installed and the hook-up to the data acquisition system completed after the move.

A test plan was developed for the Materials Test Loop and the Heat Exchanger Test Loop (which are located on the test trailer). This test plan describes the initial tests to be made, defines the expected operating parameters, and states those requirements that are necessary for the operation of the test loops. Test plans for the other loops and test facilities are being prepared.

A small tube heat exchanger experiment has been devised. Tests on small tubes accelerate deposition compared to that achieved with a full sized tube. The tests, should give a preliminary indication as to the severity of the scaling problem on the larger heat exchangers.

2.4 Geology and Geophyiscs

2.4.1 RRGE-1 and RRGE-2

The lithological sequence of RRGE-1 is depicted in Figure 4 and that of RRGE-2 in Figure 5. Figure 6 illustrates the geological sequence through both wells. There is some uncertainty as to whether or not RRGE-2 has penetrated the Bridge Fault Zone as shown in Figure 6. The deepening of RRGE-2 by approximately 500 feet should resolve this question prior to moving the drill rig to the site of RRGE-3.

2.4.2 Reservoir Testing

A series of three drawdown tests were conducted in RRGE-1 and RRGE-2 during September and October as shown in Table I. The instrument used to record the pressure changes was a highly accurate device employing a quartz crystal downhole and a frequency recorder on the surface. The INEL logging truck was used to lower and retrieve the tool from the two wells.

A coordinated effort involving INEL and the University of California Lawrence Berkeley Laboratory (Dr. Paul A. Witherspoon and Dr. T. N. Narasimhan) was accomplished during the testing. Analysis and interpretation of the data was accomplished by Witherspoon and Narasimhan.

The computation of permeability and storage coefficient result in the data of Table II for RRGE-2.

Figure 7 shows the pressure response with time, and the two discontinuities in the logarithmic slope which probably indicates the presence of two boundaries or the equivalent.

The test monitoring reservoir characteristics in RRGE-1 while RRGE-2 was flowing would more likely indicate the characteristics of the reservoir

TABLE II

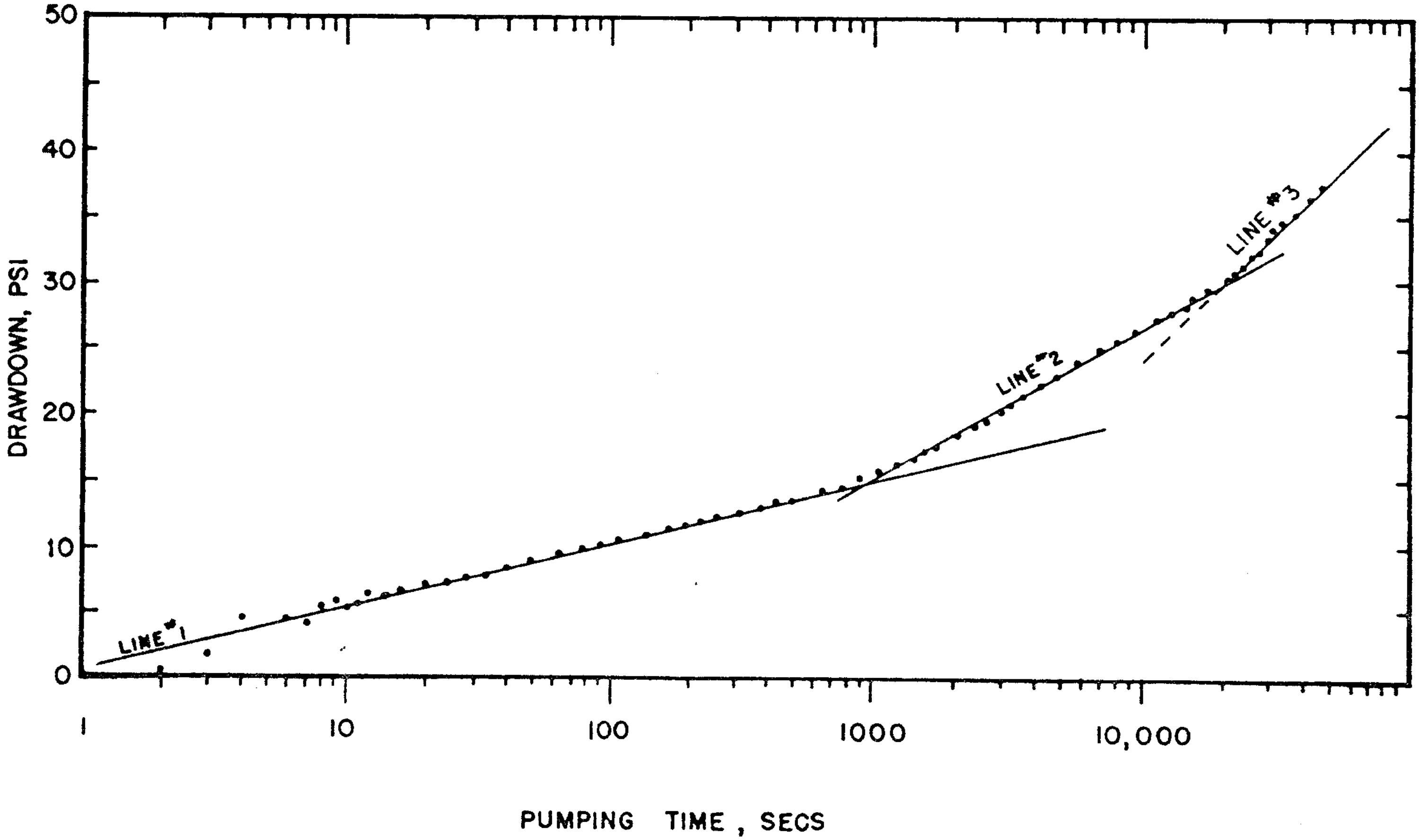
Characteristics of Reservoir as Deduced from Drawdown Measurements on RRGE-2 While Flowing RRGE-2

