RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

Rec'd 10-13-16 DOGGR Ventura.

HISTORY OF OIL OR GAS WELL

Operator Southern California Gas Company Field Aliso Canyon County Los Angeles
Well Mission Adrian 1 B Sec 34 T 3N R 16W S.B.B.M.
A.P.I. No. 03721892 Name Tom McMahon (Person submitting report) Title SIMP Project Manager (President, Secretary, or Agent)
Date 9/27/2016 (Month, day, year)
Signature Thomas A McMahon
Address PO Box 2300, SC9365, Chatsworth, CA, 91313-2300 Telephone Number 714-398-5020

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment, with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests, and initial production data.

Daily Operation Period: 6/7/2016 - 6/7/2016

Operations this Report Period (DOGGR)

MIRU Slickline. RIH with 2.30" gauge ring to No-Go Seating Nipple at 7149'
RIH and set 2.31" plug body in No-Go Seating Nipple at 7149'
RIH and set prong in plug body at 7149'
RIH with shifting and open sliding sleeve at 7115'

Daily Operation Period: 6/14/2016 - 6/15/2016

Operations this Report Period (DOGGR)

Held safety meeting. Rigged down kill equipment from FF-35D and moved to MA-1B. Rigged up Onyx flow test gas separator with choke to well. Spotted and rigged up Pacific Petroleum canister equipment. Spotted and rigged up Haliburton pump truck to well & kill tank.
Request OPS to open withdraw line valve. Open tubing and pump 41 bbls, 8.5 ppg, 27 vis, 3% KCL kill fluid with packer fluid and displaced tubing to sliding sleeve @ 7115' (plug set in profile nipple above packer @ 7149'. Killed well as per schedule, pumping a total of 187 bbls into the annulus @ 6.0 bpm while returning to SCG withdraw line. Had returns before going to canister. Establish circulation down tubing and up casing with 88 bbls to kill tank. Pumped a total of 316 bbls to kill well. Closed in well. Rigged down kill equipment.

Daily Operation Period: 7/6/2016 - 7/6/2016

Operations this Report Period (DOGGR)

MIRU 5000 psi test truck and iron to tubing wing valve. RU choke manifold to casing wing valve. RU vac truck to manifold and carbon canisters to vac truck.
Opened casing valve and topped off well with fluid by slowly pumping down tubing. With DOGGR representative on location, shut-in casing and pressured-up tubing to 1100 psi.
Tested packer, tubing plug and casing for 1 hour. Test recorded digitally and with circle-chart. Test witnessed approved by DOGGR. Bled down pressure, shut-in well, RDMO

Daily Operation Period: 9/12/2016 - 9/12/2016

Operations this Report Period (DOGGR)

MIRU 5000 psi test truck and iron to tubing wing valve. RU choke manifold to casing wing valve. RU vac truck to manifold and carbon canisters to vac truck.
Rigged up to inner string x production casing annulus. With DOGGR representative on location, shut-in casing and pressured-up tubing to 638 psi.
Tested 1 hour. Test recorded digitally and with circle-chart. Test witnessed approved by DOGGR. Bled down pressure, shut-in well, RDMO

State of California • Natural Resources Agency
Department of Conservation
Division of Oil, Gas, and Geothermal Resources
801 K Street • MS 18-05
Sacramento, CA 95814
(916) 445-9686 • FAX (916) 319-9533

Edmund G. Brown Jr., *Governor*
Kenneth A. Harris Jr., *State Oil and Gas Supervisor*

January 3, 2017

SENT VIA EMAIL

Mr. Rodger Schwecke
Vice President
Transmission and Storage
Southern California Gas Company
RSchwecke@semprautilities.com

FINDING THAT WELL MISSION ADRIAN 1B (API NO. 03721892) HAS PASSED THE FIRST BATTERY OF TESTS AND WAS TAKEN OUT OF SERVICE AND ISOLATED FROM THE UNDERGROUND GAS STORAGE RESERVOIR

Dear Mr. Schwecke:

I am writing regarding the safety review results of one of the 114 wells at the Aliso Canyon gas storage facility (Facility). Each of the wells are subject to the comprehensive safety review that State Oil and Gas Supervisor Order 1109 and SB 380[1] require to be completed before the Division of Oil, Gas, and Geothermal Resources (Division) may authorize resumption of injection operations at the Facility. Order 1109 describes two batteries of well tests. To complete the review, each well must (1) pass both batteries of tests, (2) pass the first battery of tests and be taken out of service and isolated from the underground gas storage reservoir, or (3) be properly plugged and abandoned.

The first battery of tests assesses the casing using temperature and noise logs to ensure that there is no migration of fluids near the wellbore. If a well passes those tests, it may (1) undergo the second battery of tests for potential approval to use for injection if and when injections may resume, or (2) be taken out of service and isolated from the underground gas storage reservoir as specified in Steps 4b through 7b of the Safety Review Testing Regime of Order 1109 (Testing Regime). The Division posts the current status and testing results for each of the 114 wells on its website at http://www.conservation.ca.gov/dog/AlisoCanyon/Pages/Well-Detail.aspx.

After receiving and evaluating all test results and other data concerning the well, I find for purposes of Order 1109 and SB 380, that well Mission Adrian 1B (API No. 03721892) has completed the first battery of the Testing Regime and was taken out of service and, on October 5, 2016, the well was isolated from the underground gas storage reservoir as specified in Step 6b of the Testing Regime. Monitoring and testing of the well must continue as required by Order 1109 and any applicable law. If the well does not pass the second battery of tests within one year of being isolated from the reservoir, then the well must be plugged and abandoned in accordance with Public Resources Code section 3208.

Sincerely,

Kenneth A. Harris Jr.,
State Oil and Gas Supervisor

[1] Senate Bill 380 (Pavley, Chapter 14, Statutes of 2016) codified in part at Public Resources Code section 3217.

JRAL RESOURCES AGENCY OF CALIFORN
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
1000 S. Hill Rd, Suite 116 Ventura, CA 93003-4458
Phone:(805) 654-4761 Fax:(805) 654-4765

No. T **216-0514**

REPORT ON OPERATIONS

GAS STORAGE PROJECT
"Sesnon-Frew" - Modelo (Miocene-Eocene) Formation

Roberto (Bob) Dentici
Southern California Gas Company (S4700)
555 West 5th Street, ML 17G4
Los Angeles, CA 90013

Ventura, California
October 31, 2016

Your operations at well **"Mission Adrian" 1B**, A.P.I. No. **037-21892**, Sec. **34**, T. **03N**, R. **16W**, **SB** B.&M., **Aliso Canyon** field, in **Los Angeles** County, were witnessed on **10/4/2016**, by **Randall Morlan**, a representative of the supervisor.

The operations were performed for the purpose of **determining casing integrity**.

DECISION:

APPROVED

RM/TKC

Kenneth A. Harris Jr.
State Oil and Gas Supervisor

By Robert S Abel
Patricia A. Abel, *District Deputy*

KG106.

