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PNE-G-71

PROJECT GASBUGGY HOLE HISTORIES

GB-E; GB-E-R; GB-1; GB-2R; GB-2RS;
GB-D; GB-10-36; GB-2

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BY JH Kalin lamh
DATE 3/16/71

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Larry P. Williams
Authorizing Official

P8736

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FENIX & SCISSON, INC.
HOLE HISTORY DATA

DATE: February 2, 1968

APPROVED: *Robert V. Fenn*

HOLE NO.: GB-D	CONTRACT NO.: AT(26-1)-338	I. D. NO.: <i>1</i>
USER: LRL-EPNG	TYPE HOLE: Instrument	
LOCATION:	COUNTY: Rio Arriba	AREA: Farmington, New Mexico
SURFACE COORDINATES: N-2,066,429.44'; E-220,116.61'		
GROUND ELEVATION: 7207.6'	PAD ELEVATION:	TOP CASING ELEVATION:
RIG ON LOCATION:	SPUDED: 8-19-67	COMPLETED: 10-6-67 **
CIRCULATING MEDIA: Mud		

MAIN RIG & CONTRACTOR: Brinkerhoff Drilling Co. Rig #21	NO. OF COMPRESSORS & CAPACITY:
---	--------------------------------

BORE HOLE RECORD					CASING RECORD					
FROM	TO	SIZE	I. D.	WT./FT.	WALL	GRADE	CPL'G.	FROM	TO	CU. FT. CMT.
0'	29'	26"	20" O.D.	133	.635	J-55	S.T.&C.	0'	29'	120
29'	482'	17-1/2"	13-3/8"	48		H-40	S.T.&C.	0'	482'	660
482'	4725'	12-1/4"								

TOTAL DEPTH: 4725' GL	AVERAGE MANDREL DEPTH:	FROM REFERENCE ELEVATION:
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JUNK & PLUGS LEFT IN HOLE: NONE

SURVEYS PAGE: 7	CORING PAGE:	CU. FT. CMT. TOTAL IN PLUGS, ETC:
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LOGGING DATA: Page 9

BOTTOM HOLE COORDINATES: N-2,066,432.38'; E-220,137.45'	REFERENCE: Average In & Out 332-502-001
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RIGS USED				(Site Prep Rigs *)			
RIG NO.	NAME	TYPE	CLASS	DAYS OPERATING	SECURED W/ CREW	SECURED W/O CREW	TOTAL DAYS ON LOC.
21	Brinkerhoff	500 H.P.		21.19		12.96	34.15
50	Aztec Well Service	180 H.P.		9.25			9.25

REMARKS: * Site Prep Items

** Drilling Completed 9-8-67, Stemming completed 10-6-67.

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PREPARED BY:

TIME BREAKDOWN ON NEXT PAGE

TIME BREAKDOWN

SITE PREPARATION

DRILLING OPERATION TIME (DOT)	OTHER SCHEDULED TIME (OST)	OPERATIONAL DELAY TIME (ODT)
DRILL _____	MOVE _____	RIG REPAIRS _____
TRIPS _____	RUN CASING _____	W. G. DRILLING SUPPLIES _____
SURVEYS _____	CEMENT CASING _____	CLEAN OUT FILL _____
_____	_____	SECURED WITH CREWS _____
_____	_____	_____
SITE DOT _____ DAYS	SITE OST _____ DAYS	SITE ODT _____

TOTAL SITE PREP TIME

DAYS

REMARKS:

MAIN HOLE CONSTRUCTION

DRILLING OPERATION TIME (DOT)	OTHER SCHEDULED TIME (OST)	OPERATIONAL DELAY TIME (ODT)
DRILL <u>9.39</u>	MOBILIZATION & DEMOBILIZATION _____	RIG REPAIRS <u>0.08</u>
TRIPS <u>2.34</u>	CORE _____	W. G. EQUIPMENT _____
DRESS DRILLING ASSEMBLY _____	LOG <u>2.33</u>	FISH _____
SINGLE SHOT DEV. SURVEYS <u>0.89</u>	CASED HOLE DIR. SURVEYS _____	CLEAN OUT FILL <u>0.34</u>
OPEN HOLE DIRECTION SURVEYS <u>1.02</u>	UNLOAD CASED HOLE _____	UNLOAD WATER INFLOW _____
_____	RUN MANDREL <u>1.19</u>	REAM CROOKED HOLE _____
_____	HYDROLOGICAL TESTS _____	PLUG BACK _____
_____	_____	DRILL OUT PLUGS _____
MAIN HOLE DOT <u>13.64</u> DAYS	_____	SECURED WITH CREWS _____
CASING OPERATION TIME (COT)	_____	Secured w/out crews <u>12.96</u>
RUN <u>20"</u> CASING <u>0.02</u>	_____	Stemming <u>1.21</u>
RUN <u>13-3/8"</u> CASING <u>0.17</u>	_____	_____
CEMENT <u>20"</u> CASING <u>0.98</u>	_____	_____
CEMENT <u>13-3/8"</u> CASING <u>1.15</u>	_____	_____
DRILL OUT SHOE <u>0.08</u>	_____	_____
MAIN HOLE COT <u>2.40</u> DAYS	MAIN HOLE OST <u>3.52</u> DAYS	MAIN HOLE ODT <u>14.59</u> DAYS

TOTAL MAIN HOLE CONST. TIME 34.15

DAYS

REMARKS:

TOTAL ELAPSED TIME

TOTAL SITE PREP TIME _____ DAYS	REMARKS: Instrumenting and Stemming Time
TOTAL MAIN HOLE CONST. TIME <u>21.19</u> DAYS	Mandrel Run <u>0.10</u> Days
SEC. W/O CREW SITE PREP _____ DAYS	Stemming <u>5.63</u>
SEC. W/O CREW MAIN HOLE CONST. <u>12.96</u> DAYS	Instrumenting <u>1.85</u>
TOTAL SUSPENDED (NO RIG) _____ DAYS	Waiting on Equipment <u>1.67</u>
TOTAL ELAPSED TIME <u>34.15</u> DAYS	Total Elapsed Time <u>9.25</u> Days

8-13-67 Two cats building location. Five loads of rig unloading today.

8-14-67 Eight loads of rig on location.

8-15-67 Eighteen loads of rig on location.

8-16-67 Rig up. Set sub-base, drawworks and pinned derrick.

8-17-67 90% rigged up. Will spud tomorrow.

8-18-67 Rigging up.

8-19-67 Drilled 12-1/4" hole to 29', reamed hole to 26" and set one joint (30') of 20" O.D. conductor casing, set at 29' G.L. Cemented with 120 ft³ of common plus 2% calcium chloride. CIP at 1600 hours.

8-20-67 Nippled up to drill 17-1/2" hole, started drilling at 1515 hours. Drilled 17-1/2" hole to 277'.

8-21-67 Drilled 17-1/2" hole to 391' with bit #1, made trip at 391' for bit #2. Drilled to 482' G.L. with bit #2. Ran 17 joints of 48#/ft, J-55, S.T.&C. 13-3/8" casing, set at 482' G.L. Halliburton guide shoe on bottom, Halliburton baffle float 30' off bottom, two centralizers 10' and 200' off bottom, cemented with 660 ft³ of common plus 2% calcium chloride, cement circulated, plug down at 2015 hours.

8-22-67 Waited on cement and nipped up blowout preventers to drill 12-1/4" hole.

8-23-67 Drilling 12-1/4" hole from 482' to 1323'.

8-24-67 Drilling 12-1/4" hole from 1323' to 1839'.

8-25-67 Drilling 12-1/4" hole from 1839' to 2202'.

8-26-67 Drilling 12-1/4" hole from 2202' to 2380'.

8-27-67 Drilling 12-1/4" hole from 2380' to 2763'.

8-28-67 Drilling 12-1/4" hole from 2763' to 2992'. Hole deviation remaining 1/2° or less.

8-29-67 Drilling 12-1/4" hole from 2992' to 3275'.

8-30-67 Drilling 12-1/4" hole from 3275' to 3538'.

8-31-67 Drilling 12-1/4" hole from 3538' to 3725'.

- 9-1-67 Drilling 12-1/4" hole from 3725' to 4162'.
- 9-2-67 Drilling 12-1/4" hole from 4162' to 4222'. Lost 150 bbl. of mud. Trip out to change bits and mix mud. Circulation regained, drilled 12-1/4" hole to 4441'.
- 9-3-67 Drilled 12-1/4" hole from 4441' to 4725'. Reached total contract depth at 2330 hours.
- 9-4-67 Circulated and conditioned hole for logs. Ran Schlumberger temperature log to 4669'. Trip to condition hole and attempt to wash out fill. Ran density log to 4686'.
- 9-5-67 Schlumberger Logging: Density to 4686'.
Dual Induction to 4684'.
Micro Sonic to 4685'.
Bore Hole Sonic to 4685'.
Sidewall Neutron to 4685'.
- Birdwell Logging: Caliper
3-D
- 9-6-67 Completed Birdwell 3-D logs and ran Sperry-Sun multishot directional surveys on 50' stations in and out of hole in stabilizer drill collar assembly from 0' to 4668'.
- 9-7-67 Completed running Sperry-Sun surveys. Trip in hole to condition hole and mud prior to running mandrel. Run 144 joints (4686' of 2-3/8" "CS" Hydril tubing). Ran 8" O.D. mandrel on wire line next to tubing in hole to 4702'. Pulled mandrel, laid down tubing.
- 9-8-67 Laid down tubing. Rig secured at 0700 hours, 9/8/67.
- 9-9-67 Rig on standby secured.
- 9-10-67 Rig on standby secured.
- 9-11-67 Rig on standby secured.
- 9-12-67 Rig on standby secured.
- 9-13-67 Rig on standby secured.
- 9-14-67 Rig on standby secured.
- 9-15-67 Rig on standby secured.

- 9-16-67 Rig on standby secured.
- 9-17-67 Rig on standby secured.
- 9-18-67 Rig on standby secured.
- 9-19-67 Rig on standby secured.
- 9-20-67 Rig on standby secured.
- 9-21-67 Rig on standby secured until 0700 hours. Activated rig at 0700 hours. Ran in hole with a 12-1/4" bit. Circulated and conditioned hole. Pulled out of hole and laid down drill pipe and removed BOP's. Rigged up to run tubing.
- 9-22-67 Ran 2-3/8" "CS" Hydril tubing to 4710'. Hung tubing to side of hole. Ran an 8" O.D. x 20' mandrel on Lane Wells wire line to 4700'. Ran Lane Wells collar locator in tubing to 4694'. Collar locator showed tubing string to be intact. Hung tubing from strong back. Released rig at 1630 hours. Brinkerhoff Rig started demobilization at 1630 hours.
- 9-27-67 Activated hole. Aztec finished rigging up at 1800 hours, spooled messenger cable for instruments onto drawworks drum. Circulated hole through the 2-3/8" tubing.
- 9-28-67 Circulated and conditioned hole. Ran 8" O.D. by 20' mandrel on Lane Wells line to 4675'. Rigged up and ran Sandia instruments in hole on messenger cables. Stopped running instruments at 1630 hours with 1266' in hole. Circulated mud through tubing.
- 9-29-67 Circulated and conditioned hole until 0800 hours. Continued running instruments. Hung messenger cable from strong back with Instrument #1 at 4600', #2 at 4218', #3 at 3600', and #4 at 3250'. Moved out emplacement building. Rehung cables from tripod. Rigged up Halliburton, blended and pumped 172 cubic feet of grout through 2-3/8" O.D. tubing. Sand in grout plugged tubing.
- 9-30-67 Pulled plugged tubing. Waited on new 2-3/8" O.D. Hydril tubing.
- 10-1-67 Waited on 2-3/8" O.D. Hydril tubing.
- 10-2-67 Picked up and ran new string of 2-3/8" O.D Hydril tubing with 134' of aluminum tubing on bottom. Tagged top of cement stage #1 at 4569'. Circulated hole. Mixed and pumped Stage #2, 200 cubic feet of WES designed grout. Pulled tubing up to 4214'. Circulated mud and W.O.C.

- 10-3-67 W.O.C. until 0800 hours. Tagged cement top at 4345'. Blended and pumped Stage #3, 122 cubic feet of WES designed grout. W.O.C. at 0900 hours. Pulled tubing up to 4063' and circulated.
- 10-4-67 Tagged cement top at 4191'. Blended and pumped Stage #4, 217 cubic feet of WES designed grout. W.O.C. at 0130. Pulled tubing to 3822'. Circulated and conditioned mud until 1700 hours. Tagged cement top at 3914'. Blended and pumped Stage #5, 196 cubic feet of WES designed grout. W.O.C. at 1830 hours. Pulled tubing to 3574' and circulated mud.
- 10-5-67 W.O.C. until 0800 hours. Tagged cement top at 3689'. Blended and pumped 231 cubic feet (Stage #6) of WES designed grout. W.O.C. at 1030 hours. Pulled tubing to 3299' and circulated.
- 10-6-67 Tagged top of cement Stage #6 at 3403'. Stage #7, blended and pumped 266 cubic feet of WES designed grout. W.O.C. at 0205 hours. Pulled tubing up to 2961' and circulated until 1900 hours. Tagged top Stage #7 at 3106'. Cement top 144' above instruments. Laid down Hydril tubing. Hung messenger cable from clamp type strong back which spanned well head. Made final electrical check on instruments, o.k. Released rig at 2400 hours.

