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MASTER

IDAHO
GEOTHERMAL
R&D PROJECT

DRILLING PLAN

RAFT RIVER GEOTHERMAL EXPLORATORY HOLE NO. 2

APRIL 1975

U. S. ENERGY RESEARCH
AND
DEVELOPMENT ADMINISTRATION

IDAHO OPERATIONS OFFICE
NEVADA OPERATIONS OFFICE

DISCLAIMER

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IDAHO GEOTHERMAL R&D PROJECT

DRILLING PLAN

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APRIL 1975

Approved by

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DATE 22 April 1975

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DATE 11 April 1975

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U. S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

IDAHO OPERATIONS OFFICE
NEVADA OPERATIONS OFFICE

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I. INTRODUCTION

A. Background

The Raft River Valley in south-central Idaho lies within a region that has in the past and may yet be undergoing severe tectonic stress. This stress acting on the subsurface rock at depth has caused thinning of the earth's crust and the intrusion of magmatic material into near surface formations from deep within the earth. This creates the higher heat flow observed in the Northwestern United States. In the Raft River Valley, the inferred intersection of two faults has apparently opened deep earth structures allowing circulation of water to very deep hot rock.

If favorable resources are located by exploratory holes drilled into these circulation structures, then wells can be drilled to supply the hot water required for a demonstration electric power plant. The Idaho Geothermal R&D Project, funded by the Idaho Operations Office of the U.S. Energy Research and Development Administration, completed in April, 1975, an exploratory hole to a depth of 5,007 feet. The temperature of the water encountered at this depth was approximately 290°F. A second exploratory hole will now be drilled to further investigate the geothermal resource, and if successful, to complete a test loop for geothermal power plant component tests and resource characteristics analysis.

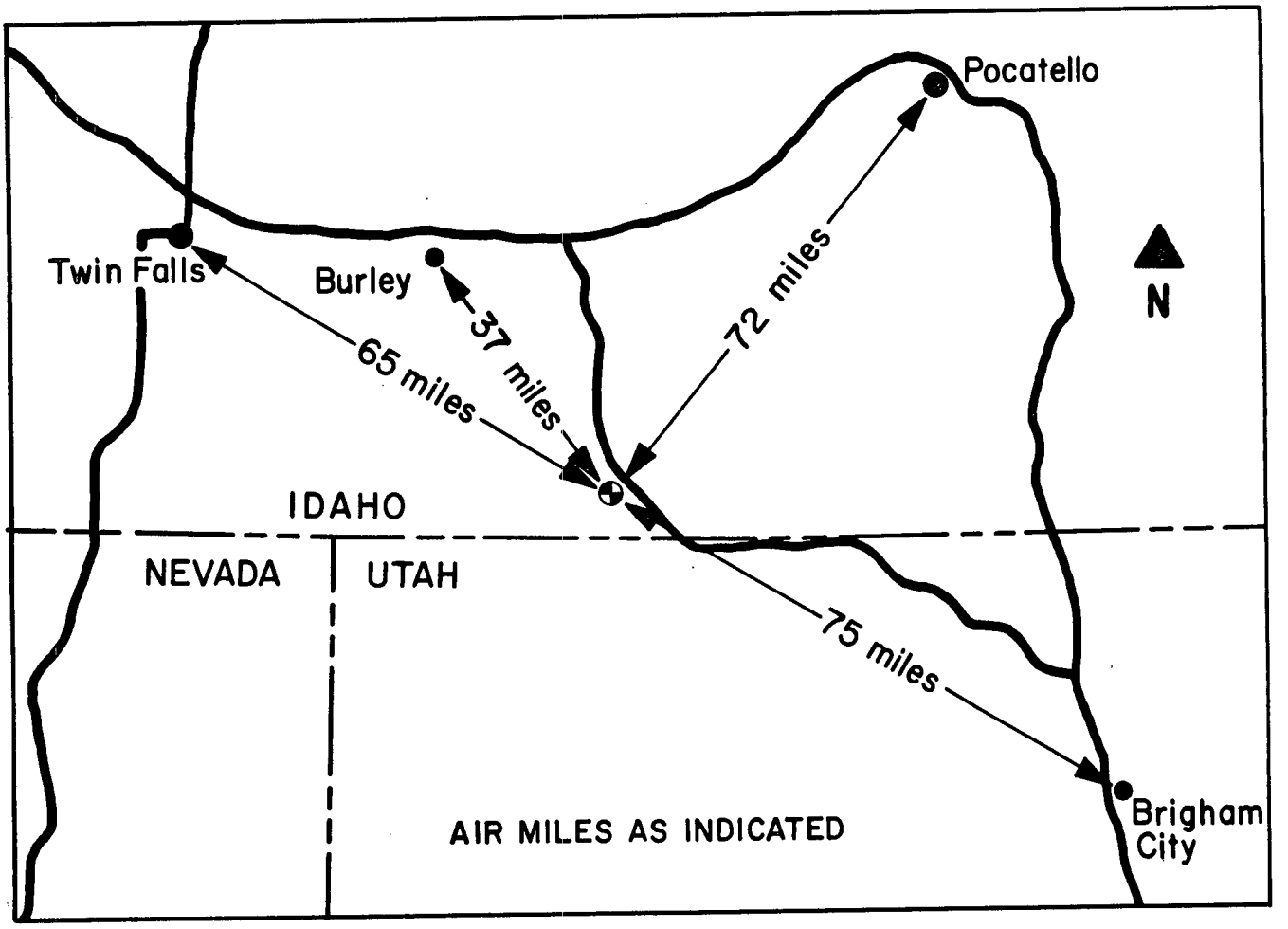
This document describes the program, plans, and procedures to be used in drilling and completion of the Raft River Geothermal Exploratory Hole No. 2 (RRGE-2).