State of California
Department of Conservation
Division of Oil, Gas, and Geothermal Resources

No. T 216-0514
#16,1

INTERNAL MECHANICAL INTEGRITY TEST (MIT)
(Standard Annulus Pressure Test-SAPT)

Operator: Southern California Gas Co.					Well: "Mission Adrian" 1-B
Sec. 34	T. 03N	R. 16W	B.&M. SB	API No.: 037-21892	Field: Aliso Canyon
County: Los Angeles					Witnessed/Reviewed on: 10/4/2016

Randall Morlan , representative of the supervisor, was present from 1030 to 1200

Also present were: Jake Zachary

Casing record of the well:

The Internal MIT was performed for the purpose of pressure testing the 8-5/8" x 6-5/8" casing annulus.

☒ The Internal MIT is approved since it indicates that the 8-5/8" x 6-5/8" casing has mechanical integrity above 7123 ' at this time.

☐ The Internal MIT is not approved due to the following reasons: (specify)

INDICATE WHERE PACKER WAS SET AND HOW LONG PRESSURE WAS HELD ALONG WITH ANY BLEEDOFF DATA.

Start time: 10:58
Start pressure: 604 psi
End Time: 11:58
End pressure: 585 psi

6-5/8" ld @ 7123'

DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

CHECK LIST-RECORDS RECEIVED AND WELL STATUS

Operator: **Southern California Gas Company** WELL DESIGNATION **"Mission Adrian" 1B**

API No. **03721892** SE **34** T: **3N** R.: **16W** , **SB** B. and M.

County: **Los Angeles** FIELD: **Aliso Canyon**

Type of Notice: **Rework** **Date** **10/3/2016** **Report Number:** **P216-0250**

RECORDS RECEIVED (ATTACH PAGES IF REQUIRED)

	Date	OK	NEED	Remarks
Well Summary (OG100)				
History (OG103)				
E-Log				
Mud Log				
Dipmeter				
Directional				
Core and/or SWS				

NEW STATUS

DATE: _____

NOTICE OF RECORDS DUE

DATE: _____

DATE: _____

DATE: _____

DATE: _____

WELL STATUS INQUIRY

DATE: _____

DATE: _____

Well Stat

Change Required: _____

Change Done: _____

ABANDONMENTS/REABANDONMENTS/DRILLS/REDRILLS

CalWims Abandonment Form: _____ SURFACE INSPECTION NEEDED _____ COMPLETED _____
Date and Inspector

FINAL LETTER NEEDED _____ COMPLETED _____ Calwims DRILL/REDRILL Form _____
(Date)

ENGINEER'S CHECK LIST

T-REPORT(S) _____ OPERATOR'S NAME _____ WELL DESIGNATION _____ SIGNATURE _____

Calwims Location _____ Calwims ELEVATION: _____ CONFIDENTIAL RELEASE DATE: _____ PERMIT REQUIREMENTS MET _____

CLERICAL CHECK LIST

LOCATION CHANGE (OG165) _____ ELEVATION CHANGE (OG165) _____ RELEASE OF BOND (OG150) _____

REMARKS

RECORDS SCANNED: _____
(Date)

RECORDS APPROVED: _____
(Date and Engineer)

Modflied OGD2

AOR Datbase _____

RAL RESOURCES AGENCY OF CALIFORN
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
1000 S. Hill Rd, Suite 116 Ventura, CA 93003 - 4458

No. P 216-0250

Old	New
010	010
FIELD CODE	
00	00
AREA CODE	
30	30
POOL CODE	

PERMIT TO CONDUCT WELL OPERATIONS

Gas Storage
"Sesnon-Frew" - Modelo (Miocene-Eocene) Formation

Ventura, California
October 06, 2016

Amy Kitson, Agent
Southern California Gas Company (S4700)
12801 Tampa Ave., SC9382
Northridge, CA 91326

Your proposal to **Rework** well **"Mission Adrian" 1B**, A.P.I. No. **037-21892**, Section **34**, T. **03N**, R. **16W**, **SB** B. & M., **Aliso Canyon** field, **Any** area, **Sesnon-Frew** pool, **Los Angeles** County, dated **10/3/2016**, received **10/3/2016** has been examined in conjunction with records filed in this office. (Lat: **34.304936** Long: **-118.542763** Datum:**83**)

THE PROPOSAL IS APPROVED PROVIDED:

1. Blowout prevention equipment, as defined by this Division's publication No. M07, shall be installed and maintained in operating condition and meet the following minimum requirements:
   a. Class **III 5M** on the **8 5/8"** casing.
2. Hole fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
3. Blowout prevention practice drills are conducted at least weekly and recorded on the tour sheet. A practice drill may be required at the time of the test/inspection.
4. Prior to installing the proposed 6 5/8" inner casing, the 8 5/8" production casing shall have a sufficient quantity of cement squeezed into the 8 5/8" x 12 1/4" annulus so that all hydrocarbon and fresh water bearing zones are isolated.
5. The **6 5/8"** casing is cemented with sufficient cement to fill behind the casing from the shoe to the surface.
6. **A Casing Wall Thickness Inspection, Cement Bond Log, and a Multi-Arm Caliper Inspection** shall be performed to demonstrate that the **6 5/8"**casing has integrity.
7. Prior to commencing injection, a pressure test is conducted to demonstrate the mechanical integrity of the **6 5/8"** casing.
8. A **Temperature and Noise Log** are run on the well within three months after injection has commenced.
9. Injection shall be through tubing and packer only. Injection or withdrawal through the casing is not permitted.
10. This office shall be contacted by phone prior to making any program changes and no changes are made without Division approval.
11. **THIS DIVISION SHALL BE NOTIFIED TO:**
    a. Inspect the installed blowout prevention equipment prior to commencing **downhole** operations.
    b. Review the proposed cement evaluation log of the **8 5/8" casing** prior to squeeze cementing.

Continued on Next Page

Kenneth A. Harris Jr.
State Oil and Gas Supervisor

Blanket Bond Dated: 7/6/1999
UIC Project No. 0100006

Engineer Kris Gustafson
Office (805) 654-4761

By pp. [signature]
Patricia A. Abel, *District Deputy*

KG/kg

A copy of this permit and the proposal must be posted at the well site prior to commencing operations. Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended. Issuance of this permit does not affect the Operator's responsibility to comply with other applicable state, federal, and local laws, regulations, and ordinances.

OG111 (revised 6/2011)

c. Witness a pressure test of the **6 5/8"** casing prior to commencing injection.
d. Witness a mechanical integrity test within three months of injection commencing.

NOTE:

1. The base of the freshwater zone is at **800'±.**
2. No operation shall be undertaken or continued that will contaminate or otherwise damage the environment.
3. This permit is being issued as part of Division Order No. 1109 dated March 4, 2016. Any well that fails any of the testing must be taken out of service and isolated from the storage reservoir pursuant to the Safety Review Testing Regime.
4. The required History of Oil or Gas Well (OG103) shall include a complete description of the required pressure testing. **An updated casing and tubing diagram shall be included with the well history.**
5. **A Well Summary Report (Form OG 100)** and **Well History (Form OG 103)** shall to be submitted to the Division within 60 days after the well is drilled, reworked, plugged and abandoned, or if the work is suspended. Any additional well work will require an additional notice to be submitted to this office prior to resuming well operations.

