Southland Royalty Company

December 15, 1980

Mr. Joe Fiore
Department of Energy
Nevada Operations Office
P.O. Box 14100
Las Vegas, Nevada 89114

RE: Contract DE-AC08-79ET27006

Dear Joe:

I am enclosing for your review a draft of the final report on our contract. As all of the appendices are items which you have already seen, I am only sending one copy. I assume since UURI either has released or is preparing to release all of the appendices that they have spare copies available.

The appendix which should include the isotope report from the Desert Research Institute is not included as the final report has not been received. It is my understanding that Elaine Bell discussed this with you last week. I am hoping that by the end of this week I will be able to forward that appendix to you.

I am also enclosing more detailed graphic representations of the well history and casing program for each of the two deep wells. I believe the most effective way of releasing this information might be to supplement the packages which UURI already has. As those packages are being referenced in this final report, any party interested in seeing them would then obtain the well histories from UURI complete with the new graphics. However, if you desire, these graphics could be included as a separate appendix to the final report.

As the draft report is rather short and each of the appendices is fairly self-explanatory and where necessary includes a table of contents, I have not prepared a table of contents for the final report. If you feel that is necessary after reviewing this document, please advise.

Sincerely yours,

Jere Denton
District Manager
Natural Resources District

JD/dcs

Enclosure
cc: Howard P. Ross

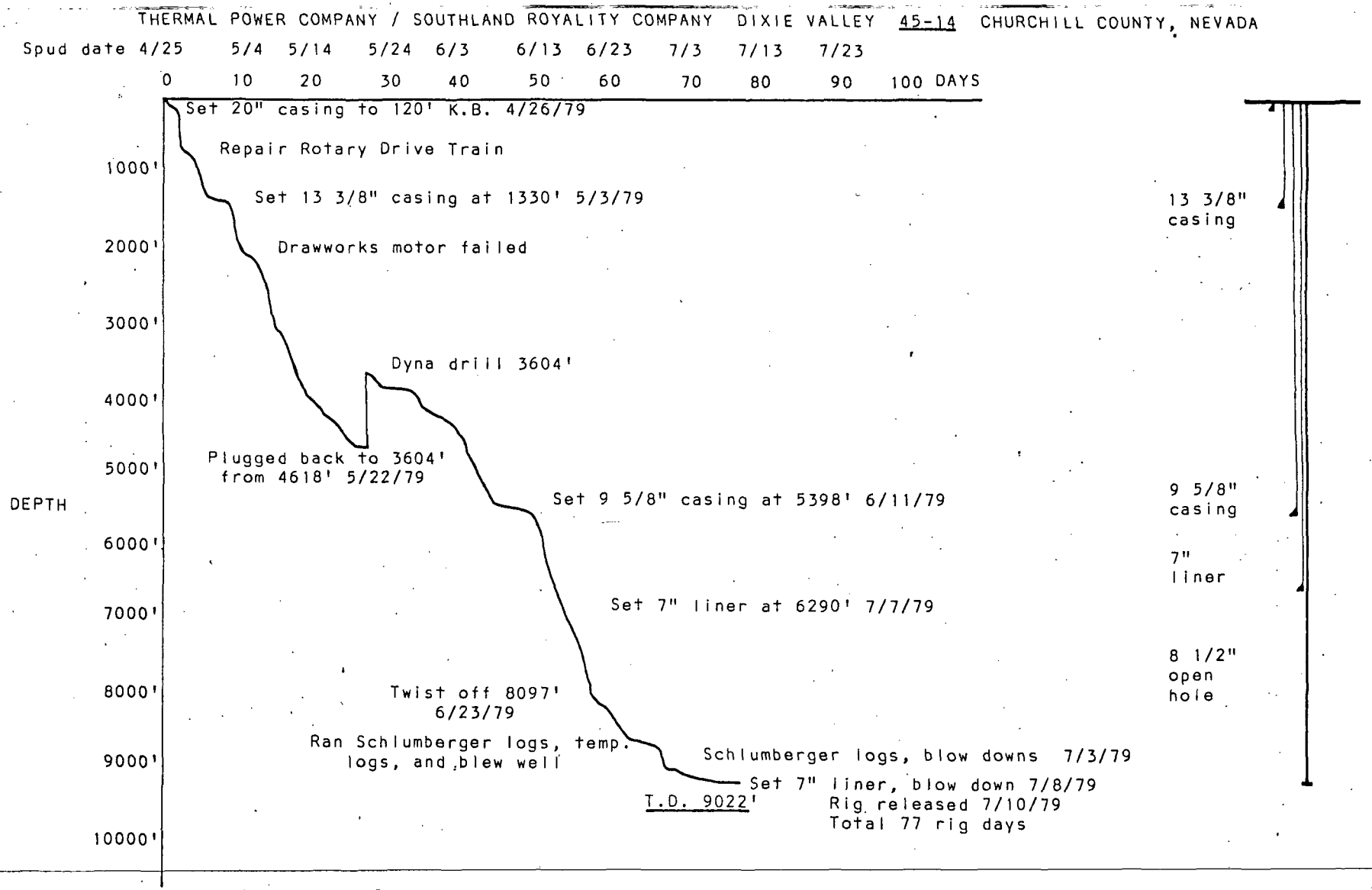
1000 FORT WORTH CLUB TOWER (817) 390-9200 FORT WORTH, TEXAS 76102

