONE"

U.S. DEPARTMENT OF ENERGY
REPORTING REQUIREMENTS CHECKLIST

(See Instructions on Reverse)

1. IDENTIFICATION University of North Dakota	2. OBLIGATION INSTRUMENT: DE-FC07-79ID12030
--	---

3. REPORTING REQUIREMENTS

A. PROJECT MANAGEMENT	Frequency	B. TECHNICAL INFORMATION REPORTING	Frequency
1. <input type="checkbox"/> Management Plan 2. <input type="checkbox"/> Milestone Schedule & Status Report 3. <input type="checkbox"/> Cost Plan 4. <input type="checkbox"/> Manpower Plan 5. <input checked="" type="checkbox"/> Contract Management Summary Report 6. <input checked="" type="checkbox"/> Project Status Report 7. <input checked="" type="checkbox"/> Cost Management Report 8. <input type="checkbox"/> Manpower Management Report 9. <input type="checkbox"/> Conference Record 10. <input type="checkbox"/> Hot Line Report	M M M	1. <input type="checkbox"/> Notice of Energy RD&D Project (SSIE) 2. <input checked="" type="checkbox"/> Technical Progress Report 3. <input checked="" type="checkbox"/> Topical Report 4. <input checked="" type="checkbox"/> Final Technical Report C. PMS/MINI-PMS 1. Cost Performance Report <input type="checkbox"/> Format 1 WBS <input type="checkbox"/> Format 2 Functional <input type="checkbox"/> Format 3 Baseline <input type="checkbox"/> Format 5 Problem Analysis 2. <input type="checkbox"/> Cost/Schedule Status Report 3. <input type="checkbox"/> Management Control System Description 4. <input type="checkbox"/> Summary System Description 5. <input type="checkbox"/> WBS Dictionary	M Y Y

FREQUENCY CODES:

A - As Required C - Contract Change F - Final (End of Contract) M - Monthly O - One Time (Soon After Contract Award)	Q - Quarterly S - Semi-Annually X - Mandatory for Delivery with Proposals/Bid Y - Yearly or Upon Contract Renewal
--	--

4. SPECIAL INSTRUCTIONS

A.5., A.6., and A.7. - Copies are due within fifteen days after end of the calendar month.

B.2. - Copies are due within fifteen days after end of the calendar month.

B.3. - Submit 2 copies in draft forty-five days prior to completion of the yearly term. After DOE approval is received, submit copies as required on attached "Report Distribution List."

B.4. - Submit 2 copies in draft forty-five days prior to completion date of contract term. After DOE approval is received, submit eleven copies including one camera-ready copy.

5. ATTACHED HEREWITH:

<input checked="" type="checkbox"/> Report Distribution List	<input type="checkbox"/>
<input type="checkbox"/> WBS/Reporting Category	<input type="checkbox"/>

6. PREPARED BY (Signature and date): 	7. REVIEWED BY (Signature and date):
---	---

U. S. DEPARTMENT OF ENERGY

PROCUREMENT/FINANCIAL ASSISTANCE REQUEST - AUTHORIZATION

Mod to DE-FC07-71D120
NORTH DAKOTA
NCTE 8/1/82

1. TO CMD
2. FROM INITIATING OFFICE E&T DIVISION
3. INITIAL: [] UPDATE: [] 4. PROCUREMENT: [] FINANCIAL ASSISTANCE: []
5. PR NUMBER: _____ 6. PR CORRECTION LETTER: _____ 7. RELATED PR NUMBER: _____

ACTION IDENTIFICATION

8. TITLE: Geothermal Resource Assessment in North Dakota No-cost time extension

9. UNSOLICITED PROPOSAL NO: _____ 10. PROJECT NO: _____ 11. CFDA NO: _____
12. PRODUCT OR SERVICE: * AG3X 13. SUPPORT SERVICES: YES [] NO [] 14. CONSULTANT AWARD: YES [] NO []
15. CONTROLLED DELIVERABLE: * AGX 16. REPORT/DRAWING REQ: YES [] NO [] IF YES, ATTACH DETAILS.
17. CLASSIFICATION OF MATERIALS/WORK: _____ U - UNCLASSIFIED C - CONFIDENTIAL S - SECRET T - TOP SECRET
18. GOVERNMENT PROPERTY: _____ F - FURNISHED P - PURCHASED N - NOT INVOLVED IF CODE F OR P, ATTACH DETAILS.