	Drawdown Data		Recovery Data
	Jacob's Method (Asymptote Solution)	Theis Method	Asymptote Solution
Transmissivity (gpd/ft^2 at 296°F)	4,667	4,696	4,718
kH md-feet	44,134	44,442	44,623
Storage Coefficient S	1.134×10^{-2}; r_w = 1 foot	1.09×10^{-2} r_w = 1 foot	-
ØCH (Porosity x Compressibility x Thickness)	2.82×10^{-2} ft/psi; r_w = 1 foot	2.71×10^{-2} ft/psi; r_w = 1 foot	-

Fig. 7

DRAWDOWN DATA FROM RAFT RIVER TEST AT RRGE NO 2

(9/12/75 TO 9/13/75)



between the recording instrumentation, both at the top and bottom of the well, were able to detect linear tides in the reservoir, as seen in Figure 8.

The computation of permeability and storage coefficient result in the data for the region between RRGE-1 and RRGE-2, as shown in Table III.

The higher transmissibility than obtained in the single well test should be assumed more characteristic of the overall reservoir.

Finally, a single well test was run on RRGE-1, flowing and monitoring both in the same well.

The analysis of this showed a permeability of the reservoir fairly consistent with the two well tests. The average permeability characteristic appear to be:

$$kH \simeq 2.25 \times 10^5 \text{ md feet and a transmissibility of}$$

$$\simeq 23{,}700 \text{ gpd/ft at } 296^0\text{F}$$

Figure 9 shows one discontinuity in the slope, implying one nearby boundary.

2.4.3 Well Logging

Well logging was conducted in both RRGE-1 and RRGE-2 by the INEL logging trucks. The logs taken by INEL exhibit good correlation with the commercial logs taken earlier. However, the most important tool (flow-meter) did not operate satisfactorily and thus no new information on production zones is available, except the preliminary information from the new USGS flow meter indicates significant production may be coming from the bottom of RRGE-2.

2.4.4 Raft River Area Subsidence Check

Elevation markers on a quarter-mile grid were established in late spring 1975, around RRGE-1 and RRGE-2. Elevation points were rechecked in December in the immediate three square mile area around the well sites. There has been no observable ground subsidence in the six month period.

2.5 Hydrology

2.5.1 Cold Ground Water

Two shallow ground water aquifer tests were run during this quarter after agricultural needs had terminated. These tests were run in the Raft River Basin to provide data on the long-term hydrogeologic parameters.