DRILLING HISTORY

D.F. 45-14

Add to NV/DV/SR-11

THERMAL POWER COMPANY / SOUTHLAND ROYALITY COMPANY DIXIE VALLEY 45-14 CHURCHILL COUNTY, NEVADA



DRILLING HISTORY

D.F. 66-21

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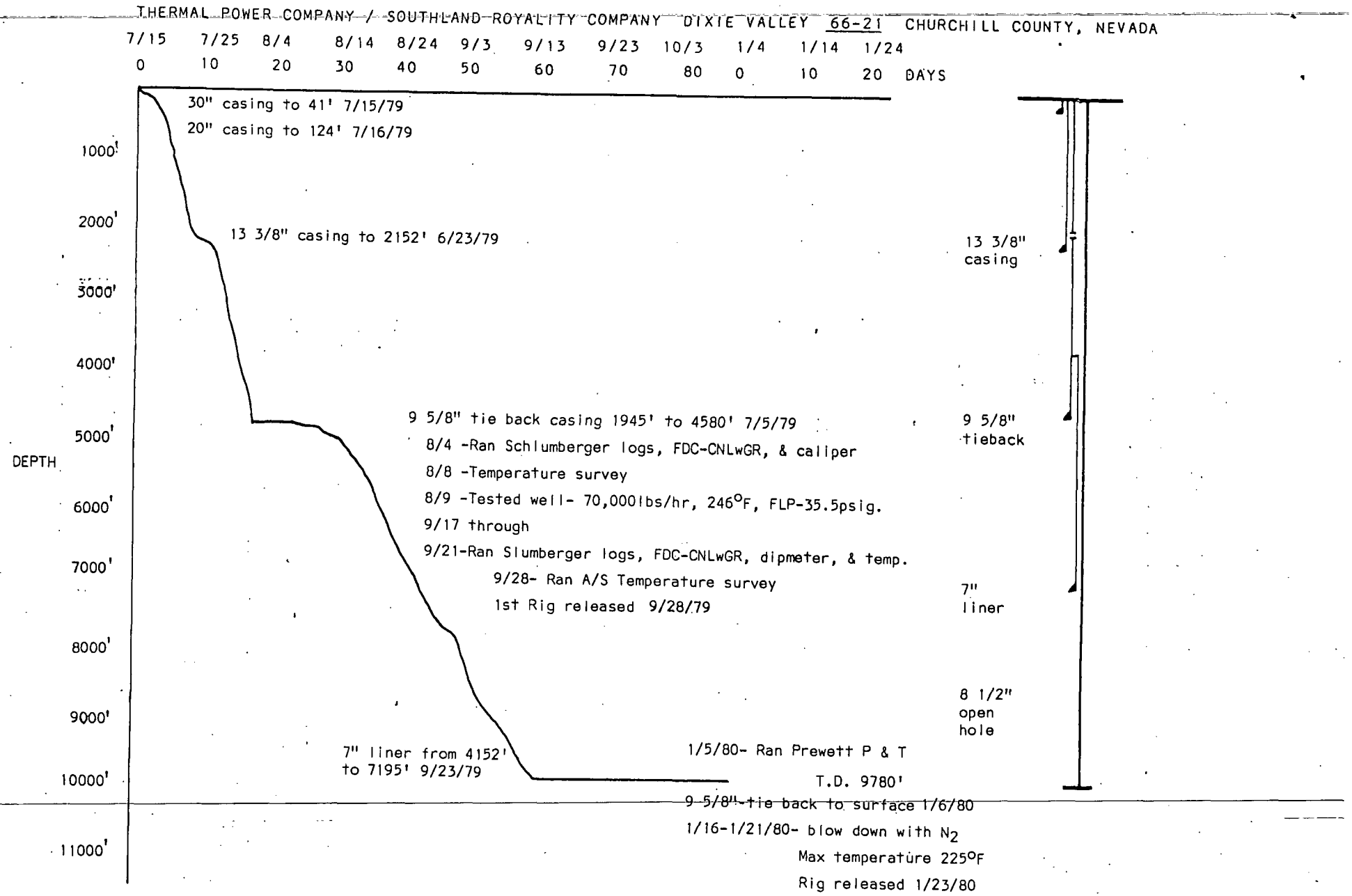
THERMAL POWER COMPANY / SOUTHLAND ROYALITY COMPANY DIXIE VALLEY 66-21 CHURCHILL COUNTY, NEVADA