GB-D
Deviation Record

Page 5

<u>Depth</u>	<u>Inclination (Degrees)</u>
115	1/4
200	1/2
260	1/2
325	1/2
393	1/2
495	1/2
555	1/4+
650	1/2
765	1/2
859	1/2
953	1/2
1053	1/2
1153	1/4
1235	3/8
1360	1/2
1454	1/4
1549	1/2
1642	3/8
1735	1/2+
1820	3/8
1923	3/4
2016	1/2
2100	1/2
2190	1/2-
2266	1
2348	1/2-
2427	1/4
2522	1/4
2622	1/4
2722	1/2
2835	1/2
2897	1/2-
2960	1/2
3057	1/2
3150	3/8
3244	1/4
3338	3/8
3438	1/2
3533	1/4
3629	1/4
3722	1/2+
3816	3/4
3910	1/2
4005	1/4+
4099	1/4+
4193	1/2
4285	1/2
4376	3/4-
4470	1/2

GB-D
Deviation Record

Page 6

<u>Depth</u>	<u>Inclination (Degrees)</u>
4553	3/4
4582	1/4
4642	1/4
4725	5/8

Sperry-Sun Multishot Gyro Survey332-SU3-001 IN RUN

Page 7

This survey was run on drill pipe on 50' stations from 0' to 482' inside 13-3/8" O.D. casing and from 482' to 4668' in 12-1/4" open hole.

<u>MD</u>	<u>TVD</u>	<u>Latitude</u>	<u>Departure</u>
0'	0'	0'	0'
103'	103.00'	0.24' S	0.12' E
203'	200.00'	0.31' S	0.29' E
300'	300.00'	0.48' S	0.17' E
400'	400.00'	0.53' S	0.08' E
500'	500.00'	0.81' S	0.10' E
600'	600.00'	1.24' S	0.06' E
700'	700.00'	1.81' S	0.03' E
800'	798.33'	2.40' S	0.03' E
900'	893.39'	2.78' S	0.00' W
1030'	999.53'	3.14' S	0.14' E
1100'	1099.99'	3.42' S	0.21' E
1200'	1199.99'	3.71' S	0.49' E
1300'	1299.99'	3.96' S	0.90' E
1400'	1399.99'	4.10' S	1.42' E
1500'	1499.99'	4.22' S	2.09' E
1600'	1599.98'	4.13' S	2.85' E
1700'	1699.98'	4.06' S	3.63' E
1800'	1799.98'	3.97' S	4.37' E
1900'	1899.97'	3.78' S	5.11' E
2000'	1999.97'	3.49' S	5.70' E
2100'	2099.97'	3.09' S	6.39' E
2200'	2199.97'	2.71' S	6.99' E
2303'	2299.96'	2.36' S	7.58' E
2400'	2399.96'	1.33' S	8.01' E
2500'	2499.96'	1.64' S	8.40' E
2600'	2599.95'	1.29' S	8.90' E
2700'	2699.95'	0.85' S	9.50' E
2800'	2799.95'	0.29' S	10.07' E
2900'	2899.95'	0.20' N	10.76' E
3000'	2999.95'	0.33' N	11.49' E
3100'	3099.95'	0.66' N	12.27' E
3200'	3199.94'	0.76' N	13.00' E
3303'	3299.94'	1.16' N	13.47' E
3400'	3399.94'	1.64' N	13.70' E
3500'	3499.94'	1.93' N	13.71' E
3600'	3599.94'	2.09' N	13.89' E
3700'	3699.94'	2.10' N	14.39' E
3800'	3799.93'	2.32' N	15.22' E
3903'	3899.93'	2.56' N	16.06' E

Sperry-Sun Multishot Gyro Survey

332-SU3-001 In Run

Page 8

<u>MD</u>	<u>TVD</u>	<u>Latitude</u>	<u>Departure</u>
4000'	3999.93'	2.87' N	16.94' E
4100'	4099.92'	3.14' N	17.81' E
4200'	4199.92'	3.32' N	18.55' E
4300'	4299.92'	3.40' N	19.34' E
4400'	4399.91'	3.52' N	20.27' E
4500'	4499.91'	3.58' N	20.39' E
4600'	4599.91'	3.59' N	21.11' E
4668'	4667.91'	3.7' N	20.80' E

Type Log	<u>Date</u>	<u>Run No.</u>	<u>Depth</u>	<u>Drillers Depth</u>	<u>Interval Logged</u>
<u>Schlumberger Logs</u>					
Formation Density	9-4-67	1	4685'	4725'	483' - 4685'
Dual Induction Laterlog	9-4-67	1	4681'	4725'	482' - 4681'
Sidewall Neutron	9-4-67	1	4684'	4725'	483' - 4684'
Borehole Sonic	9-4-57	1	4676'	4725'	483' - 4676'
Micro Sonic	9-5-67	1	4684'	4725'	483' - 4684'
Temperature	9-It-67	1	4685'	4725'	400' - 4685'
<u>Birdwell Logs</u>					
Caliper	9-5-67	1	4685'	4725'	0' - 4684'
3-D	9-5-67	1	4685'	4725'	0' - 4679'
3-D	9-5-67	2	4685'	4725'	0' - 4671'
3-D	9-5-67	3	4685'	4725'	0' - 4674'
3-D	9-6-67	4	4685'	4725'	0' - 4677'

GB-D
Review of Hole Conditions

Spudded 8-19-67

Completed - 10-6-67

26" hole to 29'

20" O.D. casing at 29' G.L.
Cemented annulus to surface
with 120 ft³ of cement slurry.

17-1/2" hole to 482'

13-3/8" O.D. casing at 482'
G.L. Cemented annulus to sur-
face with 660 ft³ of cement
slurry.

12-1/4" hole to 4725'

- I. This hole was drilled using mud as a circulating fluid. Lost returns at 4222' and regained with lost circulation materials.
- II. Ran Birdwell caliper log to 4685' prior to instrumenting hole. The log indicated the hole conformed to the 12-1/4" bit size up to 3905' with erratic washout conditions up to the 13-3/8" O.D. casing at 482'.
- III. After the instruments had been placed, the hole was stemmed as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Grout Used</u>	<u>Calculated Volume</u>
1.	4710' - 4569'	172 ft. ³	115 ft. ³
2.	4569' - 4345'	200	187
3.	4345' - 4191'	122	129
4.	4191' - 3914'	217	231
5.	3914' - 3689'	196	207
6.	3689' - 3403'	231	246
7.	3403' - 3106'	266	284
TOTAL		1404	1399

HOLE HISTORY DATA

E: July 10, 1968

APPROVED:

Robert N. Quinn

HOLE NO.: GB-2R*	CONTRACT NO.: AT(26-1)-392	LOG NO.: 10
USER: LRL-EPNG	TYPE HOLE: Exploratory -- Re-Entry	
LOCATION	COUNTY: Rio Arriba	AREA: New Mexico
SURFACE COORDINATES: 300' N, 90°E of GB-E Location		
GROUND ELEVATION: --	PAD ELEVATION:	TOP CASING ELEVATION:
RIG ON LOCATION:	Re-Entry Started: 6-14-68	COMPLETED: 6-25-68
CIRCULATING MEDIA: Water to 3713', gas to T.D.		

MAIN RIG & CONTRACTOR Loffland Brothers Co. #203	NO. OF COMPRESSORS & CAPACITY:
--	--------------------------------

[illegible]

TOTAL DEPTH: 4600' GL	AVERAGE MANDREL DEPTH:	FROM REFERENCE ELEVATION 9
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PLUG LEFT IN HOLE: Johnston cast iron bridge plug at 3699-1/2'.

SURVEYS PAGE: 5	CORING PAGE:	CU. FT. CMT. TOTAL IN PLUGS, ETC:
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LOGGING DATA: Page 4

BOTTOM HOLE COORDINATES: S-27.19', W-60.72' @ 4528'		REFERENCE: FAR-SU3-010
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RIGS USED							
RIG NO.	NAME	TYPE	CLASS	DAYS OPERATING	SECURED W CREW	SECURED W/O CREW	TOTAL DAYS ON LOC.
203	Loffland Brothers	Unit Rig & Power		11.23			11.23
	Company	Company Model 15					

REMARKS:

* Includes GB-2RS

** Window cut in 7" O.D. casing from 3678' to 3691'.

PREPARED BY: TIME BREAKDOWN ON NEXT PAGE

GB-2R, 2RS

TIME BREAKDOWN

SITE PREPARATION

DRILLING OPERATION TIME (DOT)	OTHER SCHEDULED TIME (OST)	OPERATIONAL DELAY TIME (ODT)
DRILL _____	MOVE _____	RIG REPAIRS _____
TRIPS _____	RUN CASING _____	W. O. DRILLING SUPPLIES _____
SURVEYS _____	CEMENT CASING _____	CLEAN OUT FILL _____
_____	_____	SECURED WITH CREWS _____
_____	_____	_____
SITE DOT _____ DAYS	SITE OST _____ DAYS	SITE ODT _____
TOTAL SITE PREP TIME _____ DAYS	REMARKS:	

MAIN HOLE CONSTRUCTION

DRILLING OPERATION TIME (DOT)	OTHER SCHEDULED TIME (OST)	OPERATIONAL DELAY TIME (ODT)
DRILL <u>1.38</u>	MOBILIZATION & DEMOBILIZATION _____	RIG REPAIRS _____
TRIPS <u>0.59</u>	CORE _____	W. O. EQUIPMENT <u>0.51</u>
DRESS DRILLING ASSEMBLY _____	LOG <u>2.00</u>	FISH _____
SINGLE SHOT DEV. SURVEYS _____	CASED HOLE DIR. SURVEYS _____	CLEAN OUT FILL <u>0.14</u>
OPEN HOLE DIRECTION SURVEYS <u>0.35</u>	UNLOAD CASED HOLE <u>0.19</u>	UNLOAD WATER INFLOW _____
_____	RUN MANDREL _____	BEAM CROOKED HOLE _____
_____	HYDROLOGICAL TESTS _____	PLUG BACK _____
_____	Flow Rate Tests <u>0.10</u>	DRILL OUT PLUGS _____
MAIN HOLE DOT <u>2.32</u> DAYS	Drill Cement Plug <u>1.16</u>	SECURED WITH CREWS _____
CASING OPERATION TIME (COT)	Rig Up Blow Out Containment <u>1.48</u>	Pressure Test Casing <u>0.16</u>
RUN _____ CASING _____	Camera Run <u>0.58</u>	Mill Casing <u>0.97</u>
RUN <u>2-3/8"</u> Tubing <u>0.48</u>	_____	Whipstock Operations <u>0.30</u>
CEMENT _____ CASING _____	_____	Standby Ready <u>0.54</u>
CEMENT _____ CASING _____	_____	_____
DRILL OUT SHOE _____	_____	_____
MAIN HOLE COT <u>0.48</u> DAYS	MAIN HOLE OST <u>5.81</u> DAYS	MAIN HOLE ODT <u>2.62</u> DAYS

TOTAL MAIN HOLE CONST. TIME <u>11.23</u> DAYS	REMARKS:
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TOTAL ELAPSED TIME

TOTAL SITE PREP TIME _____ DAYS	REMARKS:
TOTAL MAIN HOLE CONST. TIME <u>11.23</u> DAYS	
SEC. W/O CREW SITE PREP _____ DAYS	
SEC. W/O CREW MAIN HOLE CONST. _____ DAYS	
TOTAL SUSPENDED (NO RIG) _____ DAYS	
TOTAL ELAPSED TIME <u>11.23</u> DAYS	

HOLE HISTORY

--GB-2R 3RS

Moved in Loffland Brothers Company Rig #203 on 6-12-68 and started rigging up.

6-14-68 Rigged up Shaffer blow out containment stack and tested up to 2000 psi.

6-15-68 Picked up 6-1/4" bit, ran in hole circulating out mud with water. Tagged top of cement plug at 2980' inside 7" O.D. casing. Drilled cement from 2980' to 3180' using water. Pressure tested 7" O.D. casing to 1000 psi for 10 minutes.

6-16-68 Drilled out cement with 6-1/4" bit from 3180' to 3704' and tested 7" O.D. casing to 1000 psi for 10 minutes at 3280', 3380', 3480', 3580', and 3680'. Bit began to torque up and run rough at 3692'. Pulled bit and found teeth broken off, indicating collapsed casing or junk in the hole. Pressure tested casing to 1000 psi for 30 minutes, no bleed back.

6-17-68 Ran 4-3/4" bit, drilled and worked by bad place in casing from 3704' to 3713'. Pressured up to 1000 psi for 10 minutes. Ran impression block, showed ledge at 3704' sticking out 5/8" with bit teeth marks. Rigged up blooie line and started unloading hole with gas in stages. Unloaded to 2778'.

6-18-68 Unloaded hole and drilled cement with 4-3/4" bit from 3713' to 3812' using gas, hole dusting. At 3812' had good indication that casing had collapsed or shifted.

GB-2RS

6-18-68 Ran Schlumberger cement bond log. Ran gauge ring and set top of Johnston cast iron bridge plug at 3699-1/2'. Marks on ring gauge showed casing offset. Ran 2.5° whipstock with 6-1/4" O.D. mill in hole, tagged top of bridge plug at 3699.92'. Set bottom of whipstock at 3697.92', top at 3678.52' and started cutting window in 7" O.D. casing from 3678' to 3679' using water for a circulating fluid.

6-19-68 Cut window in 7" O.D. casing from 3679' to 3691' with 6-1/4" O.D. mill. Ran 6-1/4" bit in hole unloading water from casing with gas. Reamed out window and drilled 6-1/4" hole from 3691' to 3716' using gas at 250 psi.