TABLE III

Results from Flowing RRGE-2 and Measuring Pressure in RRGE-1

	Preliminary Test Sept. 14 to Sept. 17, 1975		Long Duration Test Sept. 20 to Oct. 16, 1975	
	Theis Curve Matching Procedure	Asymptotic Solu. (Jacob's Method)	Theis Curve Matching Procedure	Asymptotic Solu. (Jacob's Method)
kH, md feet	2.25×10^5	2.22×10^5	2.28×10^5	2.28×10^5
ØCH, ft/psi (Porosity x Compressibility x Thickness)	5.74×10^{-4}	5.39×10^{-4}	1.19×10^{-3}	9.38×10^{-4}
Transmissibility gpd/ft at 296°F	2.37×10^4	2.34×10^4	2.41×10^4	2.37×10^4
Storage Coefficient S	2.31×10^{-4}	2.16×10^{-4}	4.78×10^{-4}	3.77×10^{-4}

Fig. 8

EFFECT OF LUNAR ATTRACTION ON WATER PRESSURE IN GEOTHERMAL RESERVOIR, RAFT RIVER VALLEY, IDAHO

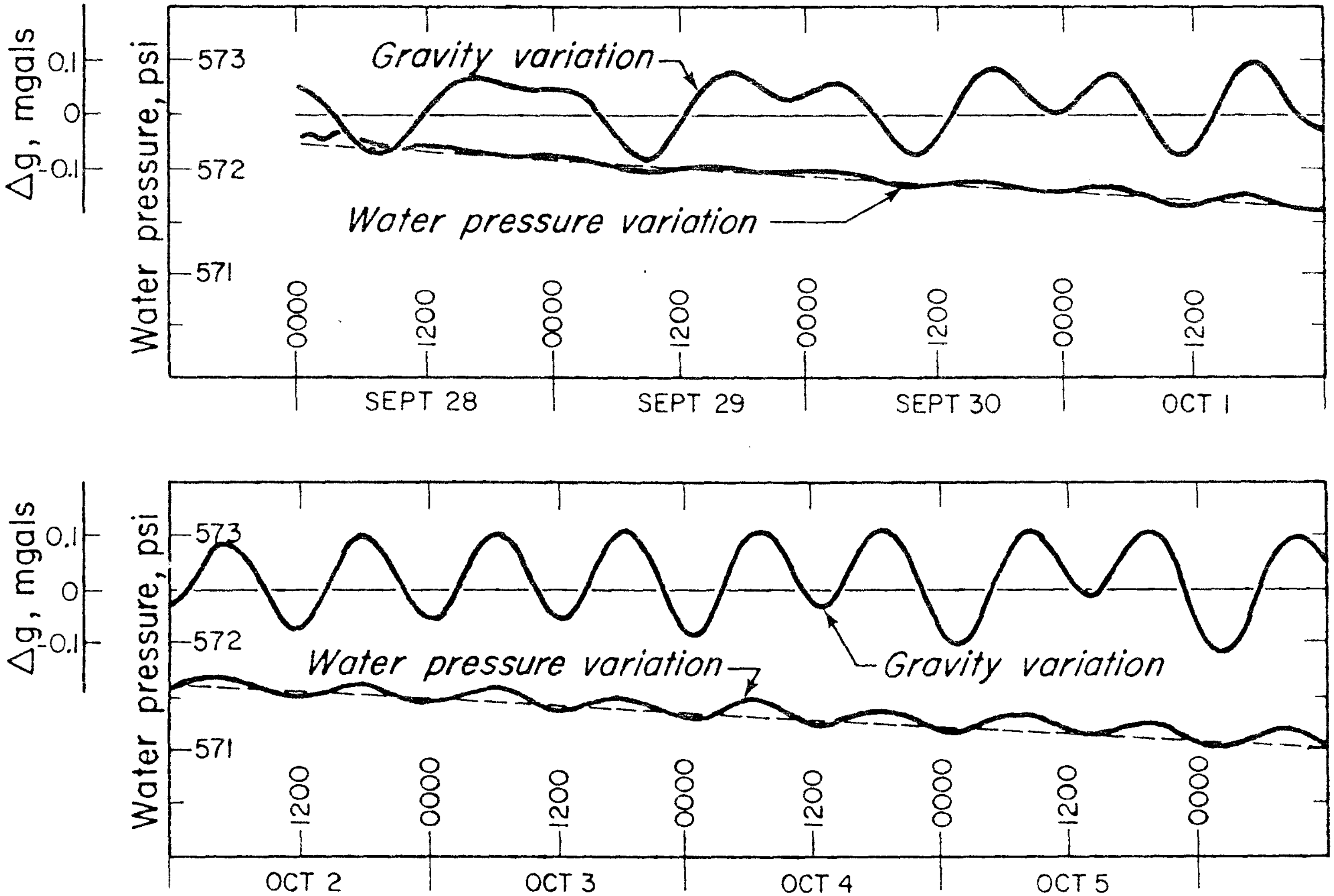
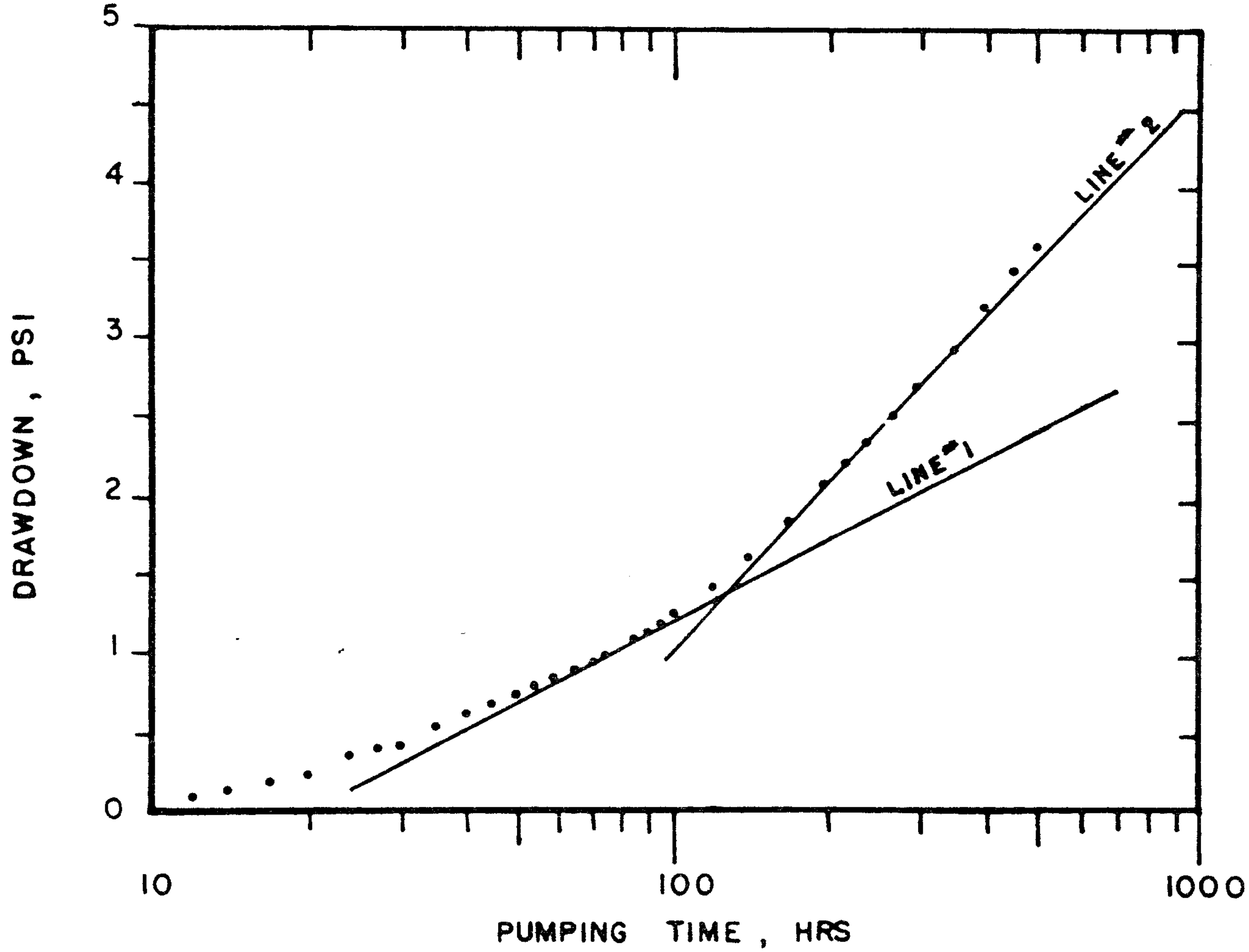