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Final Report

By
Jere M. Denton
Elaine J. Bell
Richard L. Jodry

November 1980

Work Performed Under Contact No. DE-AC08-79ET27006

Southland Royalty Company
Natural Resources District
Fort Worth, Texas

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November 1978--November 1980

by

Jere M. Denton, Elaine J. Bell, and Richard L. Jodry

Southland Royalty Company
P.O. Box 17009
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Prepared for

United States Department of Energy
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The study indicates that a geothermal regime with temperatures greater than 400^{o}F may exist at a depth of approximately 7500' to 10,000' over an area more than ten miles in length. Further work will be required to evaluate the reservoir.

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With the results of this study it is possible to say that the depth to commercial temperatures may range from 7500 to 10,000 feet below the surface of the valley along its margins. It is postulated that this depth will increase as one approaches the center of the valley. The linear distance over which commercial temperatures can be expected to be found is probably greater than ten miles. The width of the temperature regime is uncertain, but there is at least some evidence (temperature gradient hole SR-4) to indicate that the heat regime lies on the eastern side of the valley as well as along the western margin.

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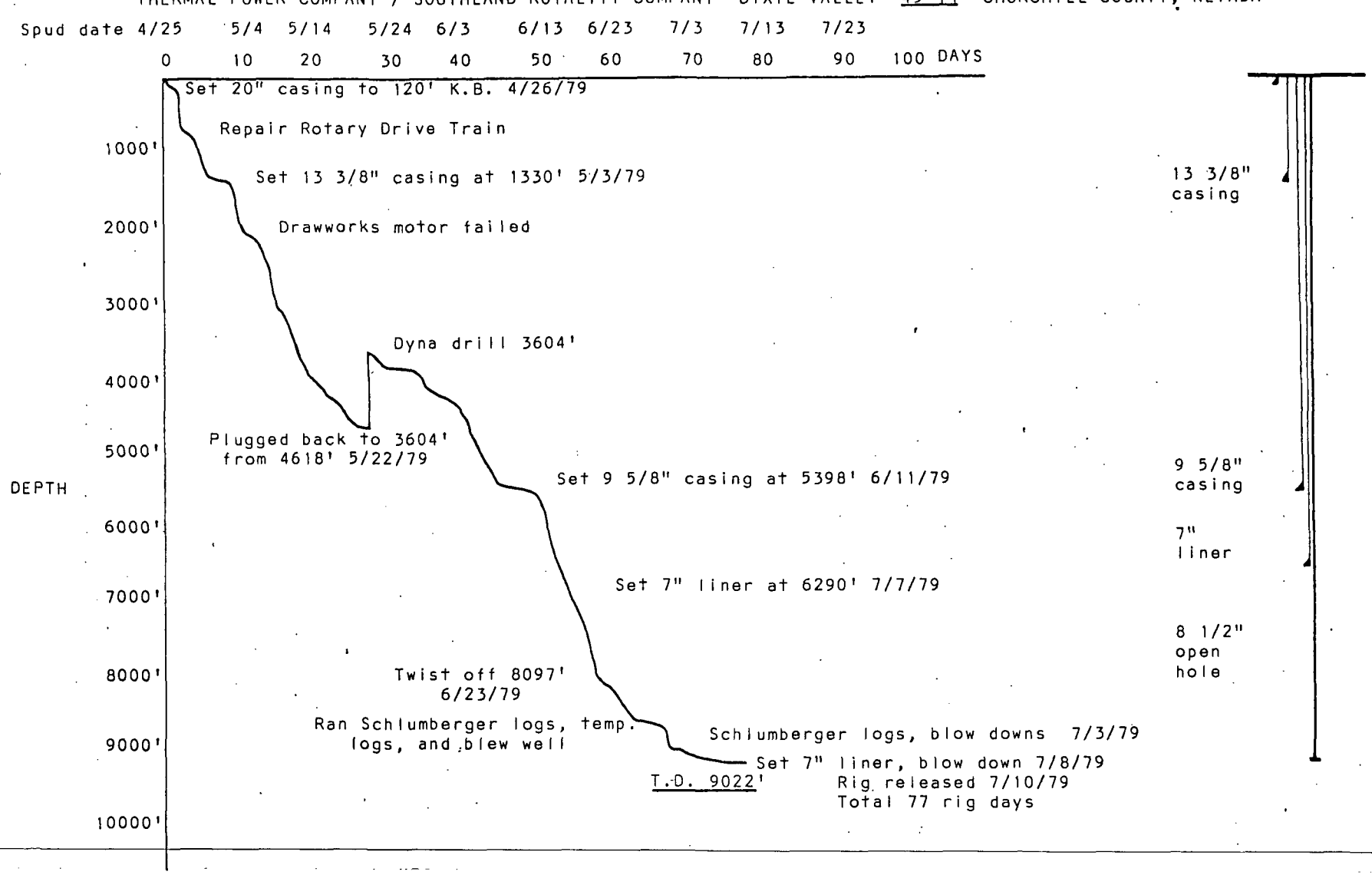