Enclosure: **Attachment 1 to DOGGR Order 1109. Safety Review Testing Regime for the Aliso Canyon Natural Gas Storage Facility**

ATTACHMENT 1
TO DOGGR ORDER 1109

SAFETY REVIEW TESTING REGIME
FOR THE ALISO CANYON NATURAL GAS STORAGE FACILITY

This document identifies the requirements of this comprehensive safety review that shall be completed by the Southern California Gas Company (Operator) and verified by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division). The Operator shall use accepted industry practices and procedures.

The Division has consulted with independent technical experts from the Lawrence Berkeley, Lawrence Livermore, and Sandia National Laboratories ("National Laboratories") to develop the requirements of this facility safety review. The National Laboratories experts independently reviewed and concurred with the testing requirements for the safety review detailed below.

This comprehensive safety review requires that each of the active injection wells in the Aliso Canyon Storage facility either pass a thorough battery of tests in order to resume gas injection or be taken out of operation and isolated from the underground gas storage reservoir. Several steps, detailed below, are required in this safety review. Documentation of all testing required under this comprehensive safety review shall be provided electronically to the Division within 72 hours of completion of a test in digital (i.e. LAS) and printed (i.e. pdf) form. All pressure tests required under this comprehensive safety review shall be witnessed by Division staff. A well that is properly plugged and abandoned in accordance with Public Resources Code section 3208 is not subject to testing under this comprehensive safety review. A well that does not pass all tests must be repaired, retested, and pass all tests, or be plug and abandoned.

REQUIRED TESTS FOR EACH WELL IN THE FACILITY

Step 1: The Operator shall perform an initial casing assessment on the well consisting of temperature and noise logs.

a. Temperature Log:
A temperature survey shall be run from the surface to the packer to measure the temperature within the wellbore. A temperature survey that demonstrates no unexplained anomalous temperature changes in the well is one indication of casing integrity.

b. Noise Log:
An acoustic sensor survey capable of detecting the sound of fluid flow will be conducted the length of the well above the packer to the surface. The survey will include stops at least every 250 feet and at the midpoint of any anomaly detected by the temperature survey. The absence of anomalous sound above the packer is an indication of well integrity

Step 2: The results of the Temperature Logs and Noise Logs will be independently reviewed by Division engineers. Any unexplained abnormal findings in this set of tests shall be addressed by the Operator in one of the following ways:

a. Conduct further investigation and demonstrate to the Division's satisfaction that the abnormal finding is not an indicator of a lack mechanical integrity;
b. Remediate the well to the Division's satisfaction; or
c. With Division review and approval, remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

Necessary actions to remediate any abnormalities revealed by these tests will be reviewed by Division engineers. Once repairs or mitigations are completed, the Temperature Log and Noise Log must then be repeated on the well and reviewed by Division engineers to ensure that there are no additional abnormal test results and to confirm the issue was repaired.

Step 3: After these tests are completed on the well, and all required action has been completed, the operator shall either:

a. Conduct the additional tests and evaluations on the well, outlined in Steps 4a through 7a below, in order to gain approval for injecting gas through that well; or
b. Remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

REQUIRED TESTS IF A WELL IS INTENDED TO RESUME OPERATIONS

If Temperature and Noise Logs have been completed on a well and they indicate well integrity, and the Operator designates the well to return to injection operations, then the Operator shall perform the additional testing outlined in Steps 4a through 7a. The results of these tests will be independently reviewed by Division engineers and posted publicly. Each of the following tests requires that the production tubing be removed from the well.

Step 4a: The Operator shall conduct a **Casing Inspection log.**
The Operator shall conduct a Casing Inspection log of the well that measures the thickness of the production casing, from the surface to the bottom of the gas storage reservoir cap rock. If the inspection reveals a reduction in wall thickness, the current minimum strength of the casing will be calculated. If the current minimum strength of the casing has diminished to the point that it cannot withstand authorized operating pressures for the well plus a built-in additional safety factor of pressure, the well has failed this test. *A passing test for a casing inspection log would show no thinning of the casing that diminishes the casing's ability to contain at least 115% of the well's maximum allowable operating pressure as authorized in the current Project Approval Letter.*

Step 5a: The Operator shall conduct a **Cement Bond Log** for the well.
The Operator shall conduct a Cement Bond Log (CBL) that measures the bonding between cement and the production casing of the well, and also the bonding between the annular cement and the formation. Cement should be solidly bonded to both the well's production casing and the geologic formation to ensure a seal that prevents fluids from migrating up or down the outside of the well. *A passing test for a cement bond log shows definitive bond, as demonstrated by sonic waveform,*

between cement and casing and between cement and the gas storage formation and/or cap rock for at least 100 feet above the top of the gas storage reservoir.

Step 6a: The Operator shall conduct a **Multi-Arm Caliper Inspection** of the well.
The operator shall conduct an inspection that measures any internal degradation or significant changes to the well's geometry from the surface to the top of the gas storage reservoir, using a minimum 32-arm caliper tool. If the inspection reveals a thinning or deformity of the casing, the current strength of the casing will be calculated. If the current strength of the casing has diminished, such that it cannot withstand authorized operating pressures plus a built-in safety factor of additional pressure, the well fails this inspection. *A passing test for a Multi-Arm Caliper Inspection would show no deformation or thinning of the casing that diminishes the casing from being able to properly contain at least 115% of each well's maximum operating pressure.*

Step 7a: The Operator will conduct a **Pressure Test** of the production casing and of the well once the production tubing has been reinstalled. The Operator may conduct the casing pressure test prior to reinstalling the production tubing. Using a digital recorder, the operator will conduct a liquid-filled positive pressure test within the production tubing of the well, and in the annular space between the production tubing and the casing, to determine the well's ability to withstand normal operating pressures. The production tubing will be isolated and then pressure tested. The annular space between tubing and casing will be pressure tested. This testing also evaluates the integrity of any packers, which seal the annular space between the tubing and casing. The pressure test will be one hour and begin at a pressure of 115% of the maximum operating pressure or the minimum yield strength of the casing and tubing, whichever is less. *A passing pressure test is a pressure loss not exceeding 10% for any 30 minute period during the hour long test.*

After conducting the above tests, the Operator will conduct any indicated remediation so that the well can pass these tests. All remediation will be subject to the review of Division engineers. The well would then be required to undergo the tests once again to demonstrate well integrity.

If the well passes the Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper inspection and the Pressure Test to the Division's satisfaction, then the Division may clear the well for use for gas injections and withdrawal, once the Division has authorized resumption of injection into the gas storage reservoir. As noted below, wells approved for operation will only be permitted to inject or withdraw gas through the production tubing.

REQUIRED ACTIONS IF THE WELL IS TO BE TAKEN OUT OF OPERATION AND ISOLATED FROM THE GAS STORAGE RESERVOIR:

If the operator elects to take a well out of service, then the following steps shall be taken to isolate the well from the gas storage reservoir:

Step 4b: The Operator shall confirm the presence of cement outside the well's external casing in the section of the well that prevents the movement of gas from the underground gas storage reservoir to shallower geologic zones above the gas storage reservoir. Existing cement bond logs and well construction

records may be used to make this confirmation. This confirmation requires concurrence from Division engineers.

