GL01058

Haskins • Pfeiffer Inc.

International Geophysical Consultants

1449 Denver Club Building
Denver, Colorado 80202
(303) 573-8958

October 7, 1980

Southland Royalty Company
1000 Fort Worth Club Tower
Fort Worth, Texas 76102
Attn: Mr. Jere Denton

RE: Dixie Valley Area
Churchhill & Pershing
Counties, Nevada

Dear Mr. Denton:

Seismic data for the Dixie Valley Prospect Area were acquired by Petroleum Geophysical Co. party No. 302. The data were recorded in SEG-B format by Texas Instrument's DFS-5 amplifiers. An 8-128Hz filter was used on recording at a sample rate of 2 ms.

Energy source consisted of four Mertz-11 vibrators equipped with Pelten Electronics Advance 1 Model 4 instruments. Sixteen sweeps were used per V.P. with sweep pilot of 12-60Hz. V.P. interval was 220 feet with a group interval of 110 feet. Stack is 2400% from 96 trace instruments with a spread geometry 5280'-440'-0'-440'-5280'.

Data processing was performed by Western Geophysical Co. Complex and rapidly changing geologic environment introduced difficult velocity and stacking problems. These problems were resolved by Western's diligence in the analysis of the stacking velocities and design of deconvolution parameters to equalize the frequency spectrum to attenuate short period multiples. Since the dips in the area were generally less than 20 degrees, "Finite Difference" digital migration was used to collapse diffractions generated by faulting and to place reflected energy in the true time domain position.

It should be noted that any additional shooting in the area will be more effective from the standpoint of migration techniques if line orientation is designed normal to the strike shown by existing control.

From available control, three maps have been constructed. These are :

1) Migrated Producing Aquifer
2) Migrated Pluton
3) Non-Migrated Shallowest Flow

Identification is from a synthetic seismogram constructed using the sonic log of the Thermal Power; Dixie Fed. 66-21 in Twp. 24N, Rge. 36E, Sec. 21, or by geologic definition of the mapped event. A discussion of the maps submitted follows:

MIGRATED PRODUCING AQUIFER

The event identified as the producing aquifer in the Thermal Power Well Dixie Fed. 66-21 is coincident with a high amplitude event generated on the synthetic seismogram from that well. A reasonable correlation exists between the synthetic and the recorded seismic data at the well. This event, in its migrated position is the basis for the map under discussion.

Because the seismic lines cross from the sedimentary basin to positions overlying the pluton, interruptions occur in the continuity of data from the aquifer. In such cases it becomes necessary to re-establish continuity through correlation across the data gaps.

The overall configuration of the event mapped indicates the Thermal Power well encountered the aquifer in an overthrust block off the forefront of the pluton. The aquifer terminates both against the pluton and basinward. A series of events with character similar to the aquifer can be noted on the sections. Because of the limited areal extent of the individual events, the map has been constructed using the event with characteristic response in the nearest equivalent stratigraphic position. Termination of events is marked by hatchers.

MIGRATED PLUTON

The purpose of this map is to show the configuration of the forefront of the pluton so that the contact between the aquifer and the pluton can be viewed in perspective. The criteria used for defining the forefront is the zone of termination of coherent energy.

NON-MIGRATED SHALLOWEST FLOW

Since no appreciable geothermal gradient is indicated in the Thermal Power well, it is possible that any potential aquifer would be suitable for production without regard to depth of burial. This map is constructed to show the shallowest position at which an event with character similar to the identified aquifer, could be expected.