6-20-68 Drilled 6-1/4" hole from 3716' to 4128' with gas at 125 psi to 160 psi. Made gas flow tests as follows:

<u>Test No.</u>	<u>Depth of Hole</u>	<u>Flow Rate - Mcfd</u>
1	3880'	0
2	3914'	121.0
3	3942'	66.5
4	3973'	93.1
5	4004'	117.6
6	4034'	112.6
7	4066'	105.0
8	4097'	270.0
9	4128'	249.0
10	4159'	230.0

6-21-68 Drilled 6-1/4" hole from 4128' to 4600' with gas and made flow tests as follows:

<u>Test No.</u>	<u>Depth of Hole</u>	<u>Flow Rate - Mcfd</u>
11	4190'	197.0
12	4221'	224.0
13	4252'	204.0
14	4283'	175.0
15	4313'	167.0
16	4345'	158.0
17	4377'	149.0
18	4407'	149.0
19	4438'	139.2
20	4469'	139.2
21	4499'	139.0
22	4531'	134.0
23	4561'	134.0
24	4600'	123.6

6-22-68 Ran Schlumberger induction, formation density, temperature and side-wall neutron porosity logs. Ran Schlumberger sidewall sample gun, took 30 samples, recovered 6. Started Sperry-Sun survey.

6-23-68 Completed Sperry-Sun gyroscopic multishot survey, ran in and out of hole on 50' stations from 3550' to 4528'.

Ran Birdwell temperature and caliper logs, top of fill at 4520'. Ran 4-1/2" O.D. x 15' 1/4" long mandrel in hole to 4307'. Ran LRL flow spinner tool on Birdwell wireline to 4434' and ran flow tests. Ran 6-1/4" bit to top of fill at 4411', reamed and cleaned out fill to 4527' with gas at 200 psi.

- 6-24-68 Ran Laval camera on Birdwell wireline to a maximum depth of 3902'. Rigged down blowout preventer stack.
- 6-25-68 Installed Shaffer Y-type tubing head. Ran 139 joints of 2-3/8" O.D., 4.70#, C.S. Hydril tubing plus 2-3/8" O.D. anchor joint with bull plug, perforated nipple, Baker seating nipple and crossover sub. Tubing bottomed at 4224' G.L., perforations from 4198' to 4201'. Pressured up on plug to 400 psi and plug dropped out. Rig released at 1300 hours. Hole suspended.

GB-2R, 2RS

LOG INDEX SHEET

Schlumberger Logs

<u>Type Logs</u>	<u>Date</u>	<u>Run No.</u>	<u>Log Depth</u>	<u>Drillers Depth</u>	<u>Interval Logged</u>
Cement Bond	6-18-68	2			
Formation Density	6-22-68	2	4595'	4600'	3690'-4594'
Induction	6-22-68	2	4597'	4600'	3690'-4589'
Sidewall Newtron Porosity	6-22-68	2	4589'	4600'	3690'-4588'
Temperature	6-22-68	-	4589'	4600'	2530'-4588'

Birdwell Logs

Caliper	6-23-68	1	4520'	4600'	3600'-4516'
Flowmeter	6-23-68	1	4520'	4600'	50'-4434'
Temperature	6-23-68	1	4520'	4600'	3700'-4520'

GB-2R, 2RS

SPERRY-SUN GYROSCOPIC MULTISHOT SURVEY

FAR-SU3-010 IN RUN

<u>MD</u>	<u>TVD</u>	<u>Latitude</u>	<u>Departure</u>
3550'	3550.00'	14.02' N	16.47' E
3650'	3649.99'	15.44' N	17.29' E
3750'	3749.96'	13.81' N	16.20' E
3850'	3849.87'	10.70' N	13.61' E
3950'	3949.64'	9.44' N	7.18' E
4050'	4049.30'	8.93' N	0.93' W
4150'	4148.87'	7.36' N	10.12' W
4250'	4248.24'	2.16' N	19.85' W
4350'	4347.34'	5.69' S	30.67' W
4450'	4445.73'	16.30' S	44.76' W
4528'	4521.30'	27.61' S	60.34' W

GB-2R, 2RS

REVIEW OF HOLE CONDITIONS

Operations Started: 6-14-68

Operations Completed: 6-25-68

GB-2 Hole Conditions

9-5/8" O.D. casing at 481'.

7" O.D. casing at 3908'.

6" open hole to 4248'.

Cement plug left at 2988'.

GB-2RS Hole Conditions

Cut window in 7" O.D. casing from 3678' to 3691'.

6-1/4" sidetrack hole from 3691' to 4600'

- I. The cement plug was drilled out from 2980' to 3713' with water and with gas to 3812'. The 7" O.D. casing was found to be parted at 3704' and the hole sidetracked. A window was cut in the 7" O.D. casing from 3678' to 3691'. The hole was dried up and drilled from 3691' to 4600' using gas as a circulating fluid. Johnston cast iron bridge plug at 3699-1/2'.
- II. Flow tests were run each time a joint of drill pipe was picked up from 3880' to 4600'. The rate at 3880' was zero mcf/d and varied from 66.5 mcf/d to 270 mcf/d.

FENIX & SCISSON, INC.
HOLE HISTORY DATA

DATE: February 2, 1968

APPROVED: Robert J. Fenix

HOLE NO.: GB-1	CONTRACT NO.: AT(26-1)-338	I.D. NO.:
USER: LRL-EPNG	TYPE HOLE: Exploratory - Instrument	
LOCATION	COUNTY: Río Arriba	AREA: New Mexico
SURFACE COORDINATES: 188.4' N 55° 45' W of GB-E Location		
GROUND ELEVATION:	PAD ELEVATION:	TOP CASING ELEVATION:
RIG ON LOCATION:	SPUDDED: **	COMPLETED: 10-18-67

CIRCULATING MEDIA:

MAIN RIG & CONTRACTOR

NO. OF COMPRESSORS & CAPACITY:

BORE HOLE RECORD				CASING RECORD						
FROM	TO	SIZE	I.D.	WT./FT.	WALL	GRADE	CPL'G.	FROM	TO	CU. FT. CM
			13-3/8" OD					0'	488'	
			9-5/8" OD					0'	3742'	
3742'	4313'	8-3/4"	2-3/8" OD					0'	4253'	604

TOTAL DEPTH: 4313' 6L AVERAGE MANDREL DEPTH: FROM REFERENCE ELEVATION @

JUNK & PLUGS LEFT IN HOLE: None

SURVEYS PAGE: CORING PAGE: CU. FT. CMT. TOTAL IN PLUGS, ETC:

LOGGING DATA: Page 2

BOTTOM HOLE COORDINATES: REFERENCE:

RIGS USED (Site Prep Rigs *)

RIG NO.	NAME	TYPE	CLASS	DAYS OPERATING	SECURED W/ CREW	SECURED W/O CREW	TOTAL C ON LO
50	Aztec Well Service Co.	180 HP Double-Drum Unit		2.13	0.35		2.48

REMARKS: * Site Prep Items

** Prior to stemming and instrumenting, this hole had been drilled and cased by others.

GB-1
Hole History

Prior to stemming and instrumenting hole, EPNG had drilled out a bridge plug at 4230' and cleaned out to 4313'.

Moved in Aztec Well Service Rig #50 and rigged up.

- 10-10-67 Completed rigging up at 1800 hours, prepared to run 2-3/8" O.D. tubing.
- 10-11-67 Ran 50 joint and subs (1515.69') of 2-3/8" O.D. fiberglass tubing with attached instruments and cables as directed by LRL. Standby ready at 1630 hours.
- 10-12-67 Standby ready until 0800 hours. Ran 87 joints of 2-3/8" O.D. tubing on top of the fiberglass tubing, temporarily landed at 4166'. Standby ready at 1500 hours.
- 10-13-67 Standby ready until 0800 hours. Completed running 50 joints and subs (1515.69') of fiberglass tubing and 87 joints (2739.34') of 2-3/8" O.D. EUE, 4.70#, J-55 tubing with crossover and subs. Landed at 4253.53' G.L. in 9-5/8" x 2-3/8" special tubing hanger spool. Instruments and cables were attached as directed by LRL. Centralizers were run on tubing collars at 90' intervals with Kellem grips attached to the cables and centralizers at 180' intervals. Baker circulating sub at 3699'. Circulated approximately 28 barrels of mud, installed grout-line and released rig at 1130 hours. Hole suspended.
- 10-17-67 Hole suspended from 1130 hours on 10-13-67 to 0700 hours on 10-17-67. Rigged up Halliburton, circulated and stemmed hole with 403 ft³ of W.E.S. special grout cement. Opened Baker circulating sub and circulated out 140 ft³ of grout leaving 263 ft³ in the hole. CIP at 1115 hours. Waited on cement and circulated hole.
- 10-18-67 Cemented stage #2 with 361 ft³ of W.E.S. special filler grout out the circulating sub at 3699'. CIP at 1145 hours. Rigged down Halliburton at 1230 hours. Top of cement inside the 2-3/8" O.D. tubing was tagged at 2612'. Hole suspended.

GB-1
Log Index Sheet

Page 2

<u>Type Log</u>	<u>Date</u>	<u>Run No.</u>	<u>Log Depth</u>	<u>Drillers Depth</u>	<u>Interval Logged</u>
NCTL	8-28-67	1	3756'	4320'	2300' - 3756'
NCTL	9-6-67	2	3000'	4320'	0' - 3000'
3-D	9-6-67	5	3790'	4320'	0' - 3790'

Note: These Birdwell logs were run for the AEC with no rig on the hole.

GB-1
Review of Hole Conditions

Operations started 10-10-67

Operations completed 10-18-67

Casing Record

13-3/8" at 488'

9-5/8" at 3742'

8-3/4" open hole to 4313'

- I. Prior to instrumenting and stemming, this hole was drilled and cased by others.
- II. A total of 1515.69' of 2-3/8" O.D. fiberglass tubing was run in the hole with 2739.34' of 2-3/8" O.D. steel tubing on top. The tubing was landed at 4253' G.L. with instruments attached as directed.
- III. The 2-3/8" O.D. tubing and instruments were stemmed with 604 ft³ of W.E.S. grout in two stages from 4254' up to 2612'.

FENIX & SCISSON, INC.
HOLE HISTORY DATA

DATE: February 2, 1968

APPROVED: *Robert H. Quinn*

HOLE NO.: GB-2	CONTRACT NO.: AT(26-1)-338	I. D. NO.:
USER: LRL-EPNG	TYPE HOLE: Exploratory	
LOCATION	COUNTY: Rio Arriba	AREA: New Mexico
SURFACE COORDINATES: 300' N 90° E of GB-E location		
GROUND ELEVATION: -	PAD ELEVATION:	TOP CASING ELEVATION:
RIG ON LOCATION:	SPOUDED: **	COMPLETED: 10-18-67

CIRCULATING MEDIA:

MAIN RIG & CONTRACTOR

NO. OF COMPRESSORS & CAPACITY:

BORE HOLE RECORD

CASING RECORD

FROM	TO	SIZE	I. D.	WT./FT.	WALL	GRADE	CPL'G.	FROM	TO	CU. FT. CMT.
			9-5/8" OD					0'	481'	
			7" OD					0'	3908'	
3908'	4248'	6"								

TOTAL DEPTH: 4248' GL AVERAGE MANDREL DEPTH: FROM REFERENCE ELEVATION @

JUNK & PLUGS LEFT IN HOLE: Cement plug from 4197' to 2817'

SURVEYS PAGE: CORING PAGE: CU. FT. CMT. TOTAL IN PLUGS, ETC: 308

LOGGING DATA: Page 2

BOTTOM HOLE COORDINATES:

REFERENCE:

RIGS USED

(Site Prep Rigs *)

RIG NO.	NAME	TYPE	CLASS	DAYS OPERATING	SECURED W CREW	SECURED W/O CREW	TOTAL DAYS ON LOC.
50	Aztec Well Service Co.	130 HP double-drum unit.		1.25			1.25

REMARKS: * Site Prep Items

** Prior to plugging back, this hole had been drilled and cased by others.

GB-2
Hole History

Moved in Aztec Well Service Company Rig #50 and rigged up.

10-17-67 Completed rigging up at 1500 hours, Ran 2-3/8" tubing and tagged top of fill at 4197.08'. Set cement plug #1 from 4196' using Halliburton with 308 ft³ of 60-40 Pozmix plus 6% gel. CIP at 2045 hours, Pulled tubing to 2551' and waited on cement.

10-18-67 Waited on cement until 0800 hours and tagged top of cement at 2817'. Pulled tubing and ran 6-1/4" bit on tubing and drilled cement from 2817' to 2998' to the top of hard cement. Filled hole with mud, installed well-head equipment and released rig at 2100 hours.

GB-2
Log Index Sheet

Page 2

<u>Type Log</u>	<u>Date</u>	<u>Run No.</u>	<u>Log Depth</u>	<u>Drillers Depth</u>	<u>Interval Logged</u>
NCTL	8-29-67	1	3900'	4260'	0' - 3900'
3-D	8-29-67	11	4260'	4001'	50' - 3990'

Note: These Birdwell logs were run for the AEC with no rig on the hole.

REVIEW OF HOLE CONDITIONS

STEMMING OPERATIONS

Operations started: 10-17-67

Operations Completed: 10-18-67

Casing Record

9-5/8" O.D. casing at: 481'
7" O.D. casing at: 3903'
6" open hole 3903' to 4248'.

Tubing was run in the hole to the top of the fill which was encountered in the open hole at 4197'. A 308 cu. ft. cement plug of 60-40 pozmix cement with 6% gel was placed in the hole with tubing at 4196'. The cement plug was drilled down to 2988'.