Step 5b: The Operator shall install a mechanical seal or "packer" within the well's production casing and install a mechanical plug within the well's production tubing, if applicable. These seals shall be set in place near the bottom of the well, within the portion of the well surrounded by cement. This kind of seal is an industry standard practice for isolating a well from reservoir gases or fluids and will further protect the casing from internal gas pressure.

Step 6b: The Operator shall fill the well with fluid to the well's surface in order to create appropriate downward hydrostatic pressure in the well that further contributes to the integrity of the well seal.

These measures will isolate a well from the underground gas reservoir, as confirmed by National Laboratory experts. Each of the above actions is subject to review and approval by Division Engineers.

Step 7b: Once the Operator has completed steps 4b, 5b, and 6b, and the seal is in place at the bottom of the well and the well is filled with fluid above the seal, the operator shall:

a. Conduct daily gas monitoring at the surface of the non-operational well, including monitoring the area around the well perimeter and in the annular space between the plugged casing string and the outmost casing;
b. Conduct noise log, temperature log and positive pressure test every six months;
c. Conduct weekly monitoring of fluid levels in the well or, install and operate real-time pressure monitors that provide immediate notification to the operator when pressures deviate from normal in the well's interior tubing and its annular space.

The above monitoring shall be reported to Division engineers and maintained as a part of the well file. Division engineers will review all submitted information for evaluation on a regular basis to ensure that the well taken out of service has maintained safety, and the operator shall take all necessary steps maintain the safety of the well.

Any well taken out of operation cannot be approved to resume operations and gas injection until the successful completion of the battery of tests outlined above in Steps 4a through 7a (Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper Extension and the Pressure Test) is completed. Those tests must be successfully completed within one year of completing step 6b. If a well cannot successfully complete all necessary steps required in this safety review after one year of completing step 6b, then the well shall be properly plugged and abandoned in accordance with Public Resources Code section 3208.

REQUIREMENTS FOR WELLS RESUMING OPERATIONS IN ALISO CANYON

The Division's authorization to resume injection in the Aliso Canyon Storage Facility will be contingent on the successful completion of this comprehensive safety review. The State Oil and Gas Supervisor must confirm in writing that all wells in the facility have either completed and passed the full battery of tests required in the safety review, been taken out of service and isolated from the underground gas storage reservoir, or been properly plugged and abandoned in accordance with Public Resources Code Section 3208.

NATURAL RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

Rec'd 10-03-16 DOGGR Ventura.

FOR DIVISION USE ONLY			
	Forms		
Bond	~~OGD114~~	OG121	
	CAL WIMS	115	

P216-0250

NOTICE OF INTENTION TO REWORK / REDRILL WELL

Detailed instructions can be found at: www.conservation.ca.gov/dog/

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to

rework ☒ / redrill ☐ (Check one) well MA 1B, API No. 037-21892,

Sec. 34, T. 3N, R. 16W, S.B. B&M, Aliso Canyon Field, Los Angeles County.

The complete casing record of the well (present hole), including plugs and perforations, is as follows: (Attach wellbore schematics diagram also.)

See attached wellbore schematic

The total depth is: 7511 feet. The effective depth is: 7511 feet.

Present completion zone(s): S1, S4, (Name). Anticipated completion zone(s): Same (Name).

Present zone pressure: Storage psi. Anticipated/existing new zone pressure: Storage psi.

Is this a critical well as defined in the California Code of Regulations, Title 14, Section 1720(a) (see next page)? Yes☐ No☒

For redrilling or deepening only, is a California Environmental Quality Act (CEQA) document required by a local agency? Yes☐ No☒ If yes, see next page.

The proposed work is as follows: (A complete program is preferred and may be attached.)

See attached program

If well is to be redrilled or deepened, show proposed coordinates (from surface location) and true vertical depth at total depth: _____ feet _____ (Direction) and _____ feet _____ (Direction) Estimated true vertical depth: _____

Will the Field and/or Area change? Yes☐ No☒ If yes, specify New Field: _____ New Area: _____

The Division must be notified immediately of changes to the proposed operations. Failure to provide a true and accurate representation of the well and proposed operations may cause rescission of the permit.

Name of Operator			
Southern California Gas Company			
Address: P. O. Box 2300		City/State: Chatsworth	Zip Code: 91313-2300
Name of Person Filing Notice: Ella Lein	Telephone Number: 818-700-3676	Signature: Ella Lein	Date: 10/03/16
Individual to contact for technical questions: Ella Lein	Telephone Number: 818-700-3676	E-Mail Address: elein@semprautilities.com	

This notice and an indemnity or cash bond must be filed, and approval given, before the workover begins. (See the reverse side for bonding information.) If operations have not commenced within one year of the Division's receipt of the notice, this notice will be considered cancelled.

INFORMATION FOR COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT OF 1970 (CEQA)

If an environmental document has been prepared by the lead agency, submit a copy of the ***Notice of Determination*** or ***Notice of Exemption*** with this notice. Please note that a CEQA determination by a local jurisdiction, if required, must be complete, or the Division may not issue a permit.

CRITICAL WELL DEFINITION

As defined in the California Code of Regulations, Title 14, Section 1720 (a), "Critical well" means a well within:

(1) 300 feet of the following:
  (A) Any building intended for human occupancy that is not necessary to the operation of the well; or
  (B) Any airport runway.
(2) 100 feet of the following:
  (A) Any dedicated public street, highway or the nearest rail of an operating railway that is in general use;
  (B) Any navigable body of water or watercourse perennially covered by water;
  (C) Any public recreational facility such as a golf course, amusement park, picnic ground, campground or any other area of periodic high-density population; or
  (D) Any officially recognized wildlife preserve.

WELL OPERATIONS REQUIRING BONDING

1. Drilling, redrilling, or deepening any well.
2. Milling out or removing a casing or liner.
3. Running and cementing casing or tubing.
4. Running and cementing liners and inner liners.
5. Perforating casing in a previously unperforated interval for production, injection, testing, observation, or cementing purposes.
6. Drilling out any type of permanent plug.
7. Reentering an abandoned well having no bond.

This form may be printed from the DOGGR website at www.conservation.ca.gov/dog/

Rec'd 10-03-16 DOGGR Ventura.

Well
Mission Adrian 1B

API #: 04-037-21892-01
Sec 34, T3N, R16W

Current Well Configuration

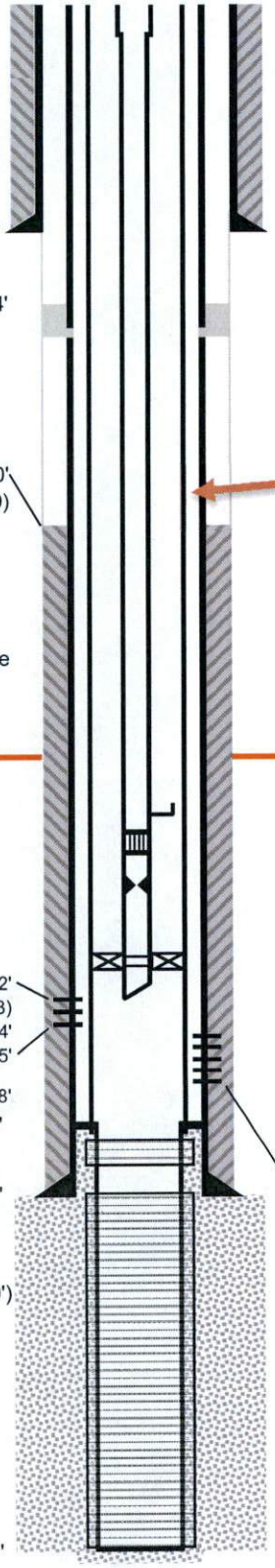
Operator: So. California Gas Co.