B. Program Description

This second deep exploratory hole will attempt to intersect a deep geothermal circulation system. The drill site is located in south-central Idaho approximately 72 air miles southwest of Pocatello and 37 air miles southeast of Burley near the Raft River (see Figure I-1).

Program direction and management of the Idaho Geothermal R&D Project is provided by the Aerojet Nuclear Company (ANC), a prime contractor to the Energy Research and Development Administration's Idaho National Engineering Laboratory (INEL). The drilling of RRGE-2, at the request of ERDA-ID/ANC, will be performed by the Reynolds Electrical & Engineering Co., Inc., (REECo), a prime contractor to the U.S. Energy Research and Development Administration's Nevada Operations Office (NV).

The drilling of RRGE-2 will require the relocation of the ERDA drill rig from the RRGE-1 site northeast to the second site approximately 4,000 feet away, where REECo personnel will drill the second exploratory hole. The schedule of major activities is shown in Appendix A. The drilling operation will consist of: (1) drilling a 42-inch hole to approximately 40 feet and running and cementing a 30-inch conductor pipe to the surface, (2) drilling a 26-inch hole with mud to approximately 900 feet or as required, and running and cementing 20-inch casing to the surface, (3) drilling a 12 1/4-inch hole to a depth of approximately 3,500 feet using mud as the drilling fluid, (4) alternately drilling ahead and conducting drill stem tests (DSTs) in the hole in the region of 2,000 feet and then again starting at 3,500



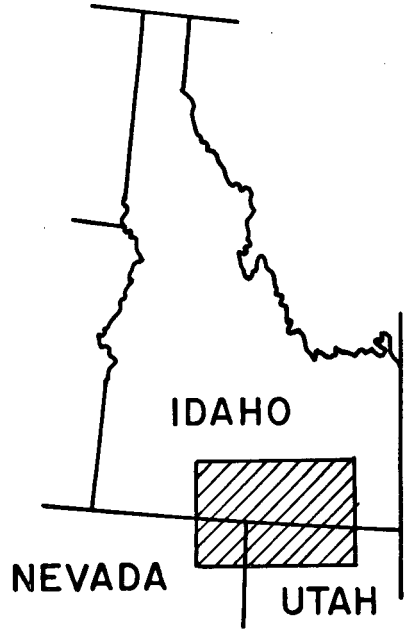


FIG. I-1
SITE LOCATION-
IDAHO GEOTHERMAL
R&D PROJECT

feet to the depth at which temperature and flow data indicate that the hole is in the vicinity of an acceptable hot water resource or that DSTs are to be terminated, (5) ream hole to total depth with 17 1/2-inch bit drilled with mud and run and cement 13 3/8-inch casing to the surface, and (6) drill out of the shoe with water to a depth which will penetrate the deep circulation system.

II. GENERALIZED SITE ACTIVITIES

A. Site Preparation and Maintenance

The drilling will take place on a drill pad of approximately 2.5 acres (see Figure II-1). Reynolds Electrical & Engineering Co., Inc. (REECo), will subcontract necessary site preparation as follows:

1. Prepare a drill pad by leveling, compacting gravel, and finishing with road gravel mix.
2. Excavate mud reserve pit.
3. Excavate for a concrete-lined cellar.
4. Install and cement a 30-inch conductor pipe.
5. Prepare an access road.
6. Drill "rat" and "mouse" holes.
7. Provide for site maintenance, as required.

B. Trailer

ANC will provide one combination living and office trailer (60 feet long, 12 feet wide). This trailer will contain cooking facilities, bunks, office furnishings, and sanitary facilities and will accommodate REECo drilling, supervisory, and service personnel. A second, smaller trailer will be supplied by ANC to accommodate NV, ID, and ANC personnel.