Fig. 9

DRAWDOWN DATA FROM RAFT RIVER TEST AT RRGE NO. 1

(9/20 TO 10/12)



These tests are believed to be representative of the hydrogeological characteristics in this area.

Pump Test No. A was run using six area wells located between RRGE-2 and RRGE-3 locations. Pump test B used two wells located approximately six miles southwest near the Narrows.

These tests were terminated in mid-December and final data analysis is not available at reporting period close.

2.5.2 Geothermal

Two geothermal deep holes approximately 11 to 1200 ft were drilled in the upper Narrows by USGS to study aquifer parameters. One well flowed hot water and was located approximately 5 miles northwest of the Narrows, the other well was 9 miles west of the Narrows. Both wells were cased near the surface, pump tests have not been started at this time.

2.6 Environmental and Area Impact Considerations

The initial phase of several of the baseline environmental studies has been completed. Data obtained from this initial phase will determine where future studies should concentrate. The following is a summary of the reports that have been received on the archaeology, vegetation, aquatic, and air quality studies.

Nearly 3,000 acres of land covering a 7-mile stretch of the Raft River and the adjacent floodplain and foothills were surveyed for archaeological resources using systematic swathing techniques. A total of 7 occupance areas and 13 use areas were located. All but two of these are within 300 meters of the river indicating that it was a major controlling factor in the development of the area. Natural occurrences resulting from activity of prior civilizations identified include chalcedony, ignimbrite, and obsidian flakes, projectile point tips, and flake scrapers. The presence of these indicates that tool manufacturing as well as hunting and hide preparation took place. Although only the surface resources were surveyed, the presence of six sites within 1.5 miles indicates a high density area where subsurface cultural resources probably exist.

The initial phase of the vegatation study concentrated on a one square mile area surrounding the two well sites. The parameters of the plant community measured include cover, frequency, and density. A species list was compiled and a total of 43 species were identified. A 500m x 500m area adjacent to the north side of RRGE-2 was more intensely sampled. The species contributing most to ground cover in this area were greasewood (22.7%), sagebrush (13.6%), and squirreltail grass (4.9%). These are the three most important species and are used to characterize the vegetation type over the entire study area. Halogeton and other annual weeds are established where the soil has been disturbed and development may cause a proliferation of these species.

In addition to the above study, 50 samples of the terrestrial environment were taken from an area that was to be irrigated with geothermal fluids. Another seven representative samples were taken following irrigation to be used to determine the effect of the geothermal fluids. These samples have been run through the ATR reactor at INEL for neutron activation analysis. Quantitative results will be forthcoming from the Ge(Li) spectrometer measurements.

An aquatic survey of the Raft River in the vicinity of the drill sites this fall showed low population of the commonly expected species, unusual for a river in this area. Reasons for the scarcity of findings include the flow conditions of the river at the time of sampling and the river bottom type (a very rare type similar to that of the Colorado River). A similar survey will be taken this spring following high water to determine if this condition is characteristic of the river.

Preliminary air quality studies were conducted at Malta during the summer and fall of 1975. Particulate filters collected during this period were examined with a scanning electron microscope and with energy dispersive X-ray analysis. The most predominant particles by number were sulfates, although fly ash, soil dust, and soot particles were also numerous. Although no air quality standards were exceeded, concentrations observed are higher than expected for a rural area. Although the meteorology of the valley has not been studied in enough detail as yet to confirm this, it is postulated that the substantial concentrations of sulfate particles may be due to transport from the Wasatch Front some 150 miles away, where industrial discharges abound.