Los Alamos

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memorandum

TO: Distribution

DATE: May 9, 1985

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SYMBOL: ESS-DOT

SUBJECT: EXPERIMENT 2059: SECOND PACKER STIMULATION OF EE-3A

Introduction

By late Thursday, 5-9-85, EE-3A should be at a depth of about 12,200 feet. We plan to stop drilling at this point and pressurize the bottom 600 to 700 feet of the open hole using a Lynes packer. The Lynes packer would be set somewhere in the interval of very competent, slow-drilling, and only slightly altered biotite granodiorite from 11,460 ft to 11,590 ft. This would place the packer below the two fractures (at 10,880 ft and 11,000 ft) stimulated during Expt. 2057, and also below the producing fracture at 11,440 ft as reported on 5-2-85.

This time, we are planning for a 24-hour (nominal) injection test at EE-3A, with a pumping pressure limit of 6000 psi. The injection flow rate will be about 10 BPM, with three Dowell pumpers on line. In 24 hours at a nominal 10 BPM, we will have injected 600,000 gallons into EE-3A.

We plan to use an OTIS coil tubing unit (using nitrogen gas) to clean out the bottom of EE-2 on Friday 5-10-85. Following this cleanout, the OTIS unit would be placed on standby through Sunday (5-12-85) to unload EE-2 during the pumping phase at EE-3A, if desirable. In any case, EE-2 will be vented during the packer stimulation test at EE-3A.

In order to positively identify any MHF reservoir throughflow during this experiment, a "negative" tracer will be injected into EE-3A -- clean water from the 5-million gallon reservoir -- and tested for in the EE-2 outflow. A gradual reduction in the boron concentration (or the concentration of other appropriate elements) in the EE-2 outflow would be indicative of a hydrologic connection, not just a ventback from the previously pressurized MHF reservoir.

Schedule

The 24-hour EE-3A pumping phase of Expt. 2059 is presently scheduled to begin on Saturday afternoon, 5-11-85.

Experiment Summary

Following background temperature and caliper logs in EE-3A (requiring about 12 hours total), the Lynes packer will be tripped in and set following the same procedure as used for Expt. 2049. The openhole interval below the packer would then be stimulated for 24 hours as discussed above. During and following the EE-3A pumping phase, EE-2 would be vented and the outflow monitored. A repeat temperature log would then be run in EE-3A after the Lynes packer is removed.

Equipment and Instrumentation

1. Dowell pumping equipment; flow rate and pressure instrumentation; suction supply pump truck.
2. ESS-6 4-inch temperature tool (with centralizer springs), caliper tool and hoist at EE-3A.
3. ESS-6 pressure transducer (0-10,000 psi) and associated plumbing to tee off Dowell's high-pressure line on the injection side of EE-3A; recorded on both the strip chart and computer in DAT.
4. ESS-6 pressure transducer (0-2000 psi) on the back side of EE-3A; recorded as in 3. above.
5. Slim-line geophone package on station at 9400 ft in EE-1; geophones in GT-1, PC-1, and PC-2.
6. Vent system for EE-2.
7. Fresh water supply for Dowell from the 5 million gallon reservoir.
8. Vent instrumentation for EE-2 as available (Pressure, 0-5000 psi; Temperature, 0-200°C)
9. EE-2 backside pressure, 0-1000 psi
10. On-line microseismic event location computer system in DAT using the Biomations.

Procedure

A. Pre-experiment Operations

1. After drilling ahead to about midnight Thursday, 5-9-85; perform a mud sweep of the hole, completely circulate the hole once with mud, and then displace the mud from the hole with clean water.
2. Trip out of the hole; clear the catwalk and V-door for subsequent logging operations.

B. Background Temperature Log in EE-3A

1. Use the 4-inch tool with centralizer bow springs; no wireline packoff.
2. Logging rates as before; log to TD and then trip out without recording.

C. Caliper log of EE-3A

1. Caliper survey from 10,800 ft to TD at about 12,200 ft; emphasize the interval from 11,400 to 11,600 feet.
2. Record the individual arm data in a continuous analog mode (not digital) if possible.

D. Lynes packer installation in EE-3A: Follow Expt. 2049 procedures (Don Dreesen in charge, Jim Miller alternate).

1. Strap in the hole to provide an accurate setting depth for the Lynes packer.

E. Pumping at EE-3A

1. After the Lynes packer is landed and inflated, bring on one Dowell pumper at 1 BPM; continue pumping until the injection pressure starts to level out.
2. Increase the injection rate to 2 BPM for 10 minutes.
3. Further increase the injection rate to 10 BPM in 2 BPM steps lasting 10 minutes each; observing a 6000 psi maximum pumping pressure limit.
4. As the test proceeds, increase (or decrease) the pumping rate to maintain 6000 psi at the pump discharge.
5. Continue pumping for 24 hours if possible (depending on packer lifetime).
6. Vent down EE-3A as necessary.

F. Post-Pumping Operations

1. Release Dowell
2. Pull the Lynes packer out of EE-3^A
3. Run a final tempeature log in EE-3A
4. Return to drilling at EE-3A

DB/jb