RECOMMENDATIONS

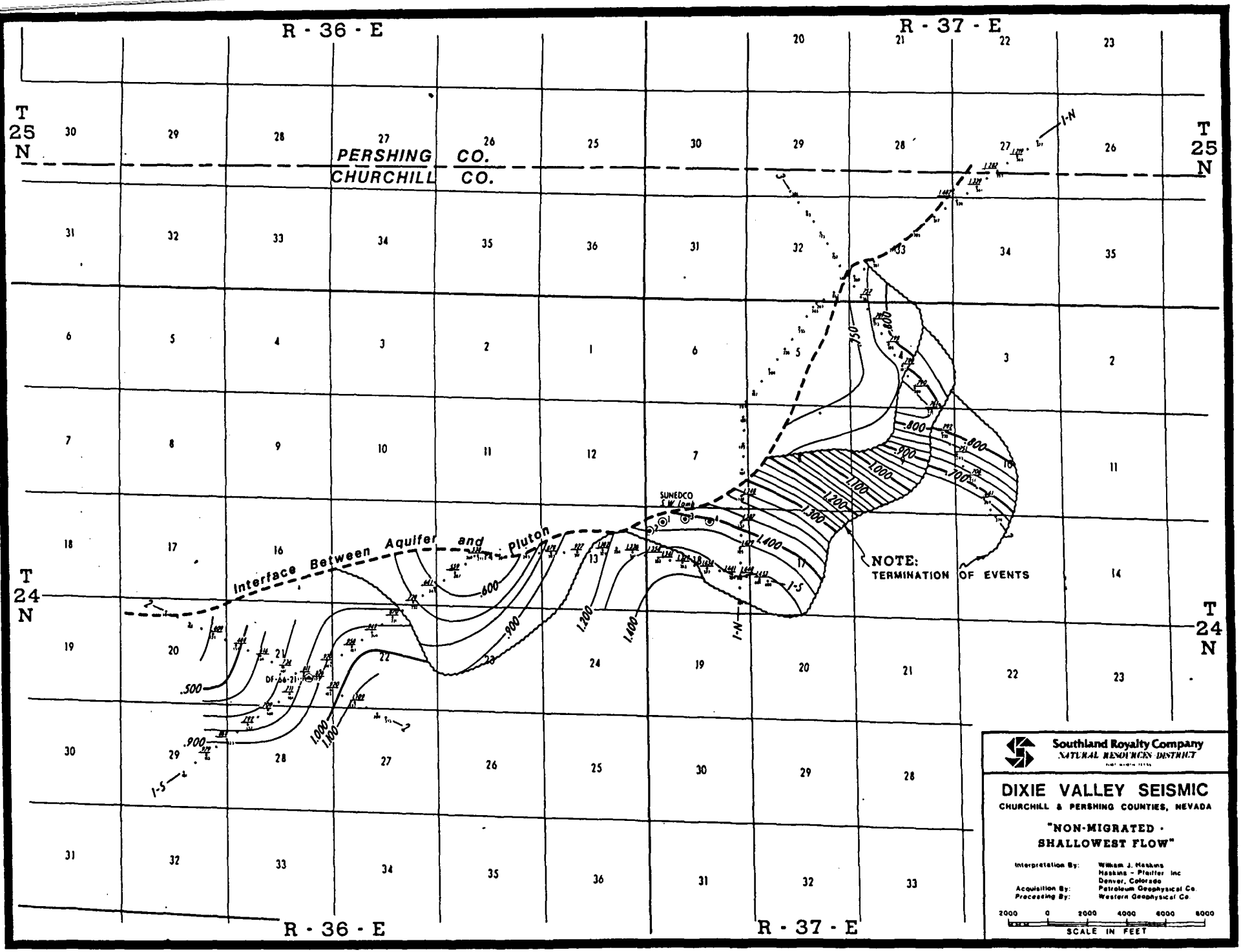
At this stage of exploration, plans should be made to increase the density of seismic control in the areas available for drilling. This additional control should use parameters compatible with the existing data. Care should be taken to keep all new lines normal to strike to aid migration. Processing should be carefully supervised so that data quality will be compatible with that now at hand.

Yours truly,

Haskins-Pfeiffer, Inc.