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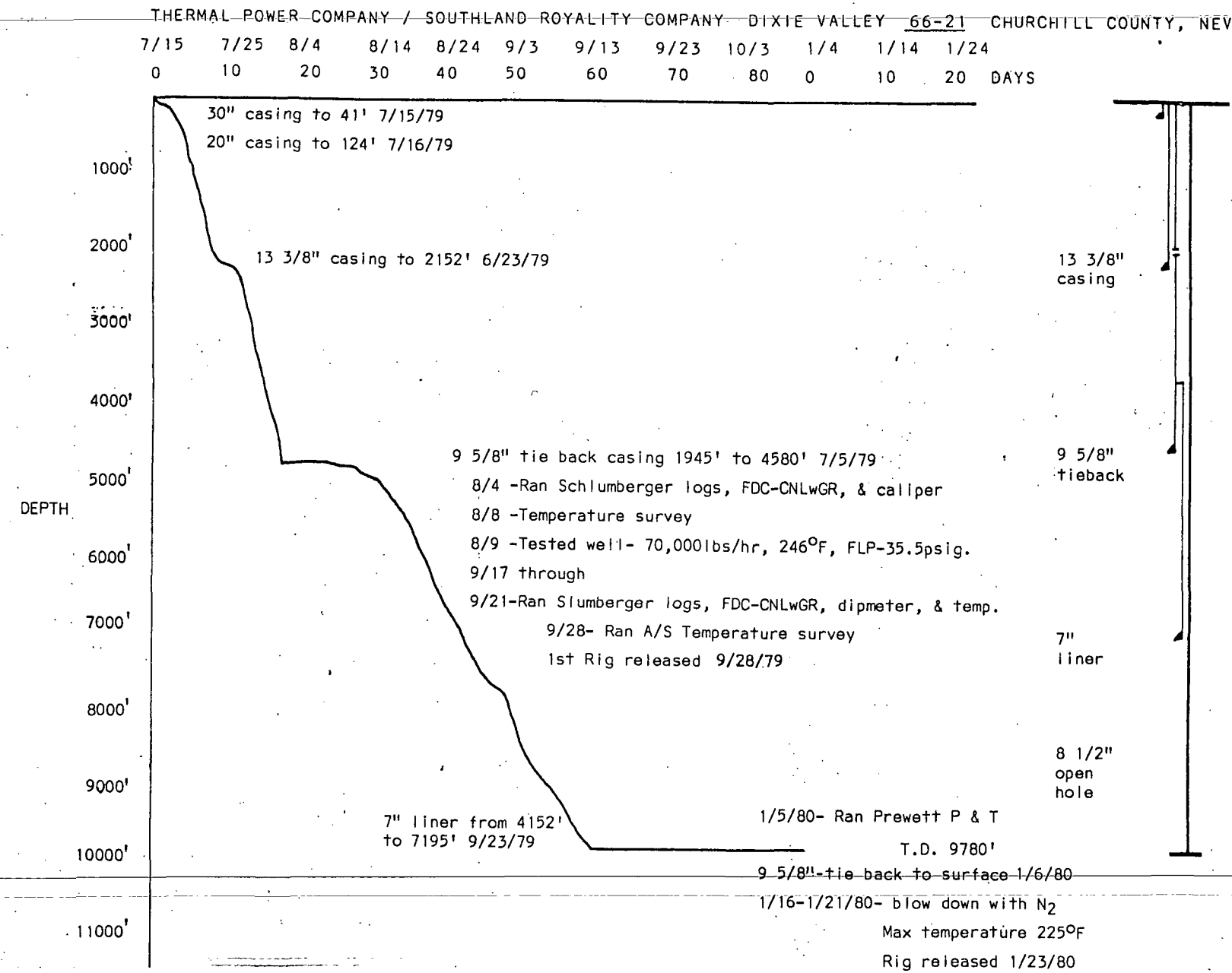