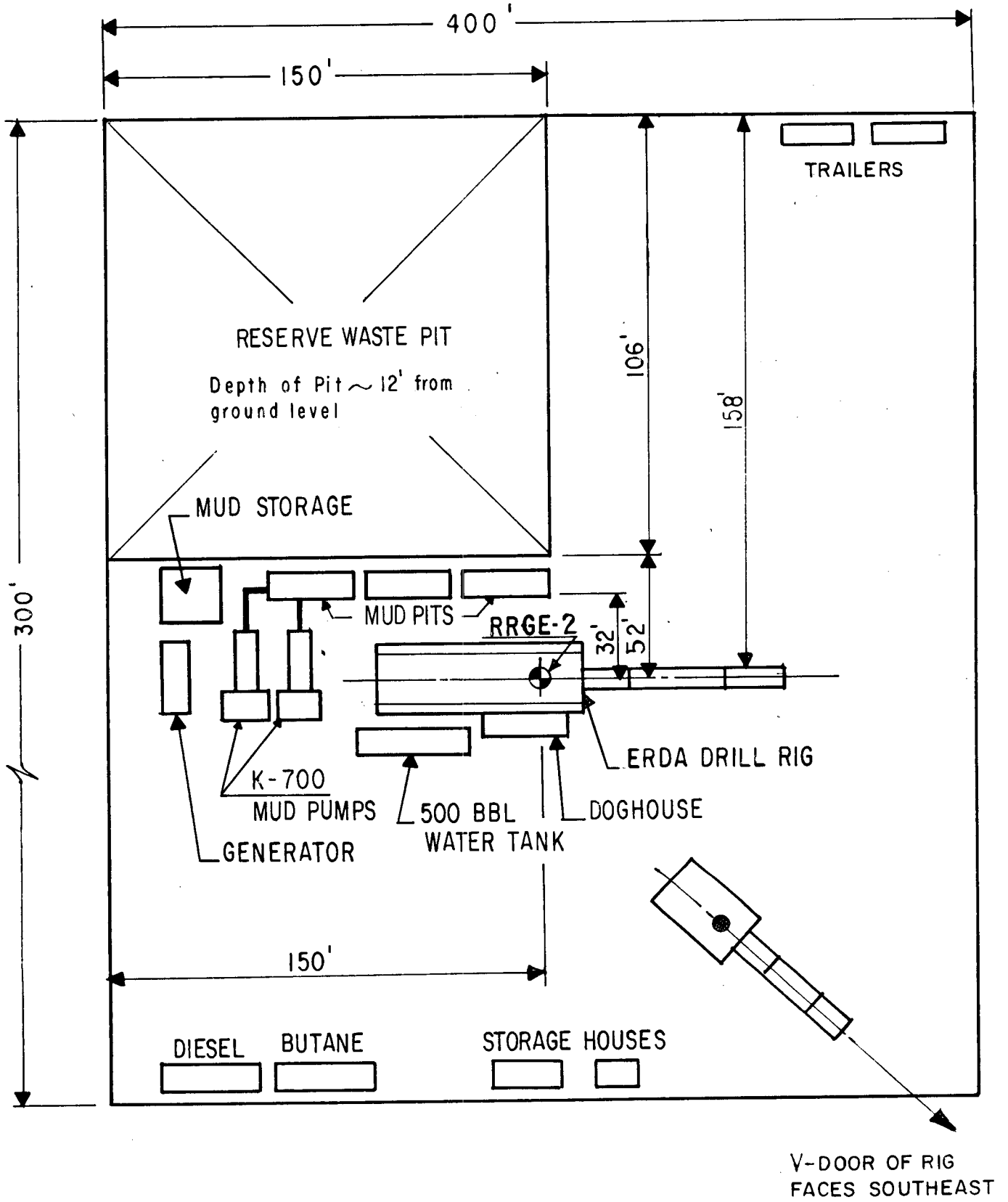


FIG. II - 1 RRGE# 2 SITE LAYOUT

C. Communications

ANC will provide three telephone lines to the site. The telephone lines will be located in both the 60-foot and the smaller trailers. The telephones can be dialed into the leased line at the Idaho National Engineering Laboratory (INEL) where access to the FTS is available at all hours. ID will attempt to obtain a second leased line to the INEL. An intercom will also be installed between the trailers.

D. Power

ANC will negotiate with the Raft River Rural Electric Cooperative for the extension of power from nearby lines to the drill site. The power requirements are 75 kva at 60 Hertz and 230 volts, three phase. Further on-site distribution of power to trailers, pumps, and other facilities, as required, will be provided by ANC, as well as three daylight sensitive flood lamps.

E. Fuel

ANC will provide the fuel to operate the drill rig and the trailers as required. ANC will supply oil, grease, antifreeze, etc., from INEL warehouse stock. Any lubricating materials not available from ANC will be purchased by REECo locally as needed.

F. Vehicles

ANC will provide five vehicles. Spare tires will be supplied by ANC and kept at a local service station. Fuel and maintenance will

also be provided by ANC. These vehicles will be apportioned in the following manner:

3 vehicles for REECo

1 vehicle for NV

1 vehicle located at the drill site for emergency use

G. Trailer Maintenance

Janitorial and repair services will be provided by ANC. This will include necessary repair and maintenance of living and office quarters, including sanitary facilities.

H. General Operational and Logistics Support

ANC will provide the following general logistical support:

1. Crafts (except drilling and associated work).
2. Clerical.
3. Office supplies.

I. Site Cleanup and Restoration

Upon completion of drilling, REECo will remove the drill rig and all rig-associated equipment. ANC will dispose of drilling fluids and backfill the mud reserve pit; dress and restore the pad.

J. Fencing

REECo will be responsible for fencing around the reserve mud pit. ANC will be responsible for all other fencing.

III. OCCUPATIONAL HEALTH AND SAFETY

A. General

All drilling operations and other site activities will be conducted in accordance with standards of the Occupational Safety and Health Act of 1970 (OSHA), and in accordance with the rules and regulations applicable to the respective responsibilities of each participating project organizations.

All participating organizations are responsible for the health and safety of their own personnel and for conducting all activities in accordance with procedures that assure:

1. A safe and healthful environment for the employees.

2. Control and minimization of hazards to the public and to personnel of other participants.

3. Minimization of the accidental damage or loss of equipment, materials, and property.

B. First Aid

ANC will determine the location of local medical facilities and physicians in the area for use in the event of accident or illness. An emergency vehicle will be provided by ANC for injured persons of all participating organizations.

ANC will provide first-aid supplies as approved by the Director of the ID Medical Division. REECo will have personnel with first-aid

training available at the site at all times. First-aid services will be available to all project participants at the site.

C. Fire Protection

Hand-operated fire extinguishers for the drill rig and associated equipment will be provided by REECo. ANC will provide extinguishers at points convenient to each significant structure or piece of equipment. Extinguisher types will be varied for control of Class A, B, or C fires, as appropriate.

D. Sanitation

ANC will provide potable water for drinking and cooking. Chemical or standard toilets will be provided and serviced, as required, by ANC. Solid wastes will be disposed of by ANC in accordance with ERDA regulations.