William J. Haskins

WJH/lf


R - 36 - E
R - 37 - E
T 25 N
T 24 N
PERSHING CO.
CHURCHILL CO.
Interface Between Aquifer and Pluton
SUNEDCO
NOTE:
TERMINATION OF EVENTS
1-N
1-S
.500
.600
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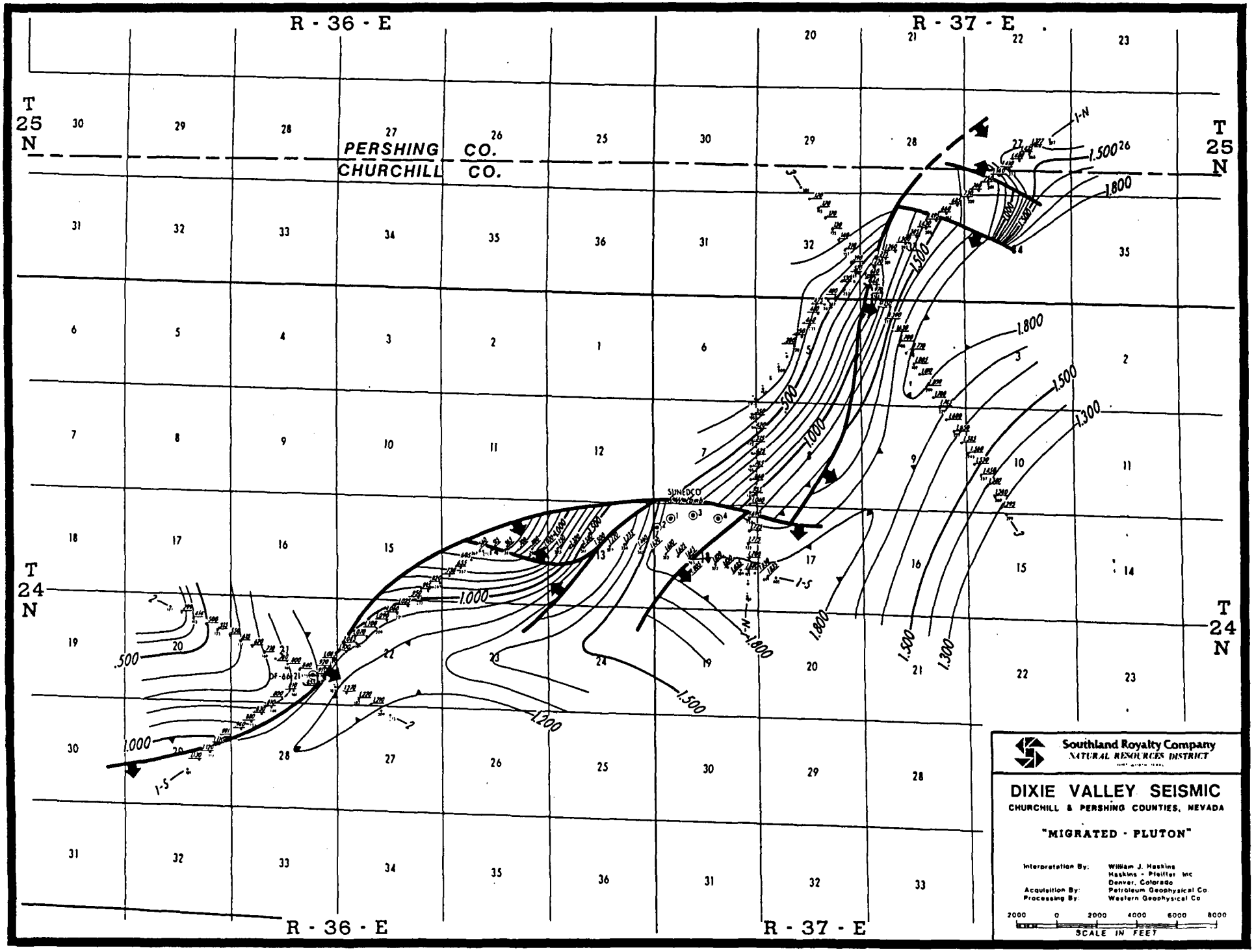
1.400
1.700
Southland Royalty Company
NATURAL RESOURCES DISTRICT
DIXIE VALLEY SEISMIC
CHURCHILL & PERSHING COUNTIES, NEVADA
"NON-MIGRATED - SHALLOWEST FLOW"
Interpretation By: William J. Haskins
Haskins - Pfeiffer Inc
Denver, Colorado
Acquisition By: Petroleum Geophysical Co.
Processing By: Western Geophysical Co.
2000 0 2000 4000 6000 8000
SCALE IN FEET



Southland Royalty Company
NATURAL RESOURCES DISTRICT

DIXIE VALLEY SEISMIC

CHURCHILL & PERSHING COUNTIES, NEVADA

"MIGRATED - PLUTON"