FENIX & SCISSON, INC.
HOLE HISTORY DATA

DATE: February 2, 1968

APPROVED: *Robert V. Zinn*

HOLE NO.: GB-E-P

CONTRACT NO.: AT(26-1)-338

I.D. NO.:

USER: LRL-EPNG

TYPE HOLE: Post shot re-entry of emplacement hole.

LOCATION

COUNTY: Rio Arriba

AREA: New Mexico

SURFACE COORDINATES: 1218' FSL, 1770' FWL, Section 36, T29N, R4W

GROUND ELEVATION: 7204'

PAD ELEVATION:

TOP CASING ELEVATION:

RIG ON LOCATION:

SPUDDED: Re-entry 12-13-67

COMPLETED: 1-15-67

CIRCULATING MEDIA:

MAIN RIG & CONTRACTOR

NO. OF COMPRESSORS & CAPACITY:

BORE HOLE RECORD

CASING RECORD

FROM	TO	SIZE	I.D.	WT./FT.	WALL	GRADE	CPL'G.	FROM	TO	CU. FT. CMT
* 0'	49'	39"	30" O.D.	157#	1/2"	A.36		0'	49'	263
49'	4350'	28"	20" O.D.	133#	.635"		STCC Weld	0'	4324'	11,133
				160#	.770"					

TOTAL DEPTH: 4350' GL

AVERAGE MANDREL DEPTH:

FROM REFERENCE ELEVATION @

JUNK & PLUGS LEFT IN HOLE:

SURVEYS PAGE:

CORING PAGE:

CU. FT. CMT. TOTAL IN PLUGS, ETC:

LOGGING DATA: Page 5

BOTTOM HOLE COORDINATES:

REFERENCE:

RIGS USED

(Site Prep Rigs *)

RIG NO.	NAME	TYPE	CLASS	DAYS OPERATING	SECURED W CREW	SECURED W/O CREW	TOTAL DA ON LOC.
21	Brinkerhoff Drilling Co.	EMSCO GC-500		31.17	4.29		35.46

REMARKS: * Site Prep Items

GB-E-R
Hole History of Post Shot Re-entry
Phase of Emplacement Hole GB-E
Through the 7" Casing

Moved in Brinkerhoff Drilling Company Rig #21 on 12-12-67 and started rigging up.

- 12-13-67 Hole suspended from 1600 hours on 12-9-67 to 2300 hours on 12-13-67. Completed rigging up at 2300 hours. Started removing blind flanges.
- 12-14-67 Removed surface equipment from hole. Top of sand inside the 7" O.D. casing at 20.6'. Installed and tested blowout containment stack. Ran open end drill pipe and de-stemmed hole to 874' using natural gas as a circulating fluid.
- 12-15-67 De-stemmed hole to 956' with open end drill pipe. Pulled drill pipe and ran 6-1/8" bit, tagged fill at 922'. Cleaned out fill to 951', sand is falling back thru slots in the 7" O.D. casing when gas is shut off. Pulled bit from hole to cement slots. Set plug #1 at 929' using Halliburton with 207 ft³ of neat cement plus 3% calcium chloride. CIP at 1845 hours. Set Halliburton Rtts. packer at 5' and tested blowout equipment to 1800 psi, recovered packer.
- 12-16-67 Ran 6-1/8" bit and tagged top of cement at 814' at 0245 hours. Dried up hole and started drilling cement at 0415 hours. Drilled out cement to 917' and cleaned out sand to 958'. Set plug #2 at 958' with 70 ft³ of neat cement plus 3% calcium chloride. CIP at 1037 hours. Waited on cement. Tagged top of plug #2 at 692' at 1930 hours and blew hole dry. Drilled cement with 6-1/8" bit from 692' to 779'.
- 12-17-67 Waited on cement until 0600 hours, drilled cement from 779' to 954' and cleaned out sand to 1474'. Drilled cement plug from 1474' to 1583'. Dried up hole.
- 12-18-67 Drilled cement with 6-1/8" bit from 1583' to 1779', had to ream hole from 290' to 434'.
- 12-19-67 Hole dried up. Drilled cement with 6-1/8" bit from 1779' to 2536' and de-stemmed sand to 2910'.
- 12-20-67 De-stemmed sand from 2910' to 3029', sand in the 20" annulus falling thru slots in the 7" casing. Set plug #3 at 3023' with 106 ft³ of neat cement plus 1-1/2% calcium chloride. Pump pressure built to 2100 psi, pulled cement plugged pipe. Ran drill pipe in hole open ended to 3010' and circulated with gas, no fill. Set plug #4 at 3010' with 106 ft³ of neat cement plus 1-1/2% calcium chloride. Pump pressure increased to 1600 psi. Worked drill pipe up to 2976' with no further movement.
- 12-21-67 Halliburton spotted 250 gallons of 15% hydrochloric acid down the 7" O.D. casing, could not work pipe free. Backed off drill pipe leaving 8 joints inside the 7" O.D. casing, approximately 249' of fish. Top of fish at 2726.95'. Ran in hole with a set of 4-5/8" O.D. Bowen oil jars and bumper sub, screwed into fish. Jarred on fish with no results until jars parted, leaving lower section of jars and bumper sub in hole.

- 12-22-67 Ran in hole with 5-3/4" O.D. Bowen overshot with 4-3/4" grapple, caught fish at 2717'. Ran McCullough string shot to back off at 2820', drill pipe backed off up the hole, screwed back together. Ran string shot at 2753' and backed off, recovered Bowen jars, sub and one joint of drill pipe. Ran drill pipe and screwed into fish. Ran string shot and backed off at 2822', recovered 2 joints of drill pipe, no fill on top of fish at 2821.67'. Unloaded hole with gas.
- 12-23-67 Ran drill pipe and screwed into fish. Ran 1.6" O.D. tubing inside the 3-1/2" O.D. drill pipe and cleaned out pockets of cement from 2831' to 2965'. Pulled tubing.
- 12-24-67 Ran McCullough free point indicator, could not get below 2692'. Ran 1.6" O.D. tubing inside drill pipe and washed from 2692' to 2965' with no returns below 2795'. Pulled tubing.
- 12-25-67 Ran McCullough string shot and backed off drill pipe at 2821', 52' above back-off point, leaving 5 joints of drill pipe in hole. Ran 6-1/8" bit to 2821' and blew hole dry with gas. Rigged up mud pump and mud tanks.
- 12-26-67 Mixed and loaded hole with mud. Ran open end drill pipe and screwed into fish, could not circulate. Ran 1.6" O.D. tubing inside drill pipe, washed from 2795' to 2945' with no mud returns. Regained circulation and cleaned out to 2989'.
- 12-27-67 Pulled 1.6" O.D. tubing, could not work fish or circulate. Ran McCullough string shot and backed off drill pipe at 2852', recovered one joint of drill pipe. Ran 6-1/8" bit, reamed and washed to top of fish at 2852'. Ran 6" O.D. wash pipe, washover shoe and a set of 5-3/4" O.D. Bowen jars. Washed over fish to 2896'.
- 12-28-67 Circulated sand out of hole, washed over fish to 2913', fish dropped to 2943'. Pulled wash pipe, ran in hole with 5-3/4" O.D. Bowen jars and recovered fish. Ran 6-1/8" bit and washed from 2882' to 3031'. Pulled out of hole to 978' to evacuate mud from hole.
- 12-29-67 Jetted mud from hole in stages down to 3031'. Ran 2-3/8" O.D. tubing to 2989' for plug #5, used 201 ft³ of neat cement plus 4% gel. CIP at 1105 hours.
- 12-30-67 Ran 6-1/8" bit and unloaded hole with gas in stages down to the top of plug #5 at 2491', could not dry up hole. Loaded hole with mud and drilled cement from 2491' to 3102'. Cement had void spaces from 2570' to 2625' and 2991' to 3031'.
- 12-31-67 Displaced mud with water and unloaded hole with gas down to 3102'. Could not dry up hole, some mud returning to surface. Ran Schlumberger Density Log.

- 1-1-68 Ran 6-1/8" bit unloading fluid from hole and drilled cement from 3102' to 3165'. Could not dry up hole. Started running Schlumberger Density Log.
- 1-2-68 Completed Density log and perforated 7" O.D. casing with 4 shots from 2796' to 2797'. Left junk from perforating gun, 2 steel plates 3" x 1-1/2", 2 lead weights and 2 cables 3' long. Ran water probe, tool would not work. Perforated 7" O.D. casing from 2858' to 2860' with 8 holes to drain annulus. Ran 6-1/8" bit to 3162' and unloaded hole. Ran Schlumberger Density Log. Ran 6-1/8" bit to 3165', drying up hole.
- 1-3-68 Dried up hole at 3165'. Ran 5-7/8" O.D. globe basket and milled on junk from 3165' to 3167', recovered 2-1/2' of wireline and lead weights. Ran 6-1/8" bit and drilled out to 3177', attempted to dry up hole. Repaired and tested blowout preventer stack, rotating head and installed high pressure circulating system.
- 1-4-68 Continued repairs and testing. Drilled cement with 6-1/8" bit to 3181'.
- 1-5-68 High pressure circulating system failed to function, changed back to El Paso gas system. Drilled cement with 6-1/8" bit from 3181' to 3208' with no returns. Pulled bit and found 7" O.D. casing plastered with cuttings from 740' to surface, pressured up annulus and blew cuttings from hole. Ran bit to bottom and had 15' of fill, cleaned out fill and drilled from 3208' to 3260', cement drilled wet. Pulled bit.
- 1-6-68 Rigged up to drill with mud. Drilled cement with 6-1/8" bit from 3260' to 3600'.
- 1-7-68 Displaced mud with water and unloaded hole in stages with gas to 3600'. Ran Baker packer and set at 3440'. Ran Schlumberger water locator, fluid level at 3538' (1725 hours) raised to 3523' (1900 hours). Took water samples on a wireline. Misrun on Temperature Survey.
- 1-8-68 Ran Schlumberger Density and Temperature Logs. Pulled packer from hole. Filled hole with mud, ran 6-1/8" bit and drilled cement from 3600' to 3856', lost circulation, fell into a cavity. Tagged top of rubble or bottom of void at 3862'. Pressure was 8 psi at 2445 hours and 0 psi at 2335 hours. Pulled bit.
- 1-9-68 Surface pressure was 0 psi until 0400 hours, gradually built to 45 psi at 0700 hours. Ran Schlumberger Gamma Ray Log. Ran fluid locator, fluid level at 1748', added 30 barrels of water inside the 7" O.D. casing and fluid level raised 9'. Ran Schlumberger Density Log.
- 1-10-68 Ran 6-1/8" bit and drilled from 3862' to 3916' using drilling mud with no return circulation. Encountered chimney from 3907' to 3916'. Drilled into chimney at 0054 hours and had fluid to surface at 0118 hours. Closed in hole at 0120 hours, pressure built to 431 psi at 0400 hours when gauge line froze. At 0800 hours, pressure was 673.5 psi. Stripped part of drill pipe from hole and rigged up Otis high pressure stripping equipment. Pressure at 2000 hours was 800 psi. Standby ready.

- 1-11-68 Standby ready until 0800 hours. Pressure on outside of drill pipe 820 psi. Stripped balance of drill pipe from hole. Rigged up Schlumberger lubricator and started logging.
- 1-12-68 Ran Schlumberger Caliper, water locator, gamma-ray, density and formation tester to take gas sample. Ran Laval camera on Schlumberger wireline. Ran formation tester.
- 1-13-68 Ran flow rate test for 1-1/2 hours, rate was 1050 cfm at 825 psi. Shut in at 0100 hours. Reran formation tester and Laval camera. Ran Baker Model "D" wireline packer and set at 3786' inside the 7" O.D. casing.
- 1-14-68 Removed Otis equipment and rigged up 2-7/8" O.D. tubing hanger spool and blow out preventer stack. Ran 119 joints of 2-7/8" O.D., EUE, 8 round, 6.50# tubing, spaced out with pup joints and landed in packer at 3786'. Set down with 3000# weight in tubing hanger. Removed blow-out equipment, and installed permanent well head equipment. Loaded 7" annulus with 295 barrels of water and pumped 22.5 barrels of water down the tubing to rupture plug. Closed in valves.
- 1-15-68 Rig released at 0300 hours. Hole suspended.

GB-E-R
Log Index Sheet

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<u>Type Log</u>	<u>Date</u>	<u>Run No.</u>	<u>Log Depth</u>	<u>Drillers Depth</u>	<u>Interval Logged</u>
Formation Density	12-31-67	12	3103'	3102'	0' - 3102'
Formation Density	1-2-65	13	3159'	3165'	? - 3158'
Formation Density	1-2-63	14	3031	3165'	2500' - 3030'
Formation Density	1-8-68	15	3857'	3600'	2350' - 3856'
Formation Density	1-9-68	16	3601'	3856'	2100' - 3600'
Formation Density	1-12-68	17	3888'	3910'	0' - 3887'
Gamma Ray	1-9-68	1			0' - 3850'
Gamma Ray Caliper	1-12-68	2	3897'	3916'	0' - 3898'
Temperature	1-8-68	4			3600'

GB-E-R
Review of Hole Conditions

39" hole to 49'

30" O.D. casing cemented to surface
with 263 ft of cement slurry.

28" hole to 4350'

20" O.D. casing cemented to surface
with 11,138 ft of cement slurry.