The trailer at the well location may be connected to a nonpotable water source and sewage system involving a septic tank or provided with other sanitary facilities in accordance with ERDA health regulations.

IV. DRILLING OPERATIONS

A. General

The site will be prepared prior to moving the rig on, which will include concrete cellar and the setting and cementing the 30-inch conductor pipe to approximately 40 feet.

A 26-inch hole will be drilled with mud into the alluvium to a depth of approximately 900 feet (see Figure IV-1). Twenty-inch surface pipe will be set and cemented to the surface.

Drilling will then be resumed with 12 1/4-inch bits and periodic DSTs made until a resource is found or a depth to be determined by the ANC Program Manager is reached. The hole will be reamed with a 17 1/2-inch bit to this depth and 13 3/8-inch casing will be run and cemented. The hole will then be further drilled with the objective being to intersect with the geothermal circulation system.

The 26-inch and the 12 1/4-inch holes will be drilled using a centralized and stabilized assembly. One near bit reamer will be placed above the bit. The string reamer should be placed 30 feet above the bit and the stabilizer at 60 feet above the bit. If any rapid buildup of angle occurs, bit weight will be reduced to correct deviation.

Minimum annular drilling fluid velocities for the 12 1/4-inch and 17 1/2-inch hole using 6 5/8-inch drill pipe will average 78 to

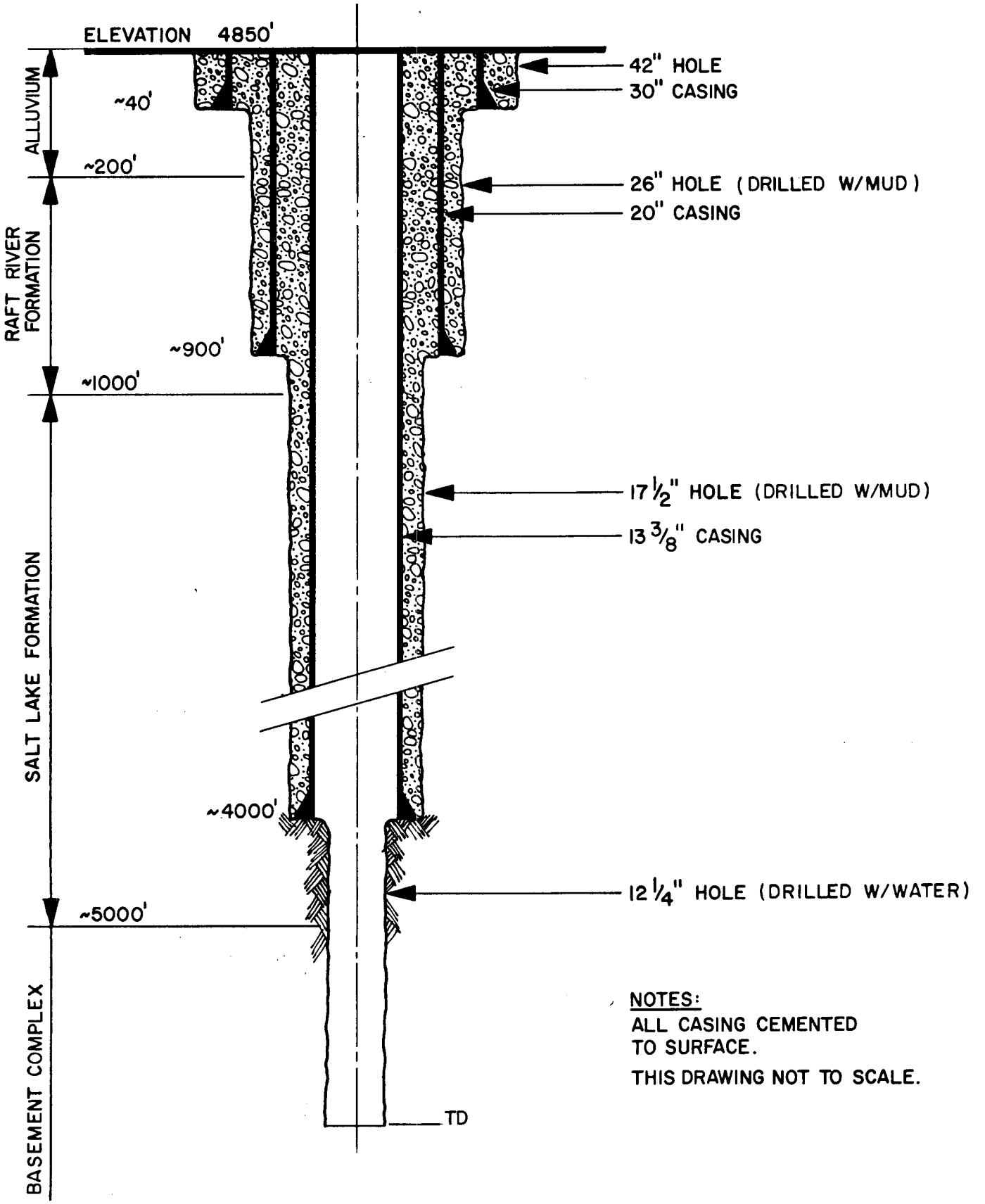


FIGURE IV-1 RAFT RIVER GEOTHERMAL EXPLORATORY HOLE NO. 2

80 fpm depending upon formation particle sizes. The drilling fluid program should try to obtain optimum hydraulics and/or impact at the bit, utilizing a large enough flow rate to clean the hole without causing excessive hole erosion.