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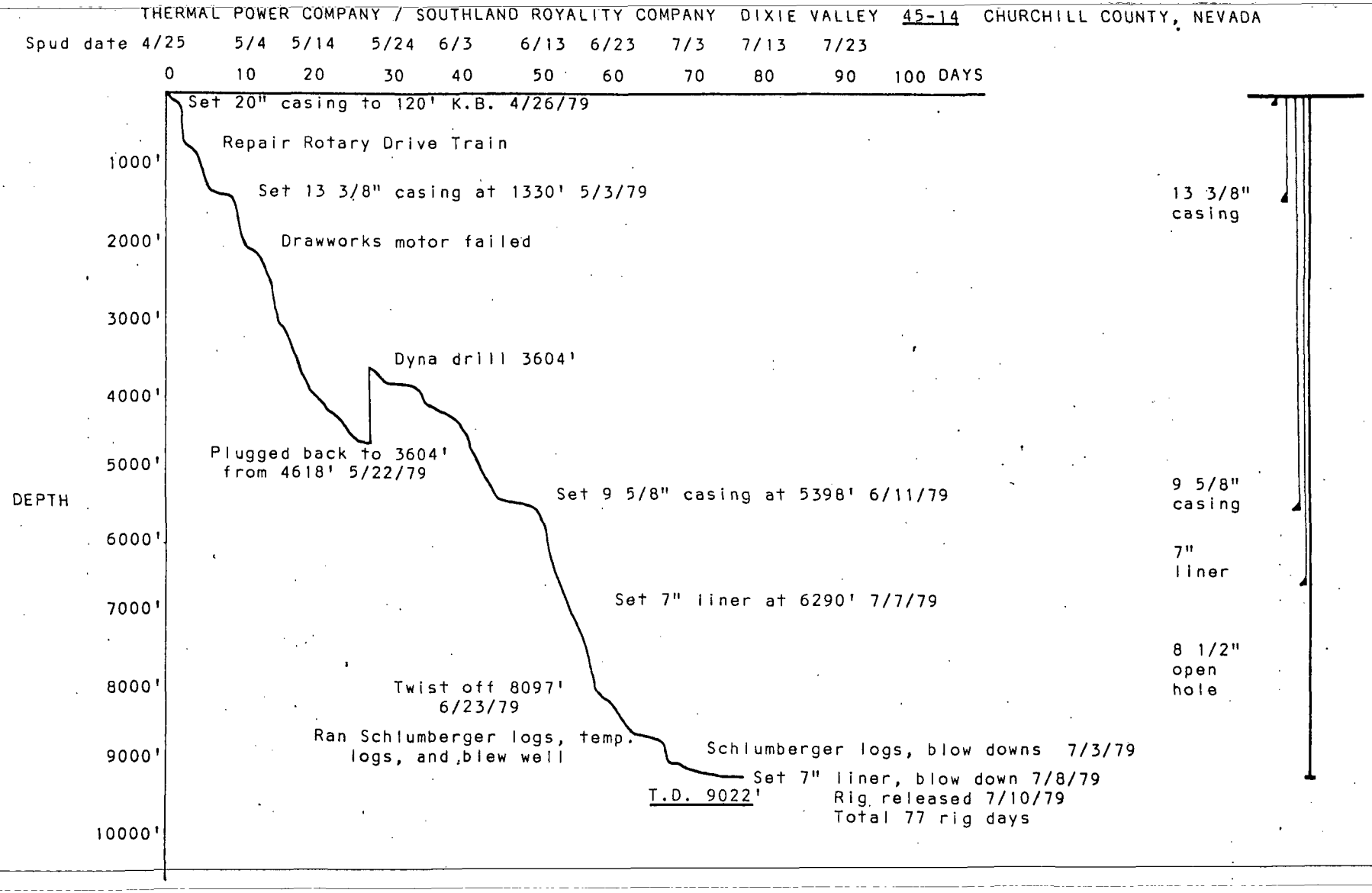