Lease: Mission Adrian
Field: Aliso Canyon
Status: Idle Gas Storage
BFW:
USDW:

Ground Elevation: 1725' asl
Datum to Ground: 21' KB

Spud Date: 6/30/1979
Sidetrack Kick-off Date: 9/27/1979
Completion Date: 7/15/1980
Last Rework Date: 2/18/1983

Junk: None



13-3/8" ETOC Surface

17-1/2" Hole

Surface Casing
13-3/8", 54.5#, K-55
0' - 1014'

CMT'D w/ 1030 CF 1014'

8-5/8" ETOC (after 1st SQZ*) 1464'

8-5/8" TOC 3700'
(per Welex Bond Log 8/12/1979)

Inner CSG
6-5/8", 24#, N-80 (2/15/1983)
0' - 7218'

12-1/4" Hole

Production Casing
8-5/8"
0' - 57'± 40#, N-80 (6/21/1980)
57'± - 180' 36#, N-80 (6/21/1980)
180' - 5323' 36#, N-80
5323' - 7347' 40#, N-80

CMT'D w/ 1853 CF

(8) 1/2" Holes 7191' - 7192'
(67 CF + 39 CF CMT SQZ'D Away, 2/5/1983)
(8) 1/2" Holes, 1/14/1983*** 7193' - 7194'
(8) 1/2" Holes, 1/13/1983*** 7195'

Baker Large Bore Model "D" PCKR 7213' - 7218'
7233'

7347'

15" Hole (7347' - 7510')

Liner
5-1/2", 20#, K-55
7233' - 7511'

7511'

22' 3-1/2" x 2-7/8" X-Over

Tubing (2/18/1983)
3-1/2", 6.5#, J-55
0' - 22'
2-7/8", 6.5#
22' - 31' J-55
31' - 216' N-80
216' - 7191' J-55

1594' - 1596' 8-5/8" CSG Leak
(*62 CF CMT SQZ'D Away, 10/12/1979
+ SQZ'D 7x's more w/ a total of 395 CF,
10/13 - 10/18/1979 CMT SQZ'D Away)**

New Inner string installed to top of liner and cemented to

8 5/8" logged with USIT/CBL and evaluated for cement across critical zones. Squeeze if required.

7028' Top of MP

7071' Otis GLM
7115' Otis Sliding Sleeve

7150' Otis No-Go Nipple

7182' Baker Latch-In-Locator
7182' Baker PCKR w/ 4 Seals (2/18/83)

7191' Tail

7203' - 7204' Four (4) 1/2" Holes WSO (8/22/1979)***
7204' - 7205' Four (4) 1/2" Holes (115 CF + 100 CF CMT SQZ'D Away, 8/13/1979)***
7205' - 7206' Four (4) 1/2" Holes (57 CF CMT SQZ'D, 8/17/1979)***
7206' - 7207' Four (4) 1/2" Holes (57 CF CMT SQZ'D, 8/18/1979)***
7207' - 7208' Four (4) 1/2" Holes (38 CF CMT SQZ'D Away, 8/20/1979)***

7400' Sidetrack KOP (from OH) into this wellbore (See History)

Liner Perfs:
7240' - 7280', 7343' - 7510'
10 Mesh WWS

Gravel Packed w/
243 CF 20-40

(7510' - 7512') 7-5/8" Hole

Wellbore History

Orig. Hole (OH) TD @ 7716'
(See Mission Adrian 1B OH)
RD KOP @ 7400'
TD @ 7512'

Notes

**Operations were suspended on 10/20/1979 until SQZ'D again 3X's more w/ a total of 300 SKS CMT, 6/27 - 6/30/1980 (received circulation between 8-5/8" x 13-3/8" annulus during first of three SQZ's), leak @ 1594' - 1596' SQZ'D Again w/ 44 CF CMT SQZ'D Away, 1/13/1982.

***15 CF CMT SQZ'D Away thru shot holes, 1/17/1983.

Hole sizes based on drill bit O.D.

Top of Zone Markers	md	(tvd)
A1	4130'	(4058')
UP	5153'	(4990')
LP	5560'	(5365')
UDA1	6075'	(5839')
LDA	6728'	(6438')
MP	7028'	(6718')
S1	7263'	(6938')
S4	7344'	(7014')

TMD 7512'
TVD (Unknown, survey not run below KOP @ 7400')
Directionally Drilled: Yes (7400' MD is ±27' E, ±1623' N of Surf, ±7066' TVD)

Prepared by: CAM (8/16/2016)
Updated by: LD (9/6/2016)

Rec'd 10-03-16 DOGGR Ventura.

Well
Mission Adrian 1B

API #: 04-037-21892-01
Sec 34, T3N, R16W

Current Well Configuration

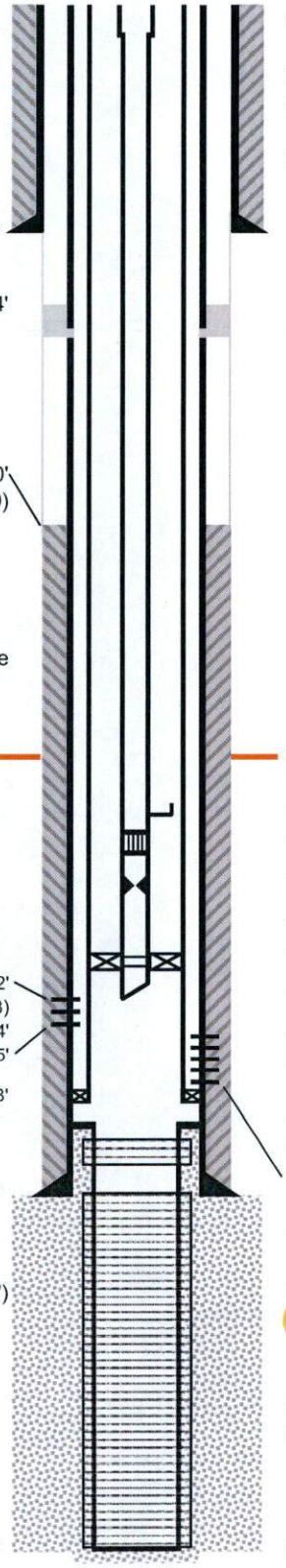
Operator: So. California Gas Co.