AWARD PLANNING

19. AWARD AS ORDER UNDER BIN: _____ 20. DESIRED AWARD DATE: ASAP 21. KIND OF AWARD ACTION: * LQ 22. TYPE OF AWARD: * I IF CODE T, ATTACH DETAILS.
23. IF MULTI-YEAR AWARD, INDICATE NUMBER OF YEARS: _____ 24. TYPE SOLICITATION INSTRUMENT: * _____
25. EXTENT OF COMPETITION: * _____ IF COMPETITIVE, ATTACH TECHNICAL EVALUATION PLAN. IF NON-COMPETITIVE, ATTACH JUSTIFICATION. REF: DOE-PR 9-3.805.51 or 9-4.909(f).
26. SOURCE SELECTION PROCEDURE: _____ 1 - A-E 2 - SEB 3 - OTHER 4 - NONE
27. FOR A-E, SHOW ESTIMATED CONSTRUCTION COST IN DOLLARS: _____

AWARDEE

IF COMPETITIVE, HAS LIST OF SOURCES BEEN ATTACHED? YES [] NO [] IF NON-COMPETITIVE, COMPLETE 28-31
28. NAME: University of North Dakota 29. ADDRESS: University Station
30. DIVISION: North Dakota Geological Survey Grand Forks, ND 58202
31. GOCO/LAB: _____ A - GOCO/LAB B - GOCO/NON-LAB C - NON-GOCO/LAB D - NOT APPLICABLE

FINANCIAL

AWARD VALUE DOLLAR AMOUNT
32. GOV'T SHARE -0-
33. TOTAL _____
34. CONSIDERATION IN KIND, LOAN, OR LOAN GUARANTEE DATA REPORTED ON PR-799C: []
35. PROJECT PERIOD: FROM 05 01 82 THRU 08 01 82
MONTH DAY YEAR MONTH DAY YEAR
CURRENT FY FUNDS COMMITTED
36. B&R NUMBER 37. FUND CLASS 38. DOLLAR AMOUNT

39. FROM PR-799B (PART A) _____
40. TOTAL THIS PR _____
41. FUNDING PERIOD: FROM _____ THRU _____
MONTH DAY YEAR MONTH DAY YEAR
42. APPROPRIATION SYMBOL: _____
43. ALLOTMENT SYMBOL: _____
44. OBJECT CLASS: _____

PROJECT MANAGER

45. NAME: SUSAN M. PRESTWICH
46. SIGNATURE: Susan M. Prestwich
47. DATE: 02 12 82 48. OFFICE CODE: _____
MONTH DAY YEAR
49. FTS TELEPHONE NUMBER: 6-1147

PROGRAM OFFICIAL

50. NAME: R. E. Wood
51. SIGNATURE: R. E. Wood
52. DATE: 2 12 82
MONTH DAY YEAR

CERTIFYING OFFICIAL

53. NAME: F. S. Smith
I HEREBY CERTIFY THAT THE FUNDS CITED IN ITEM 40 ARE AVAILABLE.
54. SIGNATURE: _____
55. DATE: _____
MONTH DAY YEAR

* SEE BACK OF FORM FOR CODES

THE
UNIVERSITY
OF
NORTH
DAKOTA

ENGINEERING EXPERIMENT STATION
Box 8103, University Station
Grand Forks, North Dakota 58202
(701) 777-3132

February 1, 1982

Ms. Elizabeth Hyster
DOE/ID
550 2nd Street
Idaho Falls, ID 83401

Dear Ms. Hyster:

We are here-with requesting a three-month, no-cost extension to our cooperative agreement DOE-FC07-7912030. This would extend our contract period from 1 May, 1982 to 1 August, 1982. The justification for this request follows.

An abstract we submitted to the AAPG national-international conference in Calgary, Alberta; Canada, has been accepted for oral presentation. A copy of the abstract, "Geothermal Resources of North Dakota" is attached. We are requesting the no-cost time extension so that the presentation of this paper (29 June, 1982), and associated travel time, falls within our funded contract period. Thank you for your cooperation.

Respectfully,



K.L. Harris
Co-Principal Investigator



F.L. Howell
Co-Principal Investigator

KLH/amf

Attachment

THE
UNIVERSITY
OF
NORTH
DAKOTA

ENGINEERING EXPERIMENT STATION

Box 8103, University Station
Grand Forks, North Dakota 58202
(701) 777-3132

November 18, 1982

Mr. Duncan Foley
UURI
Earth Science Laboratory
420 Chepeta Way, Suite 120
Salt Lake City, Utah 84108

Dear Mr. Foley:

Enclosed find our Phase III Final Technical Report. This completes our current contractual requirements under State Coupled Cooperative Agreement, Contract No. DE-FC07-79ID12030.

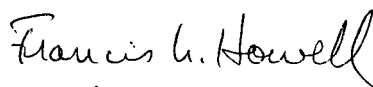
Dr. Will Gosnold is currently preparing a proposal for a no-cost extension to add additional heat flow and deep-well temperature gradient data to our study. His proposal should be mailed within a week.

Thank you for your assistance and support during the course of our study. We have learned a great deal during the study and have enjoyed working with you.