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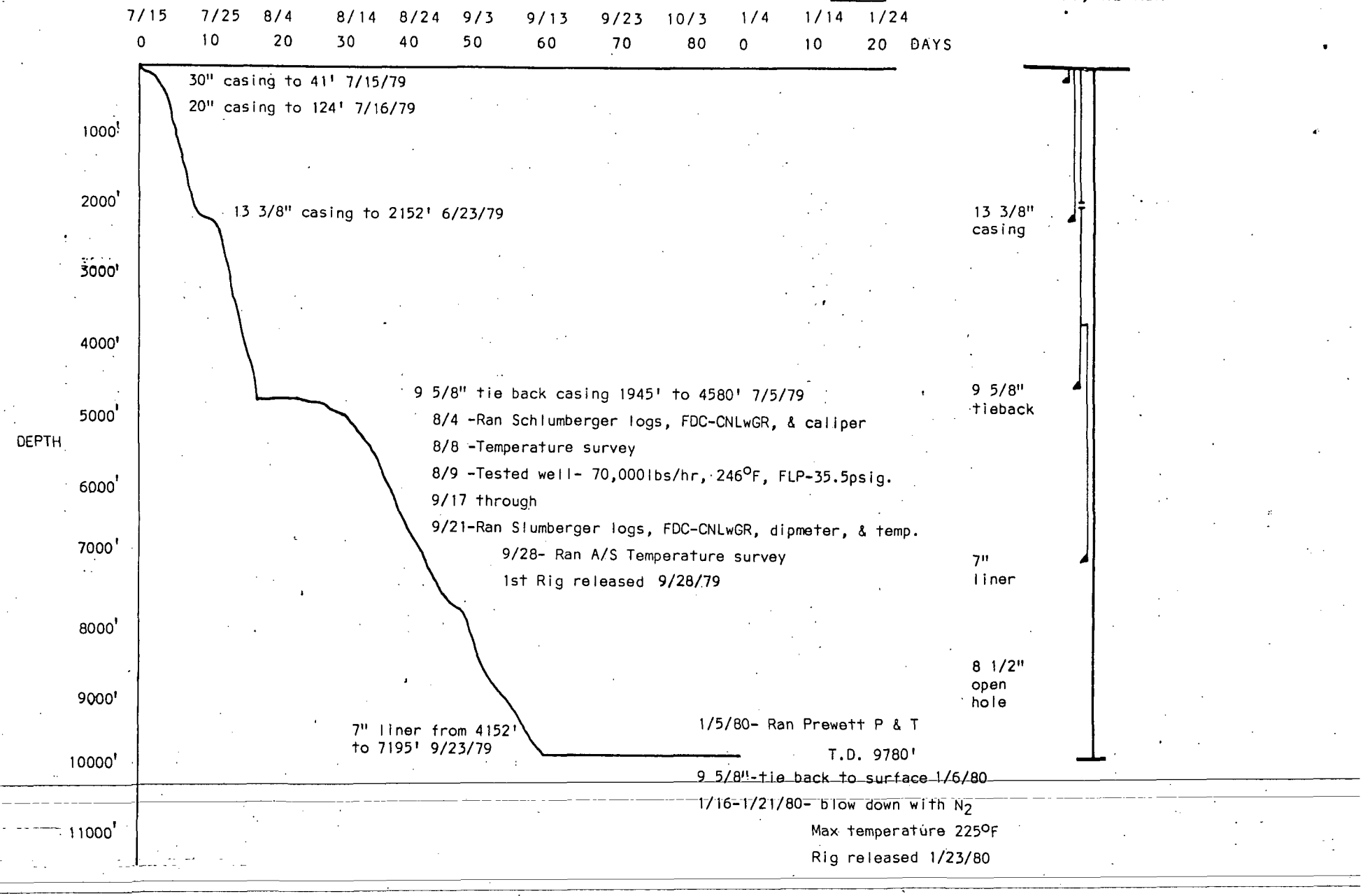