- I. This hole was de-stemmed using natural gas and mud. The drill pipe was stuck caused by sand and cement falling thru the slots in the 7" O.D. emplacement casing and was recovered.
- II. Drilled into a void space from 3856' to 3862' and lost circulation. Encountered chimney from 3907' to 3916'.
- III. A packer was set at 3786' inside the 7" O.D. emplacement casing at 3786', 2-7/8" tubing was run and permanent well head equipment was installed for testing.

FENIX & SCISSON, INC.
HOLE HISTORY DATA

DATE: February 2, 1968

APPROVED: *Robert J. Quinn*

HOLE NO.: <u>GB-E</u>	CONTRACT NO.: <u>AT(26-1)-318</u>	I.D. NO.: <u>6</u>
USER: <u>IDL-EDMC</u>	TYPE HOLE: <u>Emplacement</u>	
LOCATION	COUNTY: <u>Rio Arriba</u>	AREA: <u>New Mexico</u>
SURFACE COORDINATES: <u>1218' FSL, 1770' FWL, Section 36, T29N, R4W</u>		
GROUND ELEVATION: <u>7204'</u>	PAD ELEVATION:	TOP CASING ELEVATION:
RIG ON LOCATION:	SFUDDED: <u>6-25-67</u>	COMPLETED: <u>11-12-67</u>

CIRCULATING MEDIA: Mud

MAIN RIG & CONTRACTOR: Signal Drilling Company #16

NO. OF COMPRESSORS & CAPACITY:

BORE HOLE RECORD			CASING RECORD							
FROM	TO	SIZE	I.D.	WT./FT.	WALL	GRADE	CPL'G.	FROM	TO	CU. FT. CMT.
*0'	49'	39"	30" O.D.	157#	1/2"	A-36		0'	49'	263
49'	4350'	28"	20" O.D.	133# 160#	.635" .770"		ST&C Weld	0'	4324'	11.138

TOTAL DEPTH: 4350' SL AVERAGE MANDREL DEPTH: 1282.5' FROM REFERENCE ELEVATION @ 7204'

JUNK & PLUGS LEFT IN HOLE: Bit cones pushed to 4350'

SURVEYS PAGE: 17 CORING PAGE: CU. FT. CMT. TOTAL IN PLUGS, ETC:

LOGGING DATA: Page 14

BOTTOM HOLE COORDINATES: 1.78' N and 20.96' from surface location Average in and out REFERENCE: run 332-SU3-002

RIGS USED

*(Site Prep Rigs *)*

RIG NO.	NAME	TYPE	CLASS	DAYS OPERATING	SECURED W CREW	SECURED W/O CREW	TOTAL DAYS ON LOC.
*		Dry Hole Digger		1.05			1.05
16	Signal Drilling Co.			136.61			136.61

REMARKS: * Site Prep Items

GB-E

TIME BREAKDOWN

SITE PREPARATION

DRILLING OPERATION TIME (DOT)		OTHER SCHEDULED TIME (OST)	OPERATIONAL DELAY TIME (ODT)
DRILL	<u>0.70</u>	MOVE	RIG REPAIRS
TRIPS		RUN CASING 30"	W. O. DRILLING SUPPLIES
SURVEYS		CEMENT CASING 30"	CLEAN OUT FILL
			SECURED WITH CREWS
SITE DOT <u>0.70</u> DAYS		SITE OST <u>0.35</u> DAYS	SITE ODT

TOTAL SITE PREP TIME

1.05 DAYS

REMARKS: Dry hole digger and truck

MAIN HOLE CONSTRUCTION

DRILLING OPERATION TIME (DOT)		OTHER SCHEDULED TIME (OST)	OPERATIONAL DELAY TIME (ODT)
DRILL	<u>38.65</u>	MOBILIZATION & DEMOBILIZATION	RIG REPAIRS <u>5.8</u>
TRIPS	<u>13.74</u>	CORE	W. O. EQUIPMENT <u>6.3</u>
DRESS DRILLING ASSEMBLY	<u>3.27</u>	LOG	FISH <u>14.1</u>
SINGLE SHOT DEV. SURVEYS	<u>2.85</u>	CASED HOLE DIR. SURVEYS	CLEAN OUT FILL <u>4.8</u>
OPEN HOLE DIRECTION SURVEYS	<u>2.75</u>	UNLOAD CASED HOLE	UNLOAD WATER INFLOW
		RUN MANDREL	REAM CROOKED HOLE
		HYDROLOGICAL TESTS	PLUG BACK
			DRILL OUT PLUGS
			SECURED WITH CREWS
MAIN HOLE DOT <u>61.26</u> DAYS			Ream out of Gauge Hole <u>5.2</u>
CASING OPERATION TIME (COT)			Lost circulation <u>0.2</u>
RUN <u>20"</u> CASING	<u>18.29</u>		Standby ready <u>2.3</u>
RUN CASING			
CEMENT <u>20"</u> CASING	<u>10.43</u>		
CEMENT CASING			
DRILL OUT SHOE	<u>3.84</u>		
MAIN HOLE COT <u>32.56</u> DAYS		MAIN HOLE OST <u>11.03</u> DAYS	MAIN HOLE ODT <u>38.76</u> DAYS

TOTAL MAIN HOLE CONST. TIME 136.61

DAYS

REMARKS:

TOTAL ELAPSED TIME

TOTAL SITE PREP TIME	<u>1.05</u> DAYS	REMARKS: Stemming Operations:
TOTAL MAIN HOLE CONST. TIME	<u>136.61</u> DAYS	Suspended <u>5.63</u> days
SEC. W/O CREW SITE PREF	DAYS	Stemming <u>23.33</u> days
SEC. W/O CREW MAIN HOLE CONST.	DAYS	De-Stemming Operations:
TOTAL SUSPENDED (NO RIG)	<u>3.97</u> DAYS	Suspended <u>4.29</u> days
TOTAL ELAPSED TIME	<u>141.63</u> DAYS	De-Stemming <u>31.17</u> days

GB-E

WELL HISTORY

Moved in Signal Drilling Company Rig #16 and started rigging up on 06-21-67. Prior to moving in, a dry hole digger had drilled a 39-inch hole to 49 feet and a 24-inch hole to 51 feet. Two joints of 30-inch O.D., 1/2 inch wall, Grade **A-35** casing were run and landed at 49' G.L. The casing was cemented with 263 ft.3 of neat cement plus 3% calcium chloride.

- 06-25-67 Spudded hole at 0230 hours with 13-3/4" bit, drilled out cement inside the 30" O.D. casing and new formation from 51' to 250' using mud as a drilling fluid.
- 06-26-67 Drilled 13-3/4" hole from 250' to 530'.
- 06-27-67 Drilled 13-3/4" hole from 530' to 998'.
- 06-28-67 Drilled 13-3/4" hole from 998' to 1587'.
- 06-29-67 Drilled 13-3/4" hole from 1587' to 2160', had to wash 160' to bottom after trip.
- 06-30-67 Drilled 13-3/4" hole from 2160' to 2520', had to wash 200' to bottom after trip.
- 07-01-67 Drilled 13-3/4" hole from 2520' to 2685'. Made two trips, one to recover the survey instrument, and one to unplug the bit.
- 07-02-67 Drilled 13-3/4" hole from 2685' to 2999', had to wash 120' to bottom after trip.
- 07-03-67 Drilled 13-3/4" hole from 2999' to 3299', had to wash 70' of fill.
- 07-04-67 Drilled 13-3/4" hole from 3299' to 3490', had 12' of fill. Measured out of hole, no correction.
- 07-05-67 Drilled 13-3/4" hole from 3490' to 3699'.
- 07-06-67 Drilled 13-3/4" hole from 3699' to 4008', reamed 200' of tight hole.
- 07-07-67 Drilled 13-3/4" hole from 4008' to 4222', had 100' of fill. Hole taking mud.
- 07-08-67 Drilled 13-3/4" hole from 4222' to 4300', had 90' of fill. Hole taking mud.
- 07-09-67 Drilled 13-3/4" hole from 4300' to 4350'. Lost approximately 400 bbl. of drilling mud from 4100' to 4350'.
- 07-10-67 Reamed 13-3/4" hole to 28" from 49' to 320'.

07-11-67 Reamed 13-3/4" hole to 28" from 320' to 615'.

07-12-67 Reamed 13-3/4" hole to 28" from 615' to 794'.

07-13-67 Reamed 13-3/4" hole to 28" from 794' to 1065'.

07-14-67 Reamed 13-3/4" hole to 28" from 1065' to 1227'. Lost one cutter off hole opener #2, had 100' of fill and tight hole.

07-15-67 Reamed 13-3/4" hole to 28" from 1227' to 1418'.

07-16-67 Reamed 13-3/4" hole to 28" from 1418' to 1536'.

07-17-67 Reamed 13-3/4" hole to 28" from 1536' to 1675'.

07-18-67 Reamed 13-3/4" hole to 28" from 1675' to 1814'.

07-19-67 Reamed 13-3/4" hole to 28" from 1814' to 1960'.

07-20-67 Reamed 13-3/4" hole to 28" from 1960' to 2121'. hole out of gauge.

07-21-67 Reamed 13-3/4" hole to 28" from 2121' to 2334'.

07-22-67 Reamed 13-3/4" hole to 28" from 2334' to 2382', had 260' of out-of-gauge hole.

07-23-67 Reamed 13-3/4" hole to 28" from 2382' to 2558'.

07-24-67 Reamed 13-3/4" hole to 28" from 2558' to 2602'. Lost one gauge cutter. Ran 13-3/4" bit, found fish at 2603', washed to bottom.

07-25-67 Completed washing junk in 13-3/4" hole to 4350'. Lost and estimated 400 bbl. of drilling mud.

07-26-67 Reamed 240' of out-of-gauge hole. Reamed 13-3/4" hole to 28" from 2602' to 2649'.

07-27-67 Reamed 118' of out-of-gauge hole. Reamed 13-3/4" hole to 28" from 2649' to 2764'.

07-28-67 Reamed 13-3/4" hole to 28" from 2764' to 2841', had 200' of out-of-gauge hole.

07-29-67 Reamed 13-3/4" hole to 28" from 2841' to 2850'. Lost one cutter off hole opener.

07-30-67 Reamed 460' of out-of-gauge hole. Reamed 13-3/4" hole to 28" from 2850' to 2886'.

07-31-57 Lost, one cutter off hole opener at 2886'. Ran 13-3/4" bit. Drilled on junk, could not wash to bottom. Ran 13-3/4" globe-type junk basket, did not, recover junk.

06-01-67 Ran 13-3/4" bit, trashed junk to bottom. of pilot hole and drilled 13-3/4" hole from 4350' to 4355'.

08-02-67 Reamed out-of-gauge hole from 2600' to 2864' with 28" hole opener.

08-03-67 Reamed 13-3/4" hole to 20" from 2886' to 3025'.

08-04-67 Reamed 13-3/4" hole to 20" from 3025' to 3181', washed fill from 2886' to 3181'.

08-05-67 Reamed 13-3/4" hole to 20" from 3181' to 3420'.

08-06-67 Reamed 13-3/4" hole to 20" from 3420' to 3474'. Shut down for repairs.

08-07-67 Ran 28" hole opener, hit out-of-gauge hole at 1011'. Reamed out-of-gauge hole to 1936'.

08-08-67 Reamed out-of-gauge hole with 28" hole opener from 1936' to 2675'.

08-09-67 Reamed out-of-gauge 28" hole from 2675' to 2865'.

08-10-67 Reamed out-of-gauge 28" hole from 2865' to 2886' and reamed 20" hole to 28" from 2886' to 2947'.

08-11-67 Reamed 20" hole to 28" from 2947' to 2972', lost 20" Hughes tri-cone pilot bit. Ran in with taper tap, twisted pin off bit.

08-12-67 Pulled taper tap, no recovery. Ran 24" O.D. x 23" I.D. magnet, no recovery. Ran 20" bit and washed to top of fish at 2979'.

08-13-67 Made three trips with 24" magnet, recovered one cone and one shank from 20" bit.

08-14-67 Ran 24" magnet and milled on junk, no recovery. Ran 28" hole opener, reamed out-of-gauge hole from 2934' to 2987' to top of fish. Ran junk basket and washed over fish, no recovery.

08-15-67 Completed third run with junk basket with no recovery. Ran 24" bit and reamed out-of-gauge hole to top of fish at 2971'. Ran 24" O.D. magnet, no recovery, ran junk basket, no recovery. Ran 20" bit, drilled and pushed junk from 2971' to 3250'.

08-16-67 Drilled and pushed junk from 3250' to 3474' with 20" bit. Ran 24" bit and reamed 20" hole to 28" from 2972' to 3067'.