Respectfully,



Kenneth L. Harris
Co-Principal Investigator



Francis L. Howell
Co-Principal Investigator

KLH/lcc

Enclosure

U. S. DEPARTMENT OF ENERGY
PROCUREMENT/FINANCIAL ASSISTANCE REQUEST-AUTHORIZATION

1. TO CMD
2. FROM INITIATING OFFICE EST GEOTHERMAL

3. INITIAL: [X] UPDATE: [] 4. PROCUREMENT: [] FINANCIAL ASSISTANCE: []
5. PR NUMBER: _____ 6. PR CORRECTION LETTER: _____ 7. RELATED PR NUMBER: _____

ACTION IDENTIFICATION
8. TITLE: North Dakota State Resource Assessment
NOTE modification DE FCOI-79 ID 12030

9. UNSOLICITED PROPOSAL NO: _____ 10. PROJECT NO: _____ 11. CFDA NO: _____
12. PRODUCT OR SERVICE: * _____ 13. SUPPORT SERVICES: YES [] NO [] 14. CONSULTANT AWARD: YES [] NO []
15. CONTROLLED DELIVERABLE: * _____ 16. REPORT/DRAWING REQ: YES [] NO [] IF YES, ATTACH DETAILS.
17. CLASSIFICATION OF MATERIALS/WORK: _____ U-UNCLASSIFIED C-CONFIDENTIAL S-SECRET T-TOP SECRET
18. GOVERNMENT PROPERTY: _____ F-FURNISHED P-PURCHASED N-NOT INVOLVED IF CODE F OR P, ATTACH DETAILS.

AWARD PLANNING
19. AWARD AS ORDER UNDER BIN: _____ IF CODE T, ATTACH DETAILS.
20. DESIRED AWARD DATE: _____ 21. KIND OF AWARD ACTION: * _____ 22. TYPE OF AWARD: * _____
23. IF MULTI-YEAR AWARD, INDICATE NUMBER OF YEARS: _____ 24. TYPE SOLICITATION INSTRUMENT: * _____
25. EXTENT OF COMPETITION: * _____ IF COMPETITIVE, ATTACH TECHNICAL EVALUATION PLAN. IF NON-COMPETITIVE, ATTACH JUSTIFICATION. REF: DOE-PR 9-3,805.51 or 9-4,909(f).
26. SOURCE SELECTION PROCEDURE: _____ 1-A-E 2-SEB 3-OTHER 4-NONE
27. FOR A-E, SHOW ESTIMATED CONSTRUCTION COST IN DOLLARS: _____

AWARDEE
IF COMPETITIVE, HAS LIST OF SOURCES BEEN ATTACHED? YES [] NO [] IF NON-COMPETITIVE, COMPLETE 28-31.
28. NAME: University of North Dakota 29. ADDRESS: Grand Forks, ND 58202
30. DIVISION: _____
31. GOCO/LAB: _____ A-GOCO/LAB B-GOCO/NON-LAB C-NON-GOCO/LAB D-NOT APPLICABLE

FINANCIAL AWARD VALUE DOLLAR AMOUNT
32. GOV'T SHARE 0
33. TOTAL _____
34. CONSIDERATION IN KIND, LOAN, OR LOAN GUARANTEE DATA REPORTED ON PR-799C: []
35. PROJECT PERIOD: FROM _____ THRU 9 30 83
CURRENT FY FUNDS COMMITTED
36. B&R NUMBER FUND CLASS DOLLAR AMOUNT
37. _____ 38. _____
39. FROM PR-799B (PART A) _____
40. TOTAL THIS PR 0
41. FUNDING PERIOD: FROM _____ THRU _____
42. APPROPRIATION SYMBOL: _____
43. ALLOTMENT SYMBOL: _____
44. OBJECT CLASS: _____

PROJECT MANAGER
45. NAME: SM Prestwich
46. SIGNATURE: SM Prestwich
47. DATE: 12 15 83 48. OFFICE CODE: _____
49. FTS TELEPHONE NUMBER: _____

PROGRAM OFFICIAL
50. NAME: RE Wood
51. SIGNATURE: _____
52. DATE: _____

CERTIFYING OFFICIAL
53. NAME: F.S. Smith
I HEREBY CERTIFY THAT THE FUNDS CITED IN ITEM 40 ARE AVAILABLE.
54. SIGNATURE: _____
55. DATE: _____

* SEE BACK OF FORM FOR CODES

THE
UNIVERSITY
OF
NORTH
DAKOTA

ENGINEERING EXPERIMENT STATION
Box 8103, University Station
Grand Forks, North Dakota 58202
(701) 777-3132

November 23, 1982

Ms. Susan Prestwich
DOE/ID
550 Second Street
Idaho Falls, ID 83401

Dear Ms. Prestwich:

We are requesting a no-cost time extension for the North Dakota Geothermal Resource Assessment Program to add new heat flow and deep-well temperature gradient data to the project. These additional data will allow us to make analyses of subsurface temperatures that may greatly enhance the final assessment of the geothermal resource potential of North Dakota.