Lease: Mission Adrian
Field: Aliso Canyon
Status: Idle Gas Storage
BFW:
USDW:

Ground Elevation: 1725' asl
Datum to Ground: 21' KB

Spud Date: 6/30/1979
Sidetrack Kick-off Date: 9/27/1979
Completion Date: 7/15/1980
Last Rework Date: 2/18/1983

Junk: None



13-3/8" ETOC Surface

17-1/2" Hole

Surface Casing
13-3/8", 54.5#, K-55
0' - 1014'

CMT'D w/ 1030 CF 1014'

8-5/8" ETOC (after 1st SQZ*) 1464'

8-5/8" TOC 3700'
(per Welex Bond Log 8/12/1979)

Inner CSG
6-5/8", 24#, N-80 (2/15/1983)
0' - 7218'

12-1/4" Hole

Production Casing
8-5/8"
0' - 57'± 40#, N-80 (6/21/1980)
57'± - 180' 36#, N-80 (6/21/1980)
180' - 5323' 36#, N-80
5323' - 7347' 40#, N-80

CMT'D w/ 1853 CF

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(67 CF + 39 CF CMT SQZ'D Away, 2/5/1983)
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Baker Large Bore Model "D" PCKR 7213' - 7218'

7233'

7347'

15" Hole (7347' - 7510')

Liner
5-1/2", 20#, K-55
7233' - 7511'

7511'

22' 3-1/2" x 2-7/8" X-Over

Tubing (2/18/1983)
3-1/2", 6.5#, J-55
0' - 22'
2-7/8", 6.5#
22' - 31' J-55
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216' - 7191' J-55

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+ SQZ'D 7x's more w/ a total of 395 CF,
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7071' Otis GLM
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7204' - 7205' Four (4) 1/2" Holes (115 CF + 100 CF CMT SQZ'D Away, 8/13/1979)***
7205' - 7206' Four (4) 1/2" Holes (57 CF CMT SQZ'D, 8/17/1979)***
7206' - 7207' Four (4) 1/2" Holes (57 CF CMT SQZ'D, 8/18/1979)***
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7240' - 7280', 7343' - 7510'
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Gravel Packed w/
243 CF 20-40

(7510' - 7512') 7-5/8" Hole

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(See Mission Adrian 1B OH)
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TD @ 7512'

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Hole sizes based on drill bit O.D.

Top of Zone Markers	md	(tvd)
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LP	5560'	(5365')
UDA1	6075'	(5839')
LDA	6728'	(6438')
MP	7028'	(6718')
S1	7263'	(6938')
S4	7344'	(7014')

TMD 7512'
TVD (Unknown, survey not run below KOP @ 7400')
Directionally Drilled: Yes (7400' MD is ±27' E, ±1623' N of Surf, ±7066' TVD)

Prepared by: CAM (8/16/2016)
Updated by: LD (9/6/2016)

InterAct

Rec'd 10-03-16 DOGGR Ventura.

SoCal Gas Company

SoCalGas
A Sempra Energy utility

Well Operations Procedure

Mission Adrian 1B

Aliso Canyon

Storage Integrity Management Program
9/27/2016
Version 1

Primary Engineer:	Ella Lein	818 700-3676 (ofc)/661 340-4250 (mobile)
Alternate Engineer:	Brian Vlasko	818 700-3897 (ofc)/714 655-9506 (mobile)
Engineering Supervisor:	Jose Iguaz	818 700-3889 (ofc)/661 384-5337 (mobile)
Well Site Supervisor:	Jeff Mosier	661 706-0672 (mobile)
Well Work Superintendent:	Mike Volkmar	562 685-3810 (mobile)

Objective:

The intent of this program is to inspect the well integrity and remediate identified conditions as part of the Storage Integrity Management Program (SIMP). This project will include pulling 2-7/8" completion string, running casing inspection logs, pressure testing casing and well laterals, installing a new 3 ½" completion string, converting well to tubing flow, and installing pressure monitors. Baseline assessment data will be gathered on vertical casing pipe and other well components.

Well Data:

API #:	04-037-21892-01		
Datum:	1725		
KB to GL:	21'		
MD:	7,512'		
TVD:	unknown/ survey stops at 7400'		
PBMD:	7,511'	**Nature of Plug Back:**	Bottom of Liner

Geologic Markers:

Top of Zone Markers	md (tvd)
A1	4130' (4058')
UP	5153' (4990')
LP	5560' (5365')
UDA1	6075' (5839')
LDA	6728' (6438')
MP	7028' (6718')
S1	7263' (6938')
S4	7344' (7014')

Casing Data:

Surface Casing: 13-3/8", 54.5#, K-55; Cem @ 1014'

Intermediate Casing: 8-5/8" ",
- i. 0' - 57'± 40#, N-80 (6/21/1980)
- ii. 57'± - 180' 36#, N-80 (6/21/1980)
- iii. 180' - 5323' 36#, N-80
- iv. 5323' - 7347' 40#, N-80

Liner: 5-1/2", 20#, K-55; 7233' - 7511'

Tubing Data:
- i. 3-1/2", 6.5#, J-55
- ii. 0' - 22'
- iii. 2-7/8", 6.5#
- iv. 22' - 31' J-55
- v. 31' - 216' N-80
- vi. 216' - 7191' J-55

Wellhead: 5 M

Perforations:

Liner Perfs: 7240' - 7280', 7343' - 7510' 10 Mesh WWS

Current Status: Idle for inspection

Permit Status: Pending

History of the last activity:

- Tested tubing; tbg annulus, and inner string annulus. Passed.
- Tests witnessed by DOGGR
- See the table below for details.

7/6/2016	MIRU 5000 psi test truck and iron to tubing wing valve. RU choke manifold to casing wing valve. RU vac truck to manifold and carbon canisters to vac truck. Opened casing valve and topped off well with fluid by slowly pumping down tubing. With DOGGR representative on location, shut-in casing and pressured-up tubing to 1100 psi. Tested packer, tubing plug and casing for 1 hour. Test recorded digitally and with circle-chart. Test witnessed approved by DOGGR. Bled down pressure, shut-in well, RDMO
9/12/2016	MIRU 5000 psi test truck and iron to tubing wing valve. RU choke manifold to casing wing valve. RU vac truck to manifold and carbon canisters to vac truck. Rigged up to inner string x production casing annulus. With DOGGR representative on location, shut-in casing and pressured-up tubing to 638 psi. Tested 1 hour. Test recorded digitally and with circle-chart. Test witnessed approved by DOGGR. Bled down pressure, shut-in well, RDMO

SoCal Gas Company

SoCalGas
A Sempra Energy utility

Well Operations Procedure

PROJECT NOTES

1. BOPE requirements in Gas Company Standard 224.05 shall be fully implemented at all times.

2. The storage reservoir pressures shall be monitored during the workover with a minimum of 300 psig overbalance for well control fluids.

3. Prepare the location by removing all relevant landscaping/lighting fixtures as well as surface piping and electrical components as needed. Locate rig anchors, reinstall if necessary.

4. DOGGR permit must be posted on site. Notify the DOGGR as required for BOPE testing prior to commencing downhole operations as stated on permit. DOGGR Ventura District office (805)-654-4761. If a permit has not been issued contact DOGGR 24 hours prior to rigging up on the well for verbal approval to rig up.

PRE-RIG WORK

1. De-energize and remove all laterals. Install companion flanges for circulating the well.

2. Complete slickline work as required to set-up well for circulation. – needs to be detailed depending on downhole configuration.