- 08-17-67 Reamed 20" hole to 28" from 3057' to 3113'. Lost one cutter off of hole opener and four cones, three pins and frog from four-cone Smith K2P pilot bit. Ran 13-3/4" bit and washed junk to 3282'.
- 08-18-67 Made three trips with junk basket and one trip with 20" O.D. magnet, washed to 3290', no recovery.
- 08-19-67 Ran 20" O.D magnet, hit bridge at 3113'; cleaned out and conditioned hole with 20" bit to 3394'. Ran 20" O.D. magnet to 3401', no recovery. Ran 18" O.D. junk basket and washing over junk.
- 08-20-67 Washed junk to 3747' with junk basket, no recovery. Ran 20" O.D. magnet and recovered one cone and shank from 20" Hughes tri-cone bit.
- 08-21-67 Ran 20" O.D. magnet, washed over junk and twisted off leaving five 8" O.D. drill collars, two joints (32') of 5-9/16" O.D. drill pipe and 20" O.D. magnet in the hole. Ran overshot and recovered pipe and magnet also two cones and two pins from the four-cone Smith bit. Ran 20" O.D magnet and recovered one Smith cone.
- 08-22-67 Ran 19" O.D. junk basket, washed to 3496' and twisted off leaving junk basket in the hole. Ran 28" hole opener, washed from 2380' to 3113' and reamed 20" hole to 28" from 3113' to 3164'.
- 08-23-67 Reamed 20" hole to 28" from 3164' to 3220', washed out 200' of fill.
- 08-24-67 Left 28" Reed hole opener on bottom. Ran overshot and recovered same.
- 08-25-67 Reamed 20" hole to 28" from 3220' to 3259'.
- 08-26-67 Reamed 20" hole to 28" from 3259' to 3372'.
- 08-27-67 Reamed 20" hole to 28" from 3372' to 3415'. Ran 20" bit and washed to 3469' at top of fish. Ran 17-5/16" O.D. die nipple tapered mill fishing tool.
- 08-28-67 Pulled die nipple tool, no recovery. Ran 17-1/4" O.D Homco fishing spear, no recovery, left set of slips in hole. Ran 20" O.D. magnet, recovered drilling line and cuttings from top of junk basket. Ran die nipple and recovered junk basket.
- 08-29-67 Ran 20" bit, washed junk to 3458'. Made two trips with 20" magnet, recovered small pieces of iron from junk basket and wire line. Ran 20" bit reamed 13-3/4" hole to 3486'.
- 08-30-67 Reamed 13-3/4" hole to 20" from 3486' to 3487'. Ran 18" O.D. magnet, no recovery. Ran 13-3/4" bit and washed junk to 3544'. Ran 20" bit and reamed 13-3/4" hole from 3487' to 3525'.

08-31-67 Reamed 13-3/4" hole to 20" from 3525' to 3544'. Ran 18" O.D. magnet with tungsten carbide shoe, milled on junk from 3500' to 3544', recovered one 20" cone and shank and miscellaneous small pieces of iron. Ran 13-3/4" bit, washed and reamed from 3544' to 3818'.

09-01-67 Washed and reamed with 13-3/4" bit from 3818' to 4065'. Started losing mud below 3900', lost approximately 400 bbl.

09-02-67 Ran 20" hole opener and washed to 3535', unable to ream. Pulled out of hole and left hole opener. Ran 11-3/4" O.D. Bowen overshot with 7-5/8" grapple.

09-03-67 Recovered fish. Ran 20" bit, reamed out-of-gauge hole and 13-3/4" hole from 3533' to 3625'.

09-04-67 Reamed 13-3/4" hole to 20" from 3625' to 3711'.

09-05-67 Reamed 13-3/4" hole to 20" from 3711' to 3950'. No fluid loss.

09-06-67 Reamed 13-3/4" hole to 20" from 3950' to 3993'.

09-07-67 Reamed 20" hole to 28" from 3415' to 3506'. Out-of-gauge hole from 3295' to 3415'.

09-08-67 Ran 28" hole opener and 20" tri-cone pilot bit. Reamed 20" hole to 29" from 3506' to 3618'.

09-09-67 Reamed 20" hole to 28" from 3618' to 3650'. Twisted off drilling string leaving 6 drill collars, 28" stabilizer and 28" reamer in hole. Ran Bowen overshot, recovered fish.

09-10-67 Reamed 20" hole to 28" from 3650' to 3718'. Out-of-gauge hole from 3620' to 3630'.

09-11-67 Reamed 20" hole to 28" from 3718' to 3766'. Reamed out-of-gauge hole from 3001' to 3061' and fill from 3675' to 3727'.

09-12-67 Reamed 20" hole to 28" from 3766' to 3812'. Out-of-gauge hole from 3552' to 3612'.

09-13-67 Reamed 20" hole to 28" from 3812' to 3961'.

09-14-67 Reamed 20" hole to 28" from 3961' to 3987'. Ran 13-3/4" bit, washed down from 3987' to 4229'. Started losing fluid below 4000' and lost returns completely at 4229'. Pulled bit from hole.

09-15-67 Reamed 20" hole to 28" from 3987' to 3993', and 13-3/4" pilot hole from 3993' to 4048'.

09-16-67 Reamed 13-3/4" hole to 28" from 4048' to 4094'.

GB-E Well History

Page 6

09-17-67 Reamed 13-3/4" hole to 28" from 4094' to 4142'. Hit bridge at 2700' and cleaned out fill from 4034' to 4094'.

09-18-67 Reamed 13-3/4" hole to 28" from 4142' to 4205'. Twisted off and left 10 drill collars and reaming assembly in hole. Ran 10-3/4" O.D. Bowen overshot and recovered fish.

09-19-67 Completed laying down fish. Reamed 13-3/4" hole to 28" from 4205' to 4225'.

09-20-67 Reamed 13-3/4" hole from 4225' to 4229'. Shut down for repairs and changing drilling assembly.

09-21-67 Reamed 13-3/4" hole to 28" from 4229' to 4304', fill from 4199' to 4229'.

09-22-67 Reamed 13-3/4" hole to 28" from 4304' to 4365' or 4350' G.L.

09-23-67 Ran Schlumberger caliper, density, and temperature logs. Bottom hole temperature 129.5°F.

09-24-67 Ran Welex caliper log and waited on Sperry-Sun.

09-25-67 Waited on Sperry-Sun.

09-26-67 Ran 28" bit, cleaned out bridge at; 3000' and 20' of fill on bottom. Started running Sperry-Sun.

09-27-67 Ran Sperry-Sun Gyroscopic multishot survey in and out of hole on 50' stations from 0' to 4350'. Ran 28" tandem reaming assembly, reamed and washed from 198' to 587'.

09-28-67 Reamed 28" hole from 597' to 3098'.

09-29-67 Reamed 28" hole from 3098' to 4170'.

09-30-67 Reamed 28" hole from 4170' to 4350'.

10-01-67 Prepared to run 20" O. D. casing. Started running casing.

10-02-67 Ran 20" O.D. casing

10-03-67 Ran 20" O.D. casing.

10-04-67 Ran 20" O.D. casing.

10-05-67 Ran 20" O.D. casing.

10-06-67 Completed running 20" O.D. casing. See Casing Data Record at end of history. Cemented stage #1 with 3000 ft.³ of 50-50- Pozmix leaving 2420 ft.³ in the annulus. CIP at 1812 hours. Waited on cement for 30 minutes and opened lower DV tool at 3550' and circulated mud through the ports.

- 10-07-67 Waited on cement until 1800 hours circulating mud through the DV tool. Cemented stag? #2 with 7500 ft.³ of 50-50 Pozmix plus 2% gel and 0.3 of 1% of HR-4 Retarder, leaving 5940 ft.³ in annulus. Dropped DV closing plug at 1935 hours and started displacing cement with mud. The 20" O.D. casing parted at 2015 hours while displacing. Pulled casing from hole and found it parted in a collar 12 joints from surface at 258' G.L. -
- 10-08-67 Ran Welex caliper and temperature logs. Ran 17-1/2" bit to 1770' inside the 20" O.D. casing and conditioned mud.
- 10-09-67 Ran Schlumberger caliper log. Ran 17-1/2" underreamer to 2719'.
- 10-10-67 Checked for casing collapse with 17-1/2" underreamer from 2325' to 2679'. Standby ready waiting on 20" O.D. casing patch tool.
- 10-11-67 Standby ready, waiting on 20" O.D. casing patch tool.
- 10-12-67 Standby ready, waiting on 20" O.D. casing patch tool.
- 10-13-67 Standby ready, waiting on 20" O.D. casing patch tool.
- 10-14-67 Ran 12 joints of 20" O.D., 133#, J-55, 8 round, ST&C casing with Brown Oil Tool, 20" O.D. casing pack-off overshot on bottom. Landed at 258' G.L. and made up tool to complete the 20" O.D. casing string. Ran Birdwell NCTL log.
- 10-15-67 Pressure tested 20" O.D. casing to 400 psi. Opened upper DV tool at 1800' and circulated mud through ports.
- 10-16-67 Cemented stage #3 with 8400 ft.³ of 50-50 Pozmix plus 2% gel, leaving 2778 ft.³ in the annulus. CIP at 2035 hours. Cement circulated to surface. Waited on cement.
- 10-17-67 Waited on cement until 2000 hours. Ran Schlumberger temperature log to 1767'.
- 10-18-67 Nipped up on 20" O.D. casing. Tagged top of cement plug with 17-1/2" bit at 1779.59'. Drilled out cement to 1795'.
- 10-19-67 Drilled cement with 17-1/2" bit from 1795' to 1802'. Drilled out DV tool from 1802' to 1804'. Drilled opening bomb from upper DV tool and cement from 2713.67' to 2842'.
- 10-20-67 Drilled cement with 17-1/2" bit from 2842' to 3547.57' and DV tool at 3547.57' to 3549.57'. Circulated out to 4218'. Drilled baffle at, 4227' 2nd cement to 4239'. Void from 4227' to 4251'.
- 10-21-67 Ran 18" Drilco 3 point smooth roller reamer to 1770', washed and reamed to 1810'. Washed and reamed from 2664' to 4289'. Started displacing mud with water.

- 10-22-67 Displaced mud with water. Measured in and out of hole with 17-1/2" O.D. x 20' mandrel. In run 4282' G.L., outrun 4283' G.L. Ran Birdwell NCTL and 3-9 logs. Ran Welex Bond log.
- 10-23-67 Bailed 20" O.D. casing to 2300' with 13-3/8" O.D. x 24' bailer.
- 10-24-67 Bailed 20" O.D. casing to 2706'.
- 10-25-67 Bailed hole to 2752'. Ran Schlumberger water probe. Water level at 2621', fluid rose to 2418' in 4 hours. Ran temperature log. Monitored fluid rise with Schlumberger from 2418' to 1722'. Caught water samples with bailer.
- 10-26-67 Ran Birdwell Salinometer log. Ran 18" O.O. x 24' mandrel in and out of hole to 4250'. Started running 18" TIW packer in 20" O.D. casing.
- 10-27-67 Filled casing with water. Attempted to set packer from 3390' to 3392' with 5-1/2" O.D. casing stinger below packer at 3411'; packer would not set. Pulled out of hole and reran to 1000'; packer would not set. Pulled out of hole for repairs.
- 10-28-67 Dressed packer, ran in hole and set at 3401' with 5-1/2" O.D. stinger at 3415'. Pressured up below packer to 600 psi, bled back to 250 psi. Pulled and reset packer at 3371', pressured up to 600 psi and bled back to 250 psi in 9 minutes. Pulled out of hole. Ran drill pipe in hole for pressure test to 3500' and found 3 bad joints. Ran Birdwell water sampler and took samples at 3450', 3550' and 3650'. Started running NCA log.
- 10-29-67 Completed calibration run on the NCA log. Started running 18" TIW packer.
- 10-30-67 Set packer at 3395' to 3397', pressured up to 600 psi. Reset at several intervals and indications were a drill pipe or packer leak. Pulled out of hole and left packing element. Ran 18" bit and reamer in hole and washed element to bottom. Filled 20" O.D. casing with water and monitored fluid level. Dropped 8.31' in 2 hours 57 minutes.
- 10-31-67 Monitored fluid level, hole taking approximately 1 barrel per hour.
- 11-01-67 Monitored fluid level, hole taking approximately 1 barrel per hour. Layed down drill pipe and bailed 20" O.D. casing to 800'.
- 11-02-67 Bailed casing to 1002'. Rig on standby ready.
- 11-03-67 Rig on standby ready, released at 2400 hours. Hole suspended.
- 11-06-67 Completed moving out Signal Drilling Company Rig. Hole suspended from 2400 hours, 11-03-67, to 0700 hours, 11-06-67. Calibrated Birdwell 3 prong NCA log in 20" O.D., 160 and 133 pounds per foot casing in water, carbon tetrachloride and zinc chloride fluids. Installed Sperry-Sun Gyroscopic instrument on bottom of NCA tool and oriented gyros to arms. Running log.

11-07-67 Calibrating and logging with NCA -- Gyro instrument.

11-08-67 Calibrating and logging with NCA -- Gyro instrument.

11-09-67 Calibrating and logging with NCA -- Gyro instrument, shut down operations at 2200 hours.

11-10-67 Shut down until 1130 hours. Resumed calibrating and logging with NCA -- Gyro instrument.

11-11-67 Calibrating and logging with NCA-- Gyro instrument, shut down at 2130 hours.

11-12-67 Shut down until 1400 hours, rigged down Birdwell and Sperry-Sun. Hole suspended at 1700 hours.

GB-E
Well History
Stemming Operations

Moved in Brinkerhoff Drilling Company Rig #21 on 11-17-67 and rigged up. Prior to moving in Western States had dug a cellar 7' x 7' x 6' and boxed it in with plywood.

