EG&G Idaho

FORM EG&G-954
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INTEROFFICE CORRESPONDENCE

date October 8, 1976

to J. F. Kunze

from R. C. Stoker

subject PRESSURE PROBE RETRIEVAL FROM RRGE-1 - RCSt-26-76

Ref: 1) Pressure Probe Loss In RRGE-1 - RCSt-20-76
2) Perturbation To Testing Program - Kun-291-76

A pressure probe valued at approximately $13,000 was wedged by the lead-out cable in the 12-inch master valve of RRGE-1 on June 21 (see reference 1 for complete details). Due to flow testing requirements, design and fabrication time, the retrieval attempt was delayed until late September (see reference 2).

Several retrieval methods were discussed and studied. The method selected was determined to be the safest and offered an excellent chance of success. It was based on designing a boom assembly/retrieval tool to operate through one of two 3-inch valves located below the 12-inch master valve. The retrieval tool would engage the stinger and lift it out of the flapper valve which would then close and allow access to the well under no-flow/no-pressure conditions. See attached Figure 1 for boom assembly/retrieval tool details, Figure 2 for lubricator and stripper arrangement and Figure 3 for retrieval tool engaged in stinger. Responsibilities for tool design and fabrication rested with R. D. Sanders.

The successful retrieval of the pressure probe was accomplished using an outline procedure and the following steps briefly describe what happened during the operation.

1. Logging truck drum was adjusted to 250 lb. pull limit.
2. 3/16-inch aircraft cable was attached to boom assembly/retrieval tool and run through lubricator and stripper arrangement. Cable was rolled up on logging truck drum.
3. Boom assembly/retrieval tool was installed on 3-inch valve flange.
4. Boom assembly/retrieval tool was inserted through 3-inch valve and positioned inside well casing.
5. Retrieval tool was lowered down well through stinger and packer with flapper valve. The stinger was engaged at the 847 foot depth. The tool and stinger were raised progressively from 6 inches to 4 feet while bleeding well pressure through a 3/4-inch bleed valve. However, the flapper valve failed to close. The tool and stinger were then lowered until they seated and again withdrawn to 5 feet. Again the flapper valve failed to close.

NOTE: It was determined at this time that the closure failure of the flapper valve was probably a result of the lack of flow upward past the valve.

6. The tool and stinger were again lowered to just above the flapper valve and the other 3-inch discharge line was cracked open. This action partially closed the flapper valve with considerable water leakage through the 3/4-inch bleed valve. Hand manipulation of the retrieval tool cable and thus the stinger resulted in the complete closure of the flapper valve. Simultaneous with flow shutoff, the stinger was disengaged from the retrieval tool and ended up sitting on the flapper valve. Only minor leakage occurred through the 3/4-inch bleed valve.

7. With the bleed valve open to maintain the delta P across the flapper valve, the 12-inch master valve was rigged to the cherry-picker for removal.

8. The master valve was raised 8 inches and blocked up with wooden wedges. The pressure probe cable was then retrieved and 105 feet of cable and pressure probe removed by hand.

9. The 12-inch master valve was then opened and inspected for possible internal damage. All components were in perfect working order and the valve seats were unscarred.

10. The 12-inch master valve was then repositioned and bolted in place.

11. The boom assembly/retrieval tool and lubricator and stripper arrangement were removed from the well.

12. All valves were then closed to eliminate the delta P across the flapper valve. This action resulted in the stinger weight (150 lb.) forcing the flapper valve to open and the stinger to fall into place holding the flapper valve open.

13. It was ascertained that the stinger was in place by opening the 3-inch discharge line and observing the high flow rate and a small (~2 psi) surface pressure drop from 152 psi.

The entire operation went very well and everyone involved with it should be commended.