3. Ensure correlation log on file or plan for CCL.

WELLWORK PROGRAM

1. Move in production rig and rig pump with tank, shaker, and mixer.

2. Spot 500 bbl Baker tanks and load with 8.5 ppg KCl brine.

   - Connect pump to the tubing and vent the casing through the choke manifold to the SoCalGas withdrawal system.
   - Treat all brine with Biocide, 5 gals/100 bbls

3. Verify the well is dead. If needed, circulate well with 8.5 ppg KCL brine.
   i. The tubing volume is ~ 42 bbls and
   ii. The tubing/casing annulus is ~ 186 bbls.
   iii. *Use HEC polymer as required to minimize lost circulation.*

4. Install BPV in tubing hanger. ND tree.

   NOTE: Send-in wellhead and tree components for inspection.

5. +++Install Class III 5M BOPE per Gas Company Standard 224.05 and in accordance with the DOGGR permit. All connections and valves must be flanged and at least 5000 psig rated. (*Confirm BOPE rating*)

- All tests are to be charted and witnessed by a DOGGR representative.
- Perform a 300 psig low pressure test on the annular preventer, blind rams and pipe rams for 20 minutes. Test all lines and connections to 300 psig.
- Pressure test the Class III 5M annular preventer to 3500 psig for 20 minutes. Test blind rams and the pipe rams to 5000 psig for 20 minutes. Test all lines and connections to 5000 psig.
- Remove BPV.

6. POOH with production equipment. Lay down packer and production tubing.

   a.) Attempt to unlatch from Baker packer. If not successful plan for a cut ~ @ 7165 (mid joint of 2 7/8" above packer seal) and fish out the rest of the assembly.

   b.) If planning to mill or fish, PU 2-7/8" P110 to be used as work string.

7. Ensure 6-5/8" pipe rams.

8. Unland and spare inner string. MIRU WL and cut in half. POOH with 6 5/8" inner string and lay down.

9. PU 8-5/8" 40# positive ID scraper and RIH to top of liner top @ 7233'. POOH and lay down scraper.

10. RIH with stinger to PBMD @ 7,511' and cleanout if tagged fill. Communicate the tag to engineer.

11. MIRU WL unit to Run Gyro from PBMD to surface. Contact engineer for QC before RDMO WL. Send a copy of the survey file to elein@semprautilities.com.

    - NOTE: we will be using this info to determine the final string configuration and centralizers

12. PU and RIH with RBP and set above liner top @7200. RIH with test packer and pressure test to 500 psi.

13. Sand RBP off.

14. Rig-up wireline unit(s) and run USIT with CBL.

    - **NOTE: holes above 1200'. Keep the wellbore full by pumping fluid on back side while logging.**

    Notify engineer prior to logging. Do not RDMO WL without engineer's approval.

15. **STOP** at this point and wait on log evaluation before proceeding with the next step.

Following the log will perform remediation ensuring cement across all of

the critical hydrocarbon bearing zones and fresh water zone. @ 800'

16. RIH with retrieving tool to top of RBP. Circulate sand out on top of RBP. Latch onto the plug and POOH and lay down.

17. MIRU HES cementing equipment. Assemble Halliburton cementing BHA and RIH with new 6-5/8" inner string and cement in place.

18. Clean out 6-5/8"

19. PU and RIH with 6-5/8" 28# scraper (confirm inner sting specs) through the entire length of the string.

20. Rig-up wireline unit(s) and run:

    a.) Magnetic flux leakage from top of production liner to surface
    b.) Multi-arm caliper log from top of production liner to surface

    Notify engineer prior to logging. Do not RDMO WL without engineer's approval.

21. RIH with 6 5/8" RBP to the bottom of inner string and set COE ~ @ 7210', pressure test to 500 psi for 10 minutes and sand off.

22. Nipple down BOPE, crossover spool, and primary pack-off.

    a.) Send DSA and tubing spool to Vendor for refurbishment.
    b.) Install auxiliary spacer spool and NU BOPE

23. Rig-up wireline unit, install lubricator and run:

    c.) Ultrasonic from top of RBP to surface

    - Notify engineer prior to logging. Do not RDMO WL without engineer's approval.
    - **STOP here** and wait for log evaluation before proceeding with the next step.

24. Ensure equipment integrity (tree, spool, tubing hanger, master valve, wing valves) has been verified before proceeding to the next step.

25. ND BOPE, install tubing spool, reinstall BOPE and test.
    NOTE: VERIFY csg head rating before pressure test (5000 psi or 3000 psi; ensure we are not testing 3000 psi csg head to 5000 psi).

26. **Contact DOGGR to witness pressure test.** Pressure test casing from surface to 3625 psi. Chart for an hour.

		External Casing Backup Pressure			Pressure Test Net Burst Pressure @ Depth	Tubing Leak Net Burst Pressure @ Depth	
Depth (TVD)	85% of Burst Strength	Fluid / Formation Pressure Gradient	External Casing Backup Pressure	Internal Water Hydrostatic	1	Liquid-Filled Annulus	Gas-Filled Annulus
				Surface Test Pressure	3625	3400	3625
				Test Packer Depth	7200		
				Test Down Casing or Tubing	Casing		
				Bridge Plug Depth			
0	7811.50	0.00	0	0	3625	3400	3625
500	7811.50	0.00	0	221	3846	3624	3670
1000	7811.50	0.00	0	442	4067	3847	3716
1500	7811.50	0.00	0	663	4288	4071	3761
2000	7811.50	0.00	0	884	4509	4294	3806
2500	7811.50	0.00	0	1105	4730	4518	3852
3000	7811.50	0.00	0	1326	4951	4741	3897
3531	7811.50	0.00	0	1561	5186	4978	3945
4000	7811.50	0.00	0	1768	5393	5188	3988
4500	7811.50	0.00	0	1989	5614	5412	4033
5000	7811.50	0.00	0	2210	5835	5635	4078
5229	7811.50	0.00	0	2311	5936	5737	4099
6000	7811.50	0.00	0	2652	6277	6082	4169
6830	7811.50	0.00	0	3019	6644	6453	4244
7210	7811.50	0.00	0	3187	-	6623	4278
				0.442		0.447	0.091

27. RIH with retrieving tool on work string circulating while engaging RBP retrieval neck. Open bypass and allow RBP to equalize for 30 mins. Release RBP and allow elastomers to relax for 1 hr. Circulate as required to control well. POOH slowly to minimize swabbing and lay down work string.

28. RIH with new tubing as follows:

RIH with packer assembly (items 1 - 9). RIH with XN plug, set and bundle test packer BHA to 4000psi for 5 mins. Pull XN plug. Continue running 3-1/2" tubing hydro-testing each connection to 4000psi.