- 11-18-67 Hole suspended from 1700 hours on 11-12-67 to 0800 hours on 11-18-67. Completed rigging up at 1500 hours. Ran Schlumberger temperature log, maximum temperature 130°F. Ran 18" O.D. x 20' mandrel on 4-1/2" drill pipe to 4282' G.L.
- 11-19-67 Made inrun #2 with 18" O.D. x 20' mandrel to 4282.46' G.L. Started bailing hole.
- 11-20-67 Made 55 runs with bailer, fluid level at 852'. Cut 20" O.D. casing off 4' below surface and welded on 20" flange. Skidded rig 10' from hole and prepared for downhole operations.
- 11-21-67 Ran canister in hole with crane on one joint of 7" O.D. casing, landed on spider and slips. Skidded rig back over hole and rigged up for downhole emplacement.
- 11-22-67 Pulled canister from hole and checked out. Ran device in hole on 7" O.D., 26#, N-80, 8 round thread, long thread and collar casing. 17-1/2" O.D. centralizers were placed at approximately 80' intervals around the casing collars with kellow grips placed on the cables and secured to the centralizers. Electrical cables were also taped to the outside of the casing. Ran 21 joints of casing (887') and suspended operations at 2000 hours. 7" O.D. slotted joints of the casing were run in the string as directed.
- 11-23-67 Resumed operations at 0800 hours with downhole emplacement. Safety checks were made at 0830 hours, 1200 hours and 1600 hours. Ran a total of 77 joints (3258'). Operations suspended at 2000 hours.
- 11-24-67 Resumed operations at 0800 hours, LRL checked out instruments. Ran 100 joints and installed WES strain gauge in string. Completed running casing with joint #101. Ran a total of 4227' of 7" O.D. casing to top of device. Slotted perforations in the 7" O.D. casing are as follows: 864' to 949', 1536' to 1578', 1914' to 1956', 2469' to 2511', 2891' to 2976', 3487' to 3562', 4112' to 4145', 4195' to 4227'. Pulled and threaded cables through "Y" hanger spool, bolted spool on 20" flange. Bolted on casing head, set 7" slips and packed off around 7" O.D. casing.
- 11-25-67 Ran 131 joints of 2-3/8" O.D., EUE, 4.70#, tubing inside 7" O.D. casing to 4119.73' with pin collar on bottom. Installed "AT" closing spool on the "Y" spool and placed sealing materials around the cables inside of the "AT" spool as directed by LRL.

- 11-26-67 Ran 4 joints of 2-3/8" O.D. tubing (total of 135 joints) and landed at 4228' G.L. Rigged up Halliburton to stem with grout. Stage #1 pumped 175 ft.³ of 13.2#/gallon WES special grout mix down the 2-3/8" O.D. tubing. CIP at 1135 hours. Pulled tubing and ran Reda pump to 2578' on 2-3/8" O.D. tubing. Started pumping at 60 gpm, while waiting on cement. Fluid to surface at 2234 hours.
- 11-27-67 Continued pumping, fluid level pumped down at 1115 hours. Pulled pump from hole and tagged top of stage #1 at 4136' at 1400 hours with 2-3/8" O.D. grout string. Hung tubing at 4133.50' and pumped stage #2 down the tubing using 1023 ft.³ of 13.2 #/gallon, WES filler grout. CIP at 1538 hours. Pulled tubing and ran Reda pump on 2-3/8" tubing to 2590.69' while waiting on cement. Pumped fluid from hole to control water level.
- 11-28-67 Continued pumping water, fluid level down to 2573' at 2028 hours. Shut down waiting on fluid entry until 2315 hours, resumed pumping.
- 11-29-67 Pumped fluid until 0400 hours at 30 gpm to 22 gpm and pulled pump from hole. At 0700 hours, tagged top of stage #2 at 3528.21' with 2-3/8" O.D. grout string. Ran Schlumberger water locator, top of fluid at 2236'. Pumped stage #3 down the tubing using 1000 ft.³ of 13.2 #/gallon WES filler grout. CIP at 1140 hours. Pulled up tubing and ran Schlumberger water locator, fluid level at 1210'. Completed pulling tubing from hole and waited on cement.
- 11-30-67 Ran Reda pump on 2-3/8" tubing and tagged top of cement at 3029.44' at 1115 hours. Started pumping fluid level down at 1115 hours with pump inlet at 3013'. Pump failed at 2105 hours.
- 12-01-67 Pulled Reda pump from hole, motor burnt out. Tagged top of stage #3 with 2-3/8" O.D. grout string at 3030.32'. Ran Schlumberger water locator, fluid level at 2552' also tagged top of cement at 3032'. Rigged up swabbing unit and started swabbing at 2000 hours through the 2-3/8" O.D. tubing.
- 12-02-67 Swabbing water from hole.
- 12-03-67 Swabbed hole dry at 0230 hours, recovered approximately 5176 gallons of water. Shut down for 3 hours and found no additional fluid entry. Landed tubing at 3027.67' and packed off in tubinghead. Rigged up air compressor and started blowing air down 20" annulus to dry up hole. Used one Joy 750 compressor at 350 cfm and 40 psi, air returns wet.
- 12-04-67 Drying up hole with air down the 20" annulus.

- 12-05-67 Drying up hole with air, shut down compressor at 1345 hours. Pulled 2-3/8" O.D. tubing from hole and secured area for IRL.
- 12-06-67 Ran Schlumberger density log to 3032', fluid level 2973'. Dumped 15 ft.³ of sand inside of the 7" O.D. casing and 135 ft.³ in the 20" annulus. Ran Schlumberger water locator, top of fill at 2902'. Rigged up sand chute and stemmed inside 7" O.D. casing with 8,300# of sand and inside the 20" annulus with 61,700# of sand. Monitored fillup with Schlumberger density log. Top of sand inside the 7" O.D. casing at 2523' and in the 20" annulus 2528'.
- 12-07-67 Ran 2-3/8" O.D. grout string to 2525'. Pumped stage #4 down the tubing using 1850 ft.³ of 13.2 #/gallon WES filler grout, tubing was pulled to 1998' for the final 143 barrels of grout. CIP at 1115 hours. Pulled 2-3/8" O.D. tubing and ran Schlumberger density log. found top of cement inside the 7" O.D. casing at 1646'. Ran 2-3/8" O.D. grout string to 1589'. Pumped stage #5 down tubing using 246 ft.³ of grout. Pulled tubing and ran Schlumberger density log. top of cement at 1474'. Started stemming the hole with sand and checking fill with Schlumberger density tool.
- 12-08-67 Continued stemming hole with sand used a total of 253,700# of sand in the annulus and 28,200# inside the 7" O.D. casing. Top of sand in the 20" annulus at 50' and inside the 7" O.D. casing at 27'. Released rig at 0715 hours to move off of location.
- 12-09-67 Rig off of hole. Pumped stage #5 with Halliburton in the 20" annulus using 650 gallons of chemical seal grout. Grout to surface. Installed blind flanges on "Y" spool and 7" casinghead. Filled cellar with sand and secured hole for event. Hole suspended at 1600 hours.

20-INCH O.D. CASING RECORD

<u>No. of Joints</u>	<u>Wall Thickness</u>	<u>Weight Per Ft.</u>	<u>Grade</u>	<u>Depth</u>		<u>Remarks</u>
				<u>From</u>	<u>To</u>	
63	0.635"	133 $\frac{7}{8}$	J-55	0'	1799.48'	ST&C, 8rd.
				1799.48'	1801.80'	HOWCO DV cement tool
20	0.635"	133 $\frac{7}{8}$	J-55	1801.80'	2391.45'	ST&C, 8rd.
15	0.770"	160 $\frac{7}{8}$	J-55	2391.45'	2863.26'	ST&C, 8rd. no stiffener
11	0.770"	160 $\frac{7}{8}$	S-55	2863.26'	3548.42'	Butt welded casing with stiffeners on 6' spacing
				3548.42'	3550.76'	HOWCO DV cement tool
8	0.770"	160 $\frac{7}{8}$	J-55	3550.76'	4050.61'	Butt welded casing with stiffeners on 6' spacing
8	0.770"	160 $\frac{7}{8}$	J-55	4050.61'	4288.55'	ST&C, 8 rd, with stiffeners on 5' spacing.
				4288.55'	4290.56'	Baker float collar, welding type.
1	0.770"	160 $\frac{7}{8}$	J-55	4290.56'	4322.53'	Plain end, stiffeners on 5' spacing.
				4322.53'	4324.00'	Baker float shoe, welding type.

GB-E

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SCHLUMBERGER LOG INDEX SHEET

<u>Type</u> <u>Log</u>	<u>Date</u>	<u>Run</u> <u>No.</u>	<u>Log</u> <u>Depth</u>	<u>Drillers</u> <u>Depth</u>	<u>Interval Logged</u>
Caliper	09-23-67	1	4353'	4353'	50' - 4352'
Caliper	10-09-67	2	2724'	2740'	10' - 2724'
Density	09-23-67	1	4353'	4350'	0' - 4352'
Formation Density	12-06-67	1			0' - 3026'
Formation Density	12-06-67	2			2713' - 2882'
Formation Density	12-06-67	3			2579' - 2869'
Formation Density	12-06-67	4			2535' - 2867'
Formation Density	12-07-67	5			2523' - 2643'
Formation Density	12-07-67	6			1348' - 1444'
Formation Density	12-08-67	7			1175' - 1360'
Formation Density	12-08-67	8			960' - 1192'
Formation Density	12-08-67	9			572' - 869'
Formation Density	12-08-67	10			182' - 589'
Formation Density	12-08-67	11			148' - 200'
Temperature	09-23-67	1	4348'	4350'	60' - 4348'
Temperature	10-17-67	2	1770'	1795'	100' - 1770'
Temperature	11-18-67	3	3279'	4382'	1000' - 3279'

GB-E

WELEX LOG INDEX SHEET

<u>Type</u> <u>Log</u>	<u>Date</u>	<u>Run</u> <u>No.</u>	<u>Log</u> <u>Depth</u>	<u>Drillers</u> <u>Depth</u>	<u>Interval Logged</u>
Caliper	09-24-67	1	4315'	4350'	0' - 4314'
Caliper	10-08-67	2	2726'	2730'	0' - 2725'
Micro- Seismogram	10-22-67	1	4288'	4282'	20' - 4279'
Temperature	10-08-67	2	2729'	2730'	50' - 2729'

GR-E

BIRDWELL LOG INDEX SHEET

<u>Type</u> <u>Log</u>	<u>Date</u>	<u>Run</u> <u>No.</u>	<u>Log</u> <u>Depth</u>	<u>Drillers</u> <u>Depth</u>	<u>Interval</u> <u>Logged</u>
MCTL	10-14-67	1	2300'	4350'	0' - 2300'
NCTL	10-14-57	2	2600'	4350'	0' - 2600'
NCTL	10-22-67	3	4282'	4350'	0' - 4281'
NCTL	10-22-67	4	4282'	4350'	0' - 4281'
NCA	10-28-67	1		4350'	0' - 4270'
NCA-Gyro	11-6/7-67	2		4350'	0' - 4230'
NCA-Gyro	11-07-67	3		4350'	0' - 4000'
NCA-Gyro	11-07-57	4		4350'	0' - 4000'
NCA-Gyro	11-09-67	5		4350'	0' - 4100'
NCA-Gyro	11-10-67	6		4350'	1800' - 4100'
NCA-Gyro	11-11-67	7		4350'	1800' - 4100'
Salinometer	10-26-67	1	4279'	4350'	1800' - 4275'
kiter ' Locator	10-27-67	1-11	1750'	4350'	1550' - 1750'
3D Bond	10-22-67	1	4282'	4350'	0' - 4274'

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GB-E
SPERRY--SUN GYROSCOPIC MULTISHOT SURVEY

332--SU3--002 In Run

This survey was run inside stabilized drill **p i . ~ ~ .**

<u>MD</u>	<u>TVD</u>	<u>Latitude</u>	<u>Departure</u>
<u>0'</u>	<u>0'</u>	<u>0'</u>	<u>0'</u>
100'	100.00'	0.03'S	0.40'W
200'	200.00'	0.24'S	0.78'W
300'	300.00'	0.40'S	1.23'W
400'	400.00'	0.50'S	1.75'W
500'	499.99'	0.84'S	2.38'W
600'	599.99'	0.65'S	2.94'W
700'	693.99'	0.56'S	3.67'W
800'	799.99'	0.48'S	3.73'W
900'	899.99'	0.59'S	3.80'W
1000'	999.99'	0.82'S	4.02'W
1100'	1099.98'	0.92'S	4.58'W
1200'	1199.98'	1.02'S	5.19'W
1300'	1299.98'	1.04'S	5.82'W
1400'	1399.98'	0.73'S	6.12'W
1500'	1499.98'	0.33'S	6.12'W
1600'	1599.98'	0.03'S	6.53'W
1700'	1699.98'	0.10'N	6.94'W
1800'	1799.97'	0.24'N	7.35'W
1900'	1899.97'	0.60'N	7.95'W
2000'	1999.97'	1.05'N	8.62'W
2103'	2099.97'	1.35'N	9.28'W
2200'	2199.96'	1.84'N	9.83'W
2300'	2299.96'	2.23'N	10.12'W
2400'	2399.96'	2.67'N	10.62'W
2500'	2499.96'	2.97'N	11.10'W
2600'	2599.95'	3.03'N	11.74'W
2700'	2699.95'	3.11'N	12.26'W
2800'	2799.95'	3.34'N	12.63'W
2900'	2899.95'	3.22'N	13.51'W
3000'	2999.94'	3.26'N	14.32'W
3100'	3099.94'	3.47'N	14.94'W
3200'	3199.94'	3.01'N	15.64'W
3300'	3299.93'	2.68'N	16.52'W
3400'	3399.93'	2.47''	17.44'W
3500'	3499.92'	2.25'N	18.22'W
3600'	3599.92'	1.50'N	18.94'W
3700'	3699.92'	1.31'N	19.30'W
3800'	3799.91'	1.03'N	19.82'W
3900'	3899.91'	0.69'N	20.53'W
4000'	3999.91'	0.44'N	21.06'W
4100'	4099.91'	0.16'N	21.22'W
4200'	4199.91'	0.01'S	21.35'W
4300'	4299.91'	0.22'S	21.29'W
4350'	4349.91'	0.38'S	21.31'W

PROJECT GASBUGGY

GB-E

REVIEW OF HOLE CONDITIONS

Spudded 6-25-57

Completed 11-12-67

39" hole to 49'

30" O.D. casing at 40' G.L.
Cemented annulus to surface with 263 ft.³
of cement slurry.