B. Estimated Formation Tops

All drilling, casing, and any other depth measurements will be referenced to the Kelly bushing (KB). Logging and formation tops will be referenced to ground level (GL).

Formation	Top in True Vertical Depth (ft.)	Approximate Elevation Sea Level (ft.)
1. Alluvium of loose, coarse, and cemented gravel with silty clay and sand (from 15 to 40 feet is loose sand and gravel).	Surface	+4,835
2. Raft River Formation of gray sandstone and conglomerate with beds of siltstone.	200	+4,635
3. Salt Lake Formation of sand, silt, and clay interbedded with siltstone and sandstone.	1,000	+3,835
4. Basement rock (Paleozoic zone).	5,800	- 965
5. Bridge fault zone.	6,000	-1,165

Formation tops below about 1,400 feet are approximated from RRGE-1 hole. A major fault zone is anticipated at a depth of 6,000 to 6,500 feet.

C. Drilling Materials

ANC will be responsible for providing at the drill site the following drilling materials:

1. Casing

   a. 50 feet of 30-inch casing

   b. Required amount of 20-inch casing (94 lb/ft, H-40)

   c. Required amount of 13 3/8-inch casing (grade and weight as required)

2. Wellhead Assembly

   a. 1 each gate valve

   b. 1 each double-flanged spool from 20-inch flange to valve flange.

   c. 1 double-flanged spool for casing packer removal.

REECo will provide all other drilling materials.

D. Drilling Procedure

1. Use dry hole digger to drill 42-inch hole for 30-inch conductor pipe. Cement conductor pipe from 40 feet to surface.

2. Prepare a concrete-lined cellar, approximately 8 feet wide, 10 feet long, and 6 feet deep.

3. Move in drilling rig and rig up.

4. Drill 15-inch hole to 900 feet and open the 15-inch hole to 26 inches. Condition hole to run casing. (Appropriate notifications of scheduled BOP pressure tests will be made by ANC.)

5. Run integrated caliper survey from 900 feet to 40 feet.

6. Run induction electric log from 900 feet to 40 feet.

7. Run 900 feet of 20-inch H-40 94 lb/ft. casing. Run guide shoe, float collar, and centralizers. Cement to surface. Wait on cement (WOC) 24 hours. Run logs as specified in Section IV-L.

8. Install 20-inch casing head, 20-inch double-gate BOP, 20-inch Hydril BOP with kill line and choke line, and Grant rotating head. Use dual controls.

9. Pressure test BOPs and casing with 300-psig surface pressure.

10. Drill cement and formation with 12 1/4-inch bit. Use a centralized and stabilzed assembly for drilling the 12 1/4-inch hole. Drill to approximately 3,500 feet, then run DSTs intermittently with additional drilling as determined by ANC. Ream hole to 17 1/2-inch diameter.

11. Condition hole for running casing. Use mud logger services below 900 feet, as specified in Section IV-E. Run single-shot

magnetic survey every 90 feet or every trip, whichever occurs first.

12. Condition hole for logs. Run open hole logs as specified in Section IV-L.

13. Condition hole, run and cement a string of 13 3/8-inch casing to bottom of 17 1/2-inch hole (approximately 4,000 feet) using slurry described in Section IV-G. Run stage collar, differential-fill-up shoe and collar and cement baskets. Run stage cementing collar at approximately 2,000 feet. Open stage collar and circulate out any excess cement above stage collar, and WOC 12 hours then cement second stage to the surface. Land 13 3/8-inch casing in hanger in the 20-inch casing head.

14. WOC 18 hours. Drill out stage collar and circulate the hole with clear water. Pressure test casing and wellhead to 300 psi. Run cased hole logs as specified in Section IV-L.

15. Drill out of shoe with 12 1/4-inch bit to a depth required to penetrate the geothermal circulation system using water as the drilling fluid.

16. Run logs as specified in Section IV-L. Run flow and reinjection tests.

17. Release rig.

E. Surface Equipment and Services

1. Wellhead

A Series 600 casing head will be used on the 20-inch casing with two each 2-inch flange outlets. The 13 3/8-inch casing will land on casing hanger in the 20-inch casing head.

2. Blowout Preventor (BOP) Equipment

A 20-inch hydraulic double-gate BOP with blind and pipe rams and bag-type BOP will be installed on the 20-inch casing for drilling the 17 1/2-inch holes. This equipment shall have a minimum working pressure of 1,000 psi.

3. Drilling Recorder

A three-pen recorder to record penetration rate, weight, and pump pressure will be used.

4. Mud Logging

A mud logging unit will be used to record the following information below 900 feet.

a. In and out mud temperatures (provided by ANC)

b. Lithologic characteristics

c. Hydrogen sulfide and hydrocarbon gas volume with alarms

5. Mud Pit Level Monitoring

The mud pit level will be recorded at the end of each shift and immediately after any significant mud loss or gain.

F. Downhole Equipment and Services

1. 20-Inch Casing

Twenty-inch 94 lb/ft, H-40 grade ST&C casing (approximately 900 feet) will be required. Thread locking compound will be used on the joint above the last joint.

2. 13 3/8-Inch Casing

Run 13 3/8-inch casing (grade and weight as required) to top of resource (approximately 4,000 feet). Run stage collar, differential-fill-up shoe, collar and cement baskets (if required). Run stage collar at approximately 2,000 feet.

3. Centralizers

a. 20-Inch Casing

A centralizer will be placed approximately 20 feet above the bottom and then on every collar to the surface.

b. 13 3/8-Inch Casing

Centralizers will be located 15 feet above shoe and on every third collar.