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cc: CWBills - ERDA-ID
JLGriffith - ERDA-ID
CGCooper
ADCrandell
SDGilliard
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RWGould
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SJPrestwich ✓
RDSanders
RJSchultz
SGSpencer
DHSuckling
JFWhitbeck
RSMcPherson
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Aerojet Nuclear Company

Interoffice Correspondence

July 1, 1976

J. F. Kunze
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PRESSURE PROBE LOSS IN RRGE-1 - RCSt-20-76

On Sunday, June 6, 1976, a downhole pressure probe was lowered into RRGE-1 to monitor the pressure reponse of the geothermal reservoir. It was positioned at the 800-foot depth to eliminate any pressure transients induced by temperature changes in the near surface groundwater aquifer. The 1,100 feet of cable employed for lowering the probe was borrowed from Lawrence Berkeley Lab and had tuck tape wrapped on portions of it. An attempt was made to remove all the tuck tape prior to insertion into the well. Background pressure data was gathered until June 8, when flow was established at 145 gpm from RRGE-3. These test conditions were maintained until June 16 at which time RRGE-3 was shut in to initiate the reservoir recovery phase of the test.

Reservoir recovery was completed on Monday, June 21 and preparations were made to remove the pressure probe from RRGE-1. Approximately 800 feet of cable was retracted from the well when the cable quit feeding through the "stripper" unit. A check of the probe location was made by manually feeding the cable back into the well and then retracting it again rapidly. The use of more force or harder yanking during this check might have resulted in failure of the probe connector if it had been in contact with the stripper. This check was repeated twice and a dead stop occurred at the same spot on the cable. The indication was that the probe connector was hitting the bottom of the "stripper" rubber and preventing further withdrawal of the cable.

The 12" master valve is located approximately 8 feet below the "stripper" unit. This 8 foot distance is used to position the 4-1/2 foot long probe while the master valve is shut and the "stripper" is disassembled for final probe removal.

After the probe position check was completed, the master valve was closed very slowly until a faint snap was heard and the operation stopped. After tugging on the cable several times, it parted at the upper face of the master valve and was removed from the well.

Subsequent investigation revealed that the 3-1/2 inch thick master valve was sealed at the top face but not at the bottom face. Also, the stopping point of cable withdrawal had been caused by tuck tape, wrapped around the cable hitting the "stripper" rubber rather than the probe connector. It was verified that the 4-1/2 foot pressure probe and approximately 5 feet of cable had been left in the well. The design of the valve is such that there existed a good probability that the cable was wedged in the valve at the bottom seal.

On June 28, it was confirmed through the use of fiberoptics that the cable is indeed wedged in the master valve. Design activities are currently underway for a tool that will help in the retrieval of the probe. Meanwhile, provisions have been made to flow water out two 3-inch valves for testing purposes. The 12-inch master valve will remain in the "as is" condition until the retrieval attempt is made in about three weeks.

R. C. Stoker
Geological Engineer
Geothermal Projects

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cc: DGoldman
LGMiller

Aerojet Nuclear Company

Interoffice Correspondence

June 30, 1976

F. H. Tingey
CSCTSB

PERTURBATION TO TESTING PROGRAM - Kun-291-76

On Monday, June 21, while retrieving a downhole pressure probe from RRGE Well #1, the cable was accidentally sheared by the master gate valve. On Monday, June 28, it was confirmed, by use of a viewing light pipe inserted in the side ports of the well head, that the instrument is hanging inside the well head, with the cable caught in the closed gate of the valve.

On Tuesday, June 29, some of the more straightforward methods of retrieval were reviewed and found to be unacceptable because of uncertainties and/or safety reasons. Therefore, it was decided to begin immediately the planned operation of providing geothermal fluids from this well for the metallurgical, agricultural, and aquacultural experiments. The fluid will be provided from the side ports and should not create sufficient turbulence (at 250 gpm) to jar the probe loose. Meanwhile, more time would be available to plan and get equipment prepared for a probe recovery effort.

The probe is worth $12,950, and is currently on a special rental arrangement costing a net of about $27/day. (The probe was actually rented by LBL, but we are now obligated to pick up rental charges.)

The program was delayed about six (6) days from providing water for agricultural experiments and for some older metallurgical samples. An approximate estimate of the value of these experiments is $250/day. This is not an out-of-pocket expense, whereas the loss of the probe and/or its rental cost is out of pocket.

In perspective, loss of expensive instruments downhole is not uncommon. The manufacturer, Gerhard-Owens, has lost at least eight of these themselves. One oil company allegedly lost three such instruments in one hole.