The specific tasks to be completed during the no-cost time extension are as follows:

- (1) Collect equilibrium temperature gradients in shut-in or abandoned oil and gas wells, or deep water wells, that penetrate potential geothermal aquifers. These data will be used with stratigraphic and thermal conductivity data to estimate temperatures in two potential geothermal aquifers, the Inyan Kara (Cretaceous) and the Madison (Mississippian). The method of analysis will be that used in the Nebraska Geothermal Resources Assessment where these types of data were used successfully to determine the geothermal resource potential of the state. A description of the Nebraska analysis is included in the enclosed paper by Gosnold and Eversoll.
- (2) Install several new heat flow holes along a profile across the eastern margin of the Williston Basin to determine if updip water flow is enhancing the geothermal potential along the margins of the basin. Regional ground water flow enhances the geothermal resource potential of western Nebraska where water flows out of the Denver-Julesburg Basin and it is known to cause geothermal deposits at constrictions in the Rio Grande valley (Chan Swanberg, personal communication). A visual inspection of the North Dakota Geothermal Resource Map, which was produced from bottom-hole-temperature data, indicates that updip flow may be occurring on the margins of the Williston Basin; however, the present data are insufficient to document the flow. Heat flow data are especially sensitive to water flow and would allow calculation of the order of magnitude of water flow. These new data would be used to delineate flow-enhanced geothermal areas that are undetectable with the present data. See enclosed manuscript on heat flow and ground water movement by Will Gosnold.

- (3) Utilize the data in the first two tasks to assess the accuracy of the present geothermal data of North Dakota that are based on bottom-hole temperatures only. The possible misleading nature of the BHT data is discussed in the enclosed paper on Geothermal Resource Maps and Bottom Hole Temperature Surveys by Will Gosnold. The essence of that report is that if bottom-hole temperatures were the only data used in the Nebraska study, the geothermal resource potential would have been underestimated by 80 percent.

Completion of these tasks will be accomplished by August 31, 1983 and the final report will be completed by September 30, 1983. The funds necessary to complete the proposed no-cost time extension remain as unexpended funds in the present contract. These funds were originally budgeted for heat flow and temperature gradient logging, thus they will be expended as originally intended. The North Dakota Geological Survey will provide personnel and field vehicles; the University of North Dakota Geology Department and the North Dakota Geological Survey will provide the equipment computer time necessary to conduct the work. William Gosnold who is employed by both the University of North Dakota and the North Dakota Geological Survey will be the principal investigator for the work to be done in the time extension.

Sincerely,



William Gosnold
Principal Investigator



Alex Kotch, Director
Office of Research and
Program Development

WDG/amf

Enclosures

RECEIVED

NOV 29 1982

ADVANCED TECHNOLOGY
BRANCH

PROPOSAL BUDGET
August 1, 1982 - September 30, 1983

Salaries and Benefits

Clerical		
.5 months @ \$1209/month	\$605	
Drafting		
.2 months @ \$1055/month	211	
Benefits @ 20% of Salaries	<u>163</u>	
Total Salaries and Benefits		\$ 979

Travel

Field Expenses (Vehicle miles to be contributed by NDGS approx. 7000 miles)		
Per Diem 15 days @ 42/days in state	\$ 630	
Travel to 1 meeting (transportation, per diem, and registration)	<u>1,000</u>	
Total Travel		1,630

Drilling

3100 feet @ \$4.80/foot		14,880
-------------------------	--	--------

Supplies

3500 ft. of pipe @ \$1.10/ft. (plus shipping)	\$ 3,900	
Field supplies	250	
Phone	150	
Publication, Duplicating, Office, etc.	<u>250</u>	
Total Supplies		4,550

Computer

Total Direct Costs		<u>1,000</u> \$23,039
--------------------	--	--------------------------

Indirect ⁽¹⁾

5,889

Total Project ⁽²⁾

\$28,928

(1) Indirect Costs:

On Campus @ 35.5%		
Salaries and Benefits	\$ 979	
Publication, duplicating, office	250	
	<u>\$1,229 @ 35.5%</u>	\$ 436
Off Campus @ 25%		
Travel	\$ 1,630	
Drilling	14,880	
Supplies	4,300	
Computer	<u>1,000</u>	
	<u>\$21,810 @ 25%</u>	<u>5,453</u>
Total Indirect Cost		<u><u>\$5,889</u></u>

(2) The total amount represents rebudgeting of estimated funds remaining on the current project. The total dollar amount obligated of \$288,266 remains unchanged.