G. Cement Systems

1. Conductor Pipe is to be cemented with plant mix.

2. 20-Inch Casing Slurry-A is to be 50/50 cement and poz. mix; no gel with 60 percent silica flour.

3. 13 3/8-Inch Casing Slurry-B should be 60 percent poz. mix with 40 percent cement and 60 percent silica flour. Friction reducer (approximately ± 3/4 of 1 percent) volume requiremments will be based on caliper log with 50 percent excess. Slurry-B may be modified by the cement contractor.

H. Drilling Fluid

The hole above the resource is planned to be drilled using a gel-mud system designed for high temperatures with mud weight between 8.8 and 9.5 ppg. Viscosity to be held to about 35 sec/qt unless hole conditions dictate necessary changes. Water loss should be held to approximately 8 ml API or less. Lost circulation material will be added as necessary. After casing drilling will be by the use of 12 1/4-inch bits with water.

I. Drill Cuttings

Four (4) sample cuttings will be obtained every 30 feet or as otherwise requested by ANC. The samples will be washed and placed in legibly labeled sample bags and shipped to preindicated points.

J. Coring

A maximum of six 60-foot cores will be taken at depths to be determined by ANC.

K. Drill Stem Tests

Approximately five drill stem tests (DST) are planned at depths to be determined by ANC. Obtain water samples for chemical analysis.

L. Logging

1. 26-Inch Open-Hole Logs

Four-Arm Caliper Survey--900 feet to 40 feet.

Induction Electric--900 feet to 40 feet.

2. 20-Inch Cased-Hole Logs

CBL Log--90 feet to surface (if determined necessary by REECo).

3. 12 1/4-Inch Open-Hole Logs

The following logs will be taken all or in part as determined by ANC in order to deduce the formation water content and temperature and geological and hydrological data prior to installing casing.

a. Integrated Caliper Survey--TD to 900 feet.

b. Dual Induction Laterolog 8--TD to 900 feet.

c. Simultaneous Compensated Neutron-Formation density--TD to surface.

d. Temperature--TD to 900 feet.

e. Borehole Compensated Sonic--TD to 900 feet.

f. Dual Induction Laterolog--TD to 900 feet.

g. Flowmeter Tests--TD to 900 feet (if available).

3. 13 3/8-Inch Cased Hole Logs

Cement Bond Log--TD to surface.

M. Directional Survey

Run magnetic single-shot survey every 90 feet or every trip, whichever occurs first.

N. Completion

The dual completion procedure includes flow tests, reinjection tests, DSTs, etc., as determined by ANC.

O. Abandonment

If ID directs the abandonment of the project because of the inability to locate sufficient geothermal resource, or for any other reasons, development of abandonment procedures will be the joint responsibility of NV and ID. NV/REECo will perform abandonment work required at the drilling site and ID will be responsible for providing funding and coordinating the procedure with the appropriate parties.

Abandonment procedures will be based upon the following criteria: (1) prevent contamination of freshwaters or other natural resources; (2) prevent damage to geothermal reservoirs, (3) prevent loss of reservoir energy, and (4) protect life, health, environment, and property.

The following are general requirements which will be met:

1. A notice to abandon any geothermal resource wells will be filed with the Idaho Department of Water Resources (Department) five days prior to beginning abandonment procedures.

2. A history of geothermal resource wells (well completion report) shall be filed with the Department within 60 days after completion of abandonment procedures.

3. All wells abandoned shall be monumented and the description of the monument shall be included in the history of well report. Such monument shall consist of a four-inch diameter pipe ten feet in length, of which four feet shall be aboveground. The remainder shall be imbedded in concrete. The name, number, and location of the well shall be shown on the monument.

4. Good quality heavy drilling fluid shall be used to replace any water in the hole and to fill all portions of the hole not plugged with cement.

5. All cement plugs, with a possible exception of the surface plug, shall be pumped into the hole through drill pipe or tubing.

6. The annuli shall be cemented to straddle the interface or transition zones at the base of the groundwater aquifers.

7. A minimum of 100 feet of cement shall be emplaced straddling the interface or transition zone at the base of groundwater aquifers.

8. One hundred feet of cement shall straddle the placement of the shoe plug on all casings including conductor pipe.

9. A surface plug of either neat cement or concrete mix shall be in place from the top of the casing to at least 50 feet below the top of the casing.

10. All casing shall be cut off at least five feet below land surface.

11. Cement plugs shall extend at least 50 feet over the top of any liner installed in the well.

12. Abandonment of injection wells will be conducted in the same manner as other wells.

V. PERMITS

The location of this hole is on private land. ID will provide REECo (through NV) information so they can obtain any necessary geothermal and/or drilling permits or will advise NV that none are required of REECo. REECo will have the responsibility to do whatever is required under Idaho law to enable it as a foreign (out-of-state) corporation to do business in Idaho.

VI. ENVIRONMENTAL ASSESSMENT

ID has prepared an environmental assessment for the project which covers both RRGE-1 and RRGE-2.

VII. INDUSTRIAL RELATIONS

ID will be responsible for the determination as to whether the Davis-Bacon Act applies to this project. ID will also be responsible for the industrial relations activities of ID contractors.

NV will be responsible for industrial relations activities related to NV contractors.

VIII. PUBLIC INFORMATION

All site visits and inquiries will be coordinated through the ID Public Information Officer. Press releases will be made periodically during the program (e.g., start of drilling and termination of drilling).