This office is proceeding with a planning effort to recover the probe. There is still no assurance this can be done. (I estimate the probability potential for success is about 50%.)

J. F. Kunze, Manager
Geothermal Programs

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cc: CWBills /r/ JLGriffith - ERDA-ID
WWHickman RCStoker

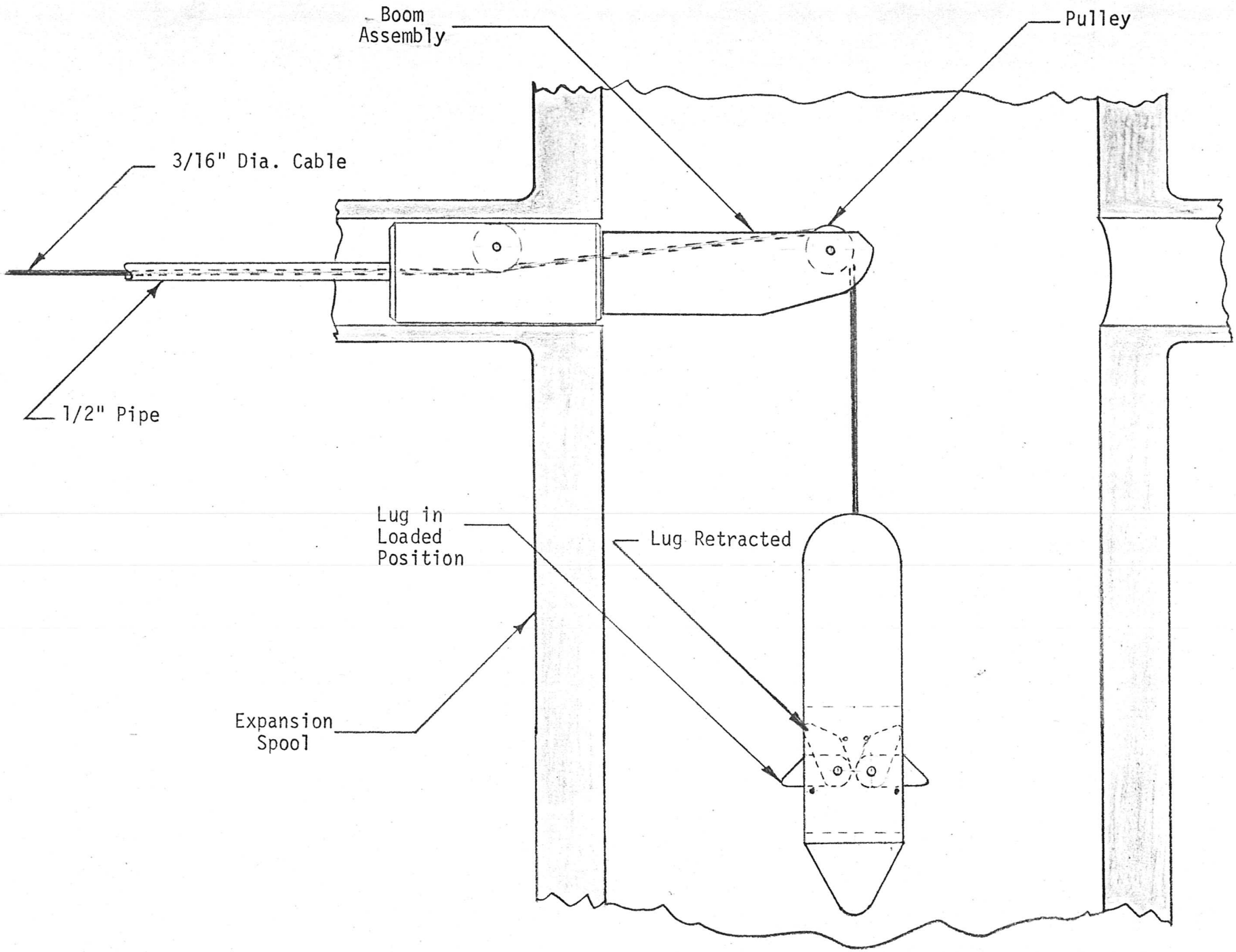
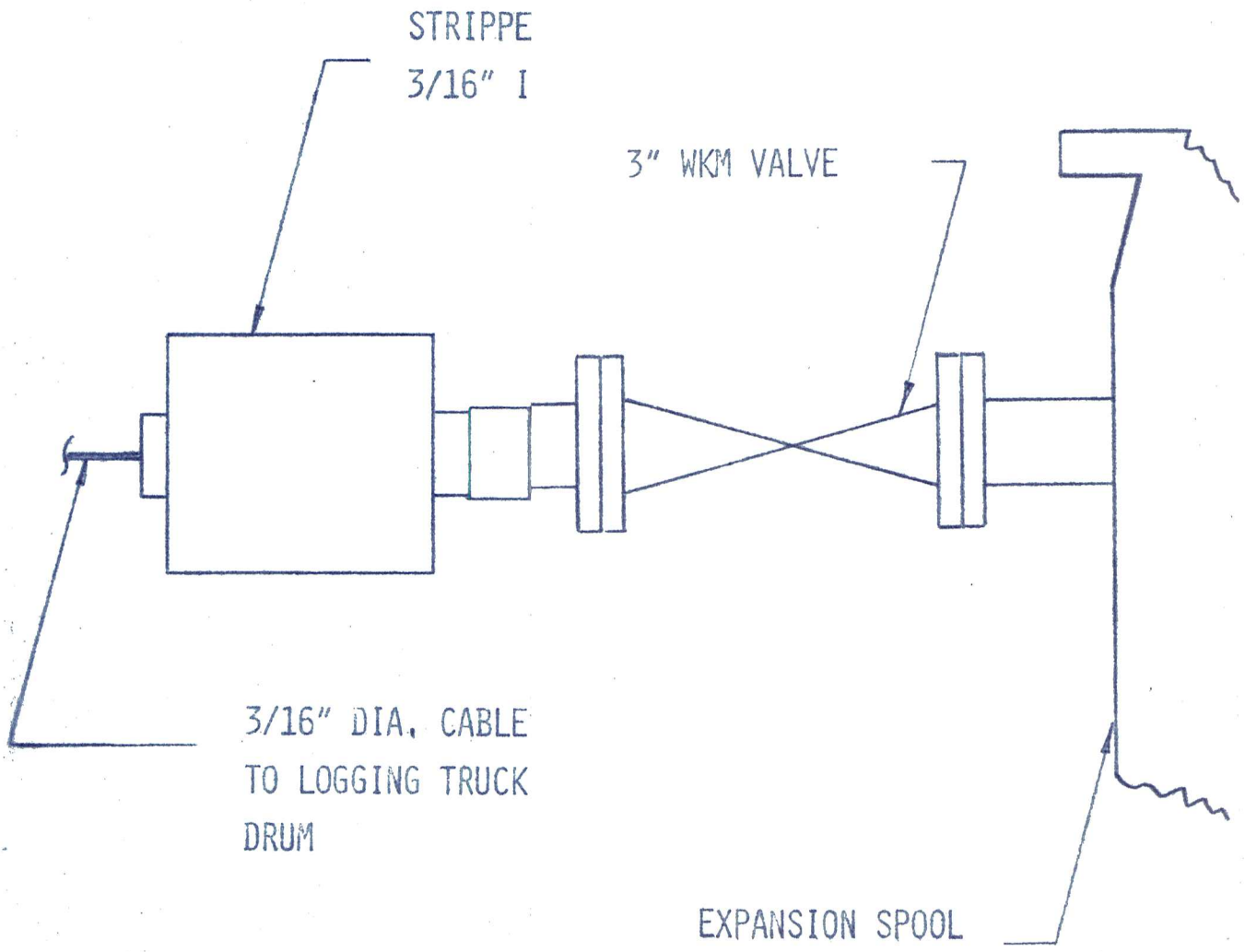