Interpretation By: William J. Haskins
Haskins - Pfeiffer Inc
Denver, Colorado
Acquisition By: Petroleum Geophysical Co.
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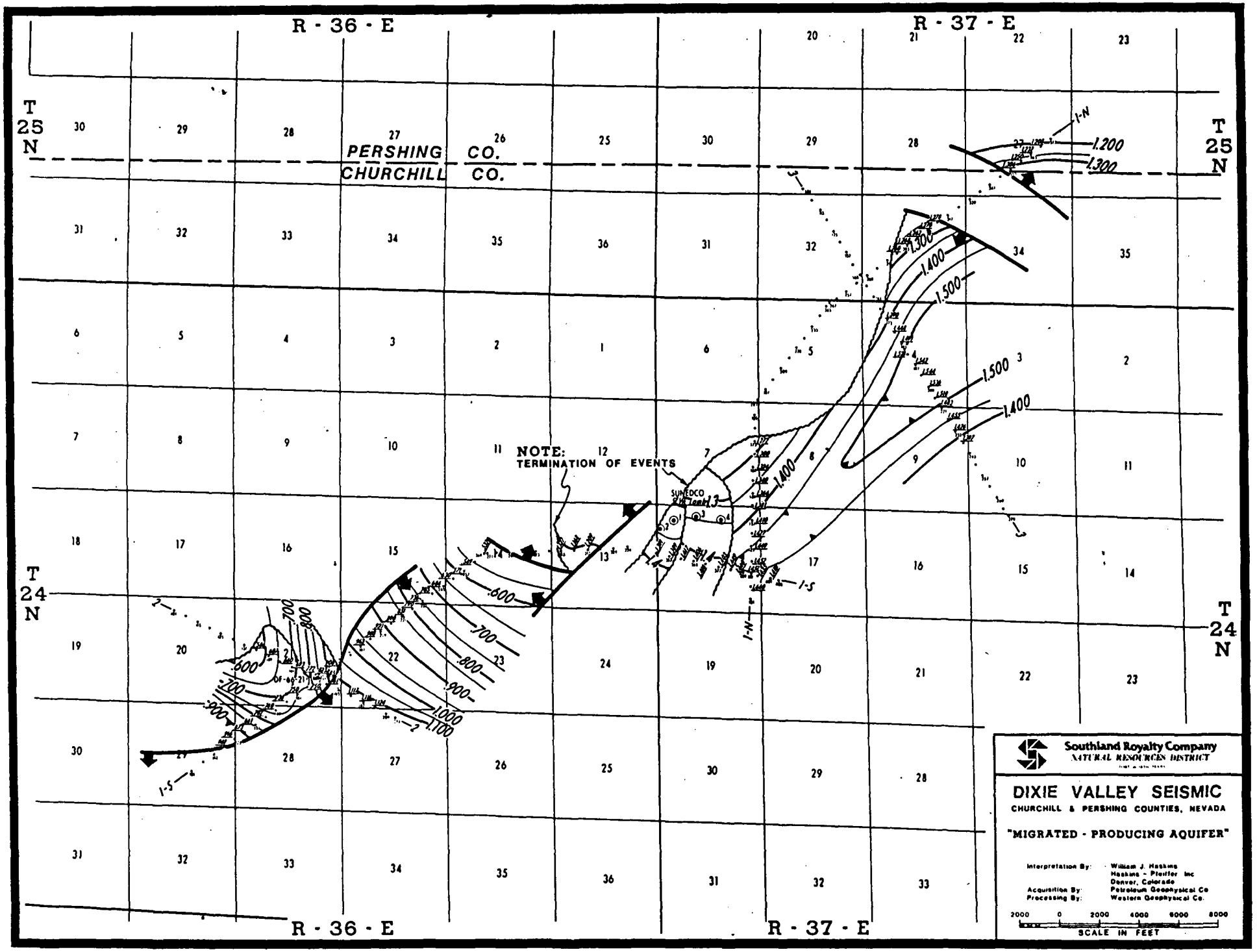
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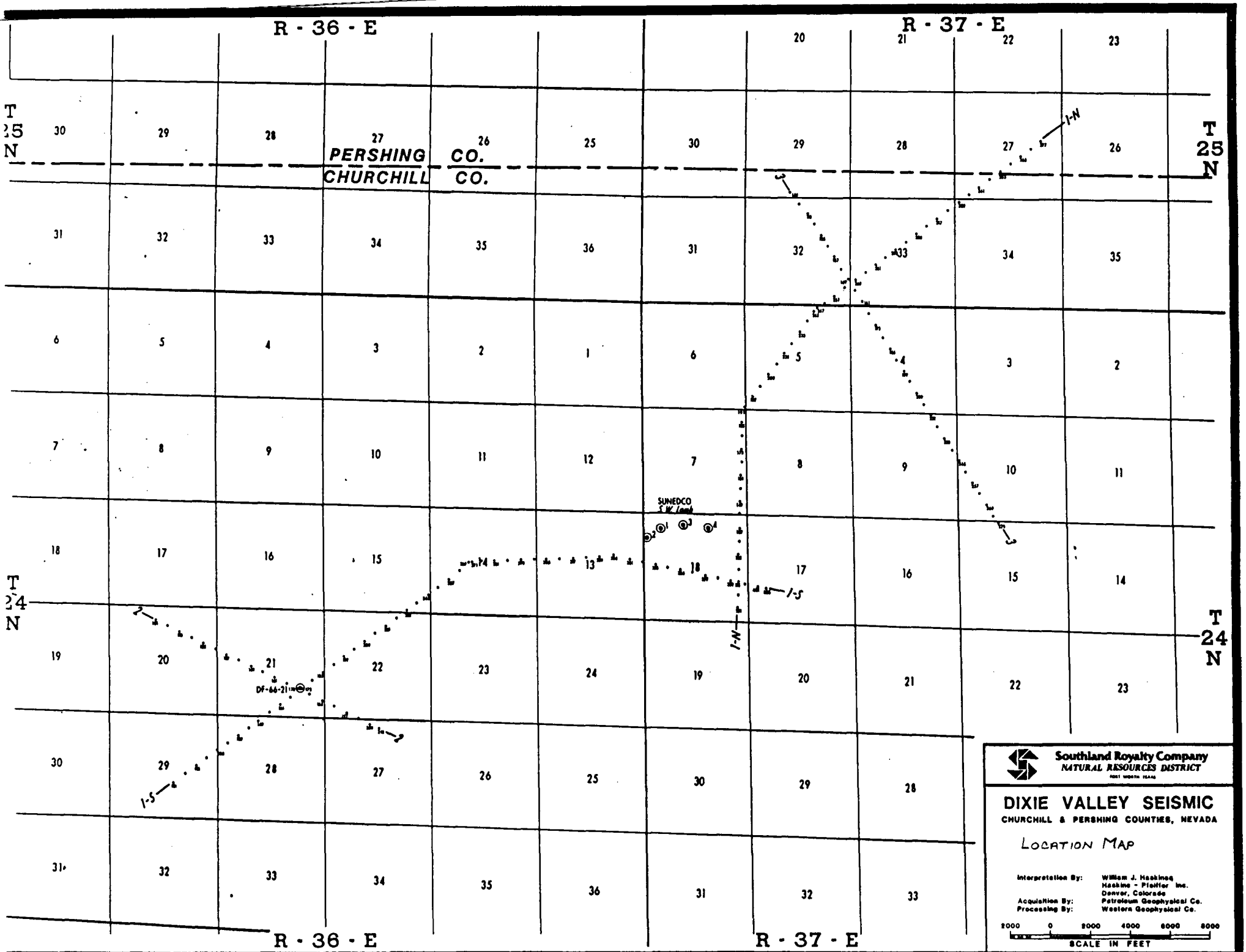

Southland Royalty Company
NATURAL RESOURCES DISTRICT
FORT WORTH, TEXAS

DIXIE VALLEY SEISMIC

CHURCHILL & PERSHING COUNTIES, NEVADA

LOCATION MAP

Interpretation By: William J. Haskinas, Haskins - Pfeiffer Inc., Denver, Colorado
Acquisition By: Petroleum Geophysical Co.
Processing By: Western Geophysical Co.

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SCALE IN FEET