28" hole to 4,350'

20" O.D. casing set at 4,324' G.L.
Cemented annulus to surface with 11,138 ft.
of cement slurry.

- I. This hole was drilled using mud as a circulating fluid. Sloughing of the hole was noted at 3,018 feet. The hole lost some fluid to the formation in the interval 4,008 feet to 4,035 feet while a 13-3/4 inch pilot hole was being drilled. Several bit cones were lost in the hole during the operations of reaming the 13-3/4 inch pilot hole to 28-inch diameter. These bit cones were either fished from the hole or pushed to the bottom of the hole at 4,350 feet. The repeated loss of bit and reamer cones in the hole and the problems of recovering them contributed greatly to the time required to drill the hole. During the process of reaming and pushing loose junk to the bottom of the hole, fluid was lost to the formation in the interval 4,000 feet to 4,100 feet.

Twenty-inch casing was run to a depth of 4,324 feet and cemented in place in three stages. Two cement stage collars, one positioned at 1,799 feet and one at 3,548 feet, were utilized to cement the casing to hole wall annular space from 4,324 feet to the surface.

The volume of cement used to cement the casing in place was based on a Welex hole diameter caliper log which was later found to be inaccurate. The inaccuracy was verified by the fact that the logging tool had a maximum diameter capability of 32-1/2 inches, but the printed log registered hole diameters in excess of the tool capability. The log has limited use in determining hole volumes but has some value in showing hole contour.

After the discovery of the inaccuracy of the Welex log and subsequent to the cementing of 20-inch O.D. casing, a Schlumberger engineer volunteered the information that the Schlumberger logging tool used to obtain a caliper log of the 28-inch drilled hole was partially inoperative for a portion of the time it was used to caliper the hole diameter. When the logging tool was pulled from the hole, it was not expanding to its full capability. An examination of the log indicates that possibly some of the peaks of the printed log, which should show washed out and enlarged sections of the hole, are truncated. This is possibly due to the logging tool not expanding beyond a fixed diameter.

Having established that neither print out was reliable by itself, it was concluded that since the Schlumberger tool appeared to malfunction at its outer limits because of a physical limitation, and the Welex log appeared to malfunction for electronic reasons where it was increasing a constant diameter, that the most reliable volume calculation would result from using the Schlumberger printout to identify gauge or near gauge sections of the hole and the Welex log to record the diameters at the washed out sections.

The resulting annulus volume calculation used herein for purpose of establishing the material balance is considered to be within the tolerances that are attainable for other quantities used in the material balance.

Cement Stage No. 1, which consisted of 3,000 cubic feet of cement slurry mixed, was emplaced by pumping it out through the casing shoe and up the annulus. At the conclusion of the cement emplacement, the ports in the stage collar located at 3,548 feet were opened and an estimated 400 cubic feet of cement was circulated out of the hole. A total of 180 cubic feet of cement was left inside the 20-inch casing below the stop for the cement displacement plug. If, at the conclusion of Cement Stage No. 1, all of the cement that was above the lower stage collar was circulated out of the hole, the volume of cement left in the annular space between 4,324 feet and 3,548 feet (2,420 cubic feet of slurry weighing 13.2 lbs./gal.) is 137.3% of the annular space arrived at by a combined calculation of both the Schlumberger and Welex caliper logs.

Cement Stage No. 2 was emplaced in the annulus through ports in the cement stage collar set at 3,548 feet. A total of 7,500 cubic feet of cement slurry which weighed an average of 13.2 lbs./gal. was mixed. The 20-inch casing parted before all of the cement had been placed in the annulus through the stage collar. Based on the volume of cement encountered inside the 20-inch casing when it was drilled out, the cement placed in the annulus during Cement Stage No. 2 was 5,940 cubic feet.

Cement Stage No. 3 was emplaced in the annulus through the cement stage collar set at 1,799 feet, after the parted casing had been reconnected. A total of 8,400 cubic feet of cement slurry which weighed an average of 13.2 lbs./gal. was mixed for Cement Stage No. 3. When 6,250 feet of cement slurry had been mixed, cement started flowing from the annulus at the surface. If it is assumed an equal volume of cement flowed from the annulus as was pumped into it, after cement returns from the annulus were first sighted, the volume of cement emplaced in the annulus during Stage No. 3 was 2,778 cubic feet.

PROJECT GASBUGGY

GB-E

REVISED MATERIAL BALANCE

Hole Volume to Cement Volume for Cementing 20-Inch O.D. Casing

Calculated from Schlumberger and Welex Caliper Logs

Gross hole volume (4,324' to surface)	19,850.5 ft. ³
Casing volume of 20" O.D. casing (4,324' to surface)	9,441.5 ft. ³
Annular volume -- gross less casing volume	10,409 ft. ³
Total cement placed in annulus	11,138 ft. ³
Percent of emplaced cement <u>greater</u> than theoretical volume	7.0%

PROJECT GASBUGGY
CE-E

CEMENTING MATERIAL BALANCE

Stage No.	Interval	Calculated Annular Volume*	Cubic Feet of Cement		% Difference of Actual Placed to Calculated Volumes
			Mixed Drilled or Circulated out	Actual Placed	
1.	4324' - 3550'	1762 C.F.	3000 580	2420	+37 3
2.	3550' - 1 00'	4272 C.F.	7500 1560	5940	+39 0
3.	1800' - 0'	4375 C.F.	8400 5622	2778	-36 5
Total		10409 C.F.	18900 7762	11138	+ 7 0

* Based upon use of the acceptable portions of both the Schlumberger and Welex caliper logs.

CEMENTING GRAPH GB-E

----- Calc. Ann. Vol.
————— Cement Used

Total Cement Used = 11,138 ft³
Total Calculated = 10,409
Difference = + 729

FENIX & SCISSON, INC.
HOLE HISTORY DATA

DATE: February 2, 1968

APPROVED: *Robert J. Scisson*

HOLE NO.: GB 10-36	CONTRACT NO.: AT(26-1)-338		I. D. NO.:
USER: LRL-EPNG	TYPE HOLE: Production Test		
LOCATION	COUNTY: Rio Arriba	AREA: New Mexico	
SURFACE COORDINATES: 434' N 9° 30' W of GB-E location.			
GROUND ELEVATION: -	PAD ELEVATION:	TOP CASING ELEVATION:	
RIG ON LOCATION:	SPUDED: **	COMPLETED: 10-17-67	

CIRCULATING MEDIA:

MAIN RIG & CONTRACTOR

NO. OF COMPRESSORS & CAPACITY:

BORE HOLE RECORD					CASING RECORD					
FROM	TO	SIZE	I. D.	WT./FT.	WALL	GRADE	CPL'G.	FROM	TO	CU. FT. CMT.
			9-5/8" O.D.					0'	124'	
			5-1/2" O.D.					0'	4200'	

TOTAL DEPTH: GL AVERAGE MANDREL DEPTH: FROM REFERENCE ELEVATION @

JUNK & PLUGS LEFT IN HOLE: Sand 4170'-3877', bridge plug at 3880', cement 3880'-2941'

SURVEYS PAGE: 3 CORING PAGE: CU. FT. CMT. TOTAL IN PLUGS, ETC: 197

LOGGING DATA: Page 2

BOTTOM HOLE COORDINATES: 8.77' S & 44.28' E of surface location Average in and out REFERENCE: 332'-SU3-003

RIGS USED

(Site Prep Rigs *)

RIG NO.	NAME	TYPE	CLASS	DAYS OPERATING	SECURED W CREW	SECURED W/O CREW	TOTAL DAYS ON LOC.
50	Aztec Well Service Co.	180 HP double-drum unit		3.35	0.54		3.89

REMARKS: * Site Prep Items

** Prior to plugging back. this hole had been drilled and cased by others.

Note: The 5 1/2" O.D. casing was perforated: 4046' - 4166', 3901' - 4012', and 120'.

GB 10-36
Hole History

Moved in Aztec Well Service Company Rig #50 and started rigging up.

- 10-13-67 Completed rigging up at 1500 hours. Ran 2-3/8" O.D. tubing in hole 2nd tagged bottom at 4170' G.L. Pulled tubing from hole and closed in. Standby ready at 1900 hours.
- 10-14-67 Standby ready until 0800 hours. Ran Schlumberger collar locator and water locator. Top of fluid in hole at 4050'. Plugged back 5-1/2" O.D. casing from 4170' to 3837' with 45 ft³ of sand. Set 5-1/2" Baker bridge plug on Schlumberger wireline at 3880'.
- 10-15-67 Filled hole with mud and pressure tested to 300 psi. Ran Birdwell 3-D Bond and NCT L logs. Ran Sperry-Sun Gyroscopic Multishot Survey in and out of the hole on 50' stations from 0' to 3880' inside the 5-1/2" O.D. casing. Ran 2-3/8" O.D. tubing and stemmed hole using Halliburton with 112 ft³ of 40-60 Pozmix plus 6% gel, CIP at 2355 hours.
- 10-16-67 Waited on cement until 1200 hours, tagged top of Stage #1 at 3205'. Cemented stage #2 with 40 ft³ of 60-40 pozmix plus 6% gel. CIP at 1340 hours. Perforated 5-1/2" O.D. casing at 120' with 4 holes using Schlumberger. Circulated the 9-5/8" x 5-1/2" annulus with mud thru the perforations. Cemented the annulus using 56 ft³ of neat cement, cement circulated to surface. CIP at 1600 hours. Waited on cement.
- 10-17-67 Waited on cement until 0500 hours, tagged top of cement at 120'. Drilled out 2' of cement plug at 0700 hours and tagged top of stage #2 at 2941'. Pressured up on casing to 503 psi, had no bleed-off of pressure in 15 minutes. Installed well head equipment and released rig at 1230 hours. Mud was left in the hole.

GB 10-36
Log Index Sheet

Page 2

<u>Type Log</u>	<u>Date</u>	<u>Run No.</u>	<u>Log Depth</u>	<u>Drillers Depth</u>	<u>Interval Logged</u>
Cas. Insp.	10-14-67	1	4165'	4170'	50' - 4150'
NCTL	10-15-67	1	3880'	3880'	0' - 3880'
NCTL	10-15-67	2	3880'	3880'	2000' - 3880'
3-D Bond	10-15-67	1	3850'	3880'	0' - 3572'

GB 10-36
 Sperry-Sun Gyroscopic Multishot Survey
332-SU3-003 In-Run

Page 3

This survey was run inside 5-1/2" O.D. casing on a Birdwell wireline.

<u>MD</u>	<u>TVD</u>	<u>Latitude</u>	<u>Departure</u>
0'	0'	0'	0'
100'	100.00'	0.19' N	- 0.38' E
200'	200.00'	0.34' N	0.95' E
300'	300.00'	0.30' N	1.46' E
400'	399.99'	0.25' N	1.93' E
500'	499.93'	0.18' N	2.55' E
600'	599.99'	0.26' N	3.46' E
700'	699.98'	0.35' N	4.47' E
800'	799.93'	0.35' N	5.63' E
900'	899.96'	0.48' N	7.18' E
1000'	999.95'	0.64' N	8.72' E
1100'	1099.94'	0.80' N	10.17' E
1200'	1199.93'	0.97' N	11.41' E
1300'	1299.93'	0.82' N	12.65' E
1400'	1399.92'	0.80' N	13.35' E
1500'	1499.92'	1.43' N	13.73' E
1600'	1599.92'	2.15' N	13.91' E
1700'	1699.92'	2.46' N	14.10' E
1800'	1799.91'	2.74' N	14.47' E
1900'	1899.91'	2.81' N	15.02' E
2030'	1999.91'	2.93' N	15.78' E
2100'	2099.91'	3.18' N	16.67' E
2200'	2199.90'	3.31' N	18.09' E
2300'	2299.88'	3.27' N	19.56' E
2400'	2399.88'	3.03' N	20.89' E
2500'	2499.86'	2.75' N	22.45' E
2600'	2599.84'	1.36' N	24.30' E
2700'	2699.82'	1.16' N	26.25' E
2800'	2799.80'	0.35' N	22.06' E
2900'	2899.78'	0.35' S	29.93' E
3030'	2999.76'	0.40' S	31.37' E
3100'	3039.74'	0.74' S	33.61' E
3203'	3199.73'	1.48' S	35.02' E
3300'	3299.72'	2.00' S	36.44' E
3400'	3390.70'	3.79' S	37.84' E
3500'	3499.68'	5.29' S	39.14' E
3500'	3599.66'	6.62' S	40.25' E
3700'	3699.65'	7.61' S	41.41' E
3800'	3793.64'	8.36' S	42.79' E
3880'	3879.62'	8.89' S	44.31' S

CE 10-36
Review of Hole Conditions

Stemming Operations

Operations started 10-13-67

Operations completed 10-17-67

Casing Record

9-5/8" O.D. at 124'
5-1/2" O.D. at 4200'

Perforation Record

4046' - 4166'
3901' - 4012'
120'

- I, Prior to stemming operations, this hole had been drilled and cased by others.
- II. This hole was plugged back with sand from 4170' up to 3887'. A bridge plug was set at 3880' and plugged back to 2941' with 152 ft³ of cement slurry. The 9-5/8" x 5-1/2" casing annulus was perforated and cemented to surface from 120' with 56 ft³ of cement slurry. The hole was cleaned out to 2941' and filled with mud.