IX. PROGRAM MANAGEMENT

A. General

This section describes the basic authorities and responsibilities of the principal participants in the drilling operations. The principal participants include the following:

1. ERDA-Idaho Operations Office.
2. ERDA-Nevada Operations Office.
3. Aerojet Nuclear Company.
4. Reynolds Electrical & Engineering Co., Inc.

Figure IX-1 indicates the interrelationship between the project participants and the channels of funding and communications.

B. U.S. Energy Research and Development Administration--Idaho Operations Office

The Manager, ID, shall be responsible for all project-related activities assigned to the government by Contract AT(10-1)-1375 between ID and ANC and by this document. The Manager, ID, shall also be responsible for funding the drilling operations in accordance with the procedures outlined in Section X of this Drilling Plan. In addition, the Manager, ID, shall appoint an ID Project Manager who will be the interface responsible for coordinating activities between ANC and NV/REECo. The ID Manager will also cause the U.S Geological Survey to perform any activities required of the USGS in the accomplishment of program objectives.

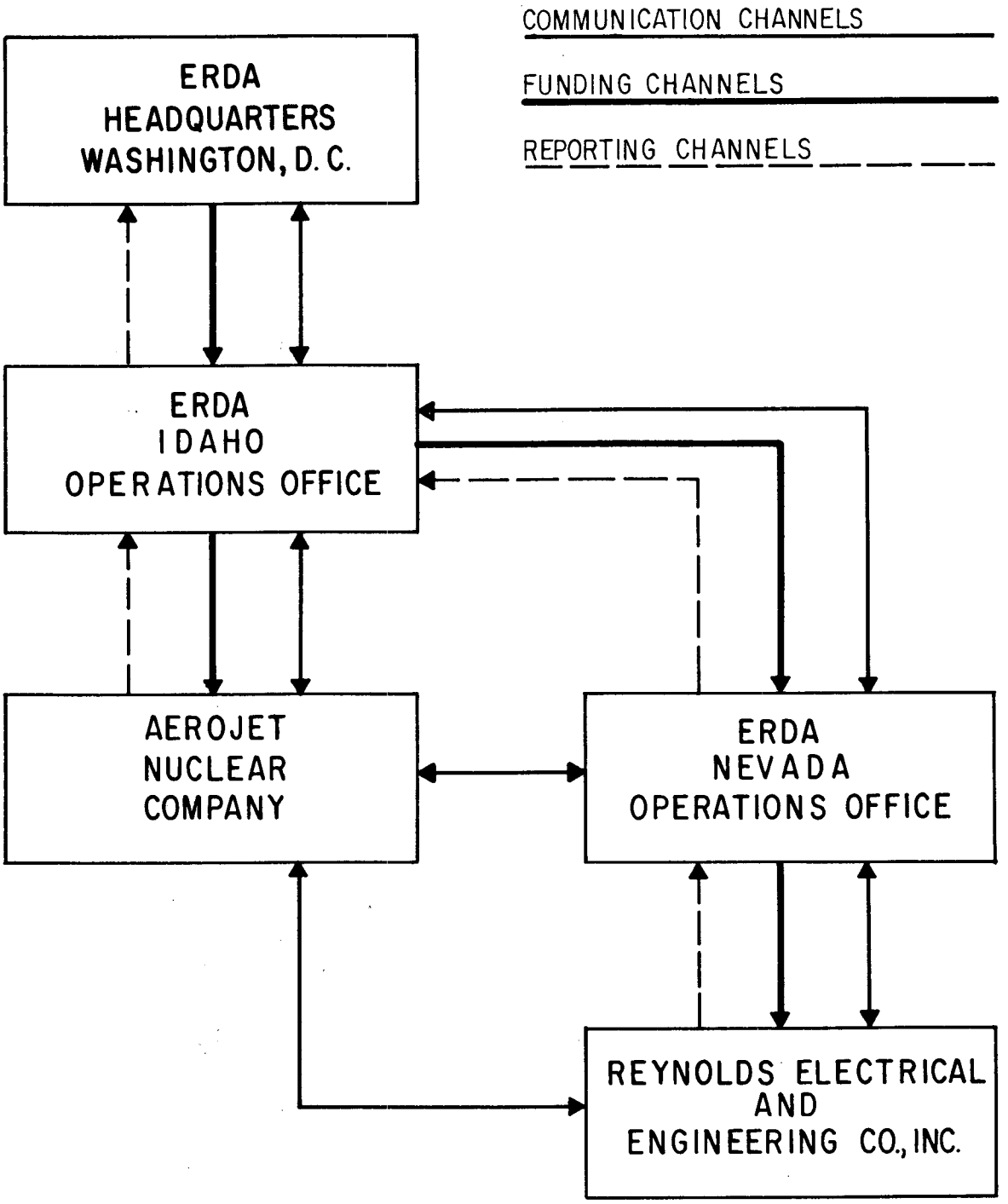


FIG. IX-1 PROJECT ORGANIZATION - DRILLING OPERATIONS
IDAHO GEOTHERMAL R&D PROJECT

C. U.S. Energy Research and Development Administration--Nevada Operations Office

The Manager, NV, shall be responsible for all project-related activities assigned to the government by Contract AT(26-1)-410 with REECo and this document. The Manager, NV, shall also provide an NV Project Manager responsible for all field activities described in this drilling plan which are assigned to NV.

The areas of authority and responsibility of the NV Project Manager are as follows:

1. Provide one or more contractors to conduct the drilling and completion operations as described in Section IV of this report.