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Final Report

By
Jere M. Denton
Elaine J. Bell
Richard L. Jodry

November 1980

Work Performed Under Contact No. DE-AC08-79ET27006

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EVALUATION OF RESULTS

Prior to the study it appeared that Dixie Valley would provide a good geothermal environment because it had numerous surface manifestations of heat, historic activity along major faults, and was the lowest valley in the

northern part of Nevada with water movement into it from a very large contiguous hydrologic basin. Thus, the requisite components for a geothermal system - heat, active or open fractures and fluids - appeared to be available. In addition a postulated gabbroic complex appeared to provide a potential reservoir seal. The chief questions were whether commercial temperatures could be reached at an economic depth; whether a reservoir was present; and, if so, its exact nature.

With the results of this study it is possible to say that the depth to commercial temperatures may range from 7500 to 10,000 feet below the surface of the valley along its margins. It is postulated that this depth will increase as one approaches the center of the valley. The linear distance over which commercial temperatures can be expected to be found is probably greater than ten miles. The width of the temperature regime is uncertain, but there is at least some evidence (temperature gradient hole SR-4) to indicate that the heat regime lies on the eastern side of the valley as well as along the western margin.

The study also confirms the idea that active faulting in the area should result in open fracture patterns in many parts of the valley. However, in some areas, such as Dixie Federal 45-14, fractures may be so infrequent or so sealed that the potential for hot dry rock geothermal systems may be greater than for hydrothermal systems.

Fluids in the valley appear to be abundant although there is some evidence to indicate more than one hydrothermal regime exists in the valley. Structural or sedimentary controls may have an important bearing on which of

these fluid regimes may have the greatest potential for economic use.

The part of the geothermal regime which is least well understood is the nature of the reservoir.

The Dixie Valley geothermal resource is probably unique within the Basin and Range Province. The structural complexity of the area is related to apparent rifting of the valley and the presence of the Humboldt Lopolith. It is therefore unlikely that a continuous homogeneous reservoir will exist across the entire northern part of Dixie Valley. The area encompassed by mapped surface outcrops of the Humboldt Lopolith and the adjacent part of the valley containing extensive gabbroic sequences may be the area in which optimum conditions for geothermal energy production are most likely to be found. Areas in which faults are acting as thermal conduits may have potential for economic geothermal energy production in areas where no specific reservoir rocks are found. Long term development of the geothermal resource in Dixie Valley will require additional drilling to define areas of this reservoir that are characterized by both depth and temperature regime suitable for commercial application for electric power production. Although geothermal resources at lower temperatures than those presently considered economic for such power production exist in Dixie Valley, its remote location makes economic development of those resources unlikely in the near future.