Figure 1 - Boom Assembly/Retrieval Tool
Scale: 1/8


STRIPPE
3/16" I
3" WKM VALVE
3/16" DIA. CABLE
TO LOGGING TRUCK
DRUM
EXPANSION SPOOL

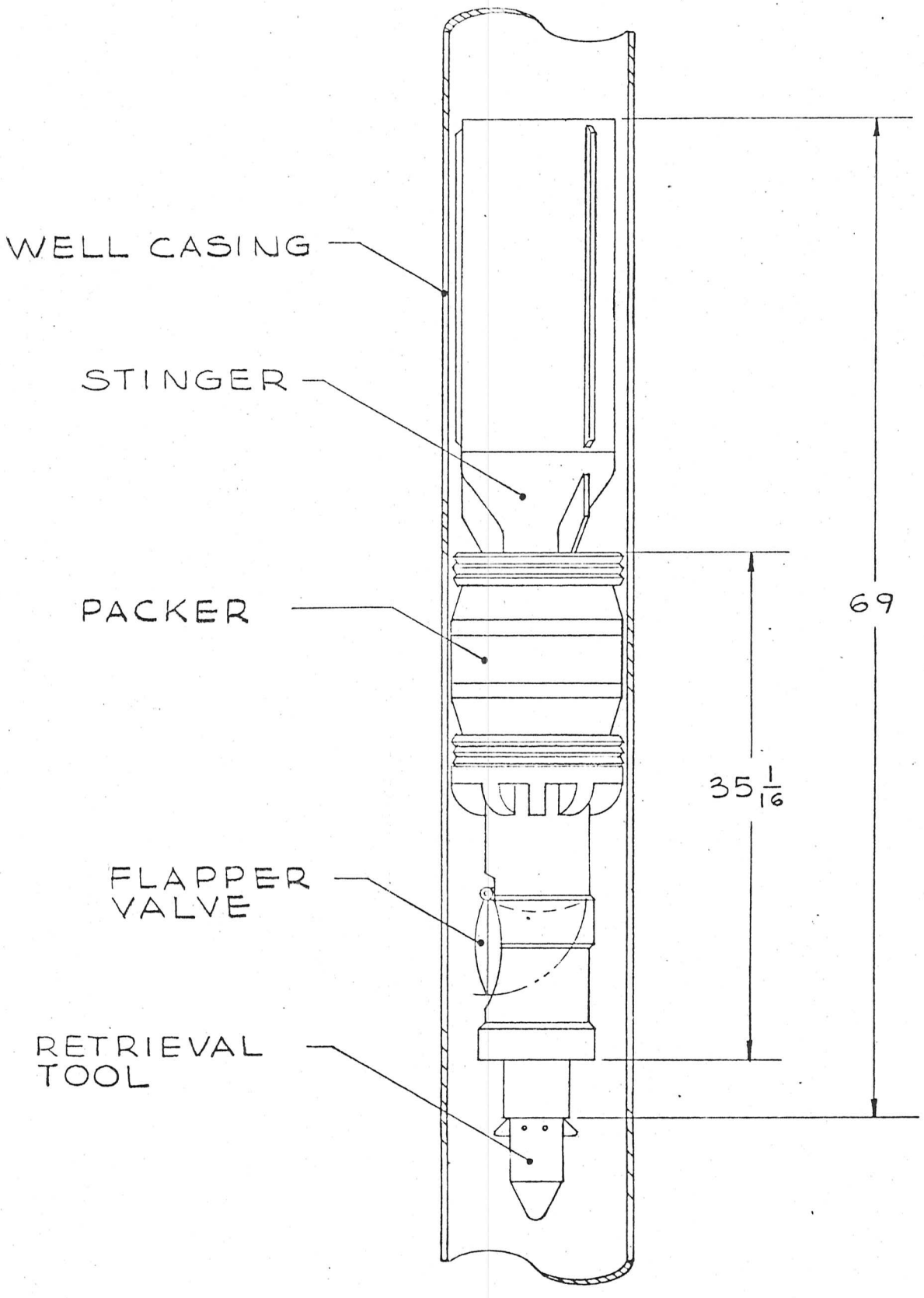


FIG. 3
RETRIEVAL TOOL ENGAGED IN STINGER