2. Provide technical direction of the drilling operation.

3. Provide an NV site representative to manage all NV and NV-contractor activities.

4. Assure that the provisions for occupational health and safety are met in accordance with Section III of this report.

5. Prepare cost reports and technical documentation to the ID as described in Sections X and XI of this report.

D. Aerojet Nuclear Company

ANC will appoint a Project Manager. The ANC Project Manager will be responsible to the General Manager of ANC and the General Manager of ANC will be responsible to the Manager of ID for all project

related functions being accomplished in an effective and timely manner. The ANC Project Manager will continuously monitor the activities of all the program participants so as to assure that all the participants are accomplishing all of the activities required by this drilling plan. The ANC Project Manager will also assure that the appropriate technical expertise is available to allow the tasks, as defined in this drilling plan and as stated in the Idaho Geothermal R&D Project, to be accomplished. The ANC Project Manager is further charged with the primary responsibility of accomplishing the goals of the Idaho Geothermal R&D Project.

The ANC Project Manager will appoint an ANC Field Operations Task Manager who will be responsible to the ANC Project Manager. The ANC Field Operations Task Manager responsibilities will include the following:

1. Provide technical criteria for the development of the drilling plan including identifying the requirements for technical data to be obtained during the drilling operation.

2. Provide technical program direction to the NV site representative and technical program support to REECo to assure that the objectives of the project are accomplished.

3. Provide on-site logistical support activities as specified in Section II of this report.

4. Management of ANC activities on-site.

5. Be continually aware of all drilling site-related activities and assure that the project participants are cognizant of any development which may impair the drilling program or the objectives of the Idaho Geothermal R&D Project.

E. Reynolds Electrical & Engineering Co., Inc.

REECo, under direction of NV, will provide the necessary equipment, material, and personnel to conduct the drilling operations as described in this plan. REECo will also be responsible for all procurement of materials and services directly related to drilling operations that are not assigned to ANC in Sections II and IV of this plan.

X. FUNDING AND COST REPORTING

Costs incurred by REECo will be reported to ID on a weekly basis by NV at the REECo work order level (see Figure X-1). It is recognized and agreed to by the parties that such costs are unofficial and subject to change when official monthly costs are reported.

A comprehensive cost report will be prepared by NV for ID at the conclusion of the drilling.

The official costs incurred will be transferred monthly to ID via nonreconciling transfer from NV.

(EXAMPLE)

REYNOLDS ELECTRICAL & ENGINEERING CO., INC.

RAFT RIVER GEOTHERMAL EXPLORATORY HOLE NO. 2
COST REPORT--W/E XX-XX-XX

Work Order No.--Description	Accum. Cost Prior Weeks	Costs This Week	Total To Date	Major Outstanding Commitments	Total Costs/ Commitments
9075-200--Site Preparation					
9075-201--Location to Location/Move/ Rig-Up					
9075-202-- Exploratory Hole Drilling					
9075-203--R&D Drilling and Testing					
9075-204--Logis-tical Support					
9075-205--Demobil-ization and Trans-portation of Drill Rig					
Totals					

FIGURE X-1--REECo COST REPORT

XI. TECHNICAL DOCUMENTATION AND REPORTING

A. General

The documentation and reporting requirements during the drilling of the RRGE-2 will be limited to those necessary for the participants to maintain a thorough working knowledge of day-to-day operations and the final well configuration.

B. Reports

The required reports for the RRGE-2 include:

1. A daily drilling report similar to that shown in Figure XI-1.

2. A well completion report estimated to be issued within 60 days of completion of the hole. This report will document the drilling and completion procedure, and will be prepared by NV and REECo and ten copies submitted to ID/ANC.

IDAHO GEOTHERMAL R&D PROJECT
DAILY DRILLING REPORT

DATE_____ LOCATION RRGE-2_____

PRESENT OPERATION_____FORMATION_____HOLE SIZE_____

PRESENT T.D._____DRILLED FROM_____FEET TO_____FEET: MADE_____FEET OF HOLE

IN_____HOURS: TRIPS_____HOURS: SERVICE RIG_____HOURS: D.S.T._____

HOLE SURVEY_____HOURS: OTHER DOWNTIME: _____HOURS

MUD LOG TEMPERATURES: MUD IN--HIGH_____°C @ _____FEET T.D., LOW_____°C @ _____FEET T.D.
MUD OUT--HIGH_____°C @ _____FEET T. D., LOW_____°C @ _____FEET T.D.

REMARKS:_____

_____

_____

_____

DRILLING INFORMATION: ROTARY RPM_____ PUMP PRESSURE_____ PUMP ON HOLE _____ _____
1 2
PUMP STROKES_____ WEIGHT ON BIT_____#

MUD INFORMATION: WT._____ VISCOSITY_____ PLASTIC VISCOSITY _____

WATER LOSS_____ FILTER CAKE_____ PH_____ SAND CONTENT_____

BIT INFORMATION: PRESENT BIT#_____ DEPTH IN_____ MAKE_____ TYPE_____

JET NOZZLES_____ _____

LAST BIT RUN #_____ MAKE_____ TYPE_____

JET NOZZLES_____ _____ DEPTH IN_____

DEPTH OUT_____ FOOTAGE_____ HOURS RUN_____

CONDITION OF BIT_____

DRILL COLLAR INFORMATION: NO. OF COLLARS IN USE _____ _____ O.D._____ I.D._____

PLACEMENT OF STABILIZERS_____

FUEL CONSUMPTION: BUTANE_____GAL. DIESEL_____GAL.

PUMP NO. 1 LINEAR SIZE_____ PUMP NO. 2 LINEAR SIZE_____

FIGURE XI-1--DAILY DRILLING REPORT

Appendix A
Schedule of Major Activities
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