1. *~ 1ft - 3-1/2" 9.3# L80 TCPC Wireline re-entry guide*
2. *~ 2ft - 3-1/2" 9.3# L80 TCPC XN Nipple (2.75" Bore w/ 2.635" NoGo)*
3. *~ 10ft - Pup joint 3-1/2" 9.3# L80 TCPC*
4. *~ 8ft - 3-1/2" 9.3# L80 TCPC x 8-5/8" 40# Mechanical Production Packer* ***~ 7,180'***
5. *~ 10ft - Pup joint 3-1/2" 9.3# L80 TCPC*
6. *~ 30ft – 1 Joint 3-1/2" 9.3# L80 TCPC tubing*
7. *~ 2ft - Pup 3-1/2" 9.3# L80 TCPC*
8. *~ 2ft - 3-1/2" 9.3# L80 TCPC (2.813" Open Down) sliding sleeve*
9. *~ 4ft - Pup 3-1/2" 9.3# L80 TCPC*
10. *~ 30ft – 1 Joint 3-1/2" 9.3# L80 TCPC tubing*
11. *~ 2ft - 3-1/2" 9.3# L80 TCPC X Nipple (2.813" Bore)*
12. *~ 7086ft - 3-1/2" 9.3# L80 TCPC tubing to surface*
13. *Pup joints 3-1/2" 9.3# L80 TCPC for space-out*
14. *~ 4ft - 3-1/2" 9.3# L80 TCPC fatigue nipple (pin x pin)*
15. *Tubing hanger with 3-1/2" EUE top box / 3" BPV / 3-1/2" 9.3# TCPC bottom box*

Notes : Prior to sending completion equipment to well site

- Make up items 1) through 5) under the supervision of Quality Tubulars. Pressure test assembly to 4000 psi for 1hr, chart test. Test caps to be installed and removed by Quality Tubulars.
- Make up items 7) through 9) under the supervision of Quality Tubulars. Pressure test assembly to 4000 psi for 1hr, chart test. Test caps to be installed and removed by Quality Tubulars.
- Shift sliding sleeve and drift with XN plug prior to shipping tools to location.
- Seal lube top sub on ASX-1 packer, to be witnessed by Quality Tubulars.
- Packer vendor to provide Force Analysis / Tube Move Calculations prior to sending equipment to well site.

29. Land tubing as per vendor specifications.

    Note: Amount of compression to set on packer will be determined by Force Analysis / Tube Move Calculations.

30. Rig-up slickline unit and lubricator. Set a plug in the 3.81" XN profile.

31. Notifiy DOGGR to witness tubing tests to 3700 psi, hold for 1 hour. Perform annular test to 1000 psi, hold for 1 hour. Record tests digitally.

    Take a note of tubing pressure in case of annular pressure doesn't hold.

32. RIH with WL and shift the sliding sleeve open. RDMO WL.

33. Install BPV in tubing hanger. Nipple down BOPE, install production tree and test to 5,000 psig. Remove BPV.

34. RDMO.

UNLOAD WELL

35. Rig-up nitrogen unit. Recover workover fluid by pumping down annulus taking returns up tubing.

36. MIRU WL unit. RIH with slickline and shift sliding sleeve closed. POOH and rig down slickline unit.

WELL LATERAL HYDROTESTING

37. Per Gas Company Standard 182.0170, pressure test the tubing and casing kill laterals from the wellhead to the remote tie in to 3625 psig. Pressure test the tubing and casing withdrawal/injection laterals from wellhead to operating valves to 3625 psig.

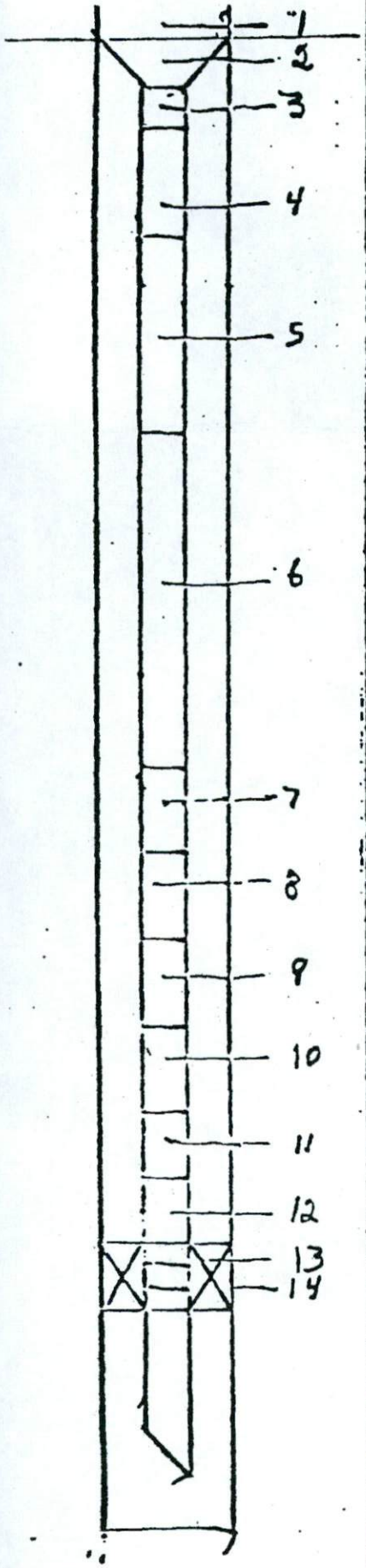
21. Reinstall the hydro-tested laterals.

22. Install the well safety systems and instrumentation. Install pressure transmitters on tubing, casing, and surface casing.

23. Release well to operations.

EXTERNAL CORROSION PROTECTION

Per Gas Company Standard 167.30, remove any lead based paint and recoat wellhead, production tree, and laterals.



OPERATOR

WELL # MA 1-B

FIELD Aliso Canyon

COUNTY Los Angeles

STATE California

DATE 3-23-83

☐ NEW COMPLETION ☒ WORKOVER

Rec'd 10-03-16 DOGGR Ventura.

	CASING	LINER	1	2	3
SIZE					
WEIGHT					
GRADE					
THREAD					
DEPTH					

ITEM NO.	TUBING DETAILS	LENGTH	DEPTH
1.	K.B.	21.00	
2.	Tubing hanger (3-1/2" EUE 8Rd)	.85	21.8
3.	Cross-over 3-1/2"x2-7/8"	1.05	22.9
4.	1 pup joint 2-7/8" 8Rd EUE J-55	8.00	30.9
5.	6 joints 2-7/8" 6.5# 8Rd EUE N-80 tub	185.07	215.9
6.	223 joints 2-7/8" 6.5# 8Rd EUE J-55 tub	6855.09	7071.0
7.	2-7/8" otis gas lift mandrel open	13.05	7084.1
8.	1 joint 2-7/8" 6.5# EUE 8Rd J-55 tub.	31.13	7115.2
9.	Otis 2-7/8" sliding sleeve open	3.18	7118.4
10.	1 joint 2-7/8" 6.5# EUE 8Rd J-55 tub.	31.02	7149.4
11.	Otis 2.205 NO-GO nipple	1.28	7150.7
12.	1 joint 2-7/8" 6.5# EUE 8Rd J-55 tub.	31.41	7182.1
13.	Baker latch-in-locator	1.20	7183.3
14.	Baker 4 seals	3.75	7187.0
15.	Baker production tube	5.25	7192.3

Tested latch-in 20,000# over tubing landed 10,000# on packer.

TYPE V

Rec'd 10-03-16 DOGGR Ventura.

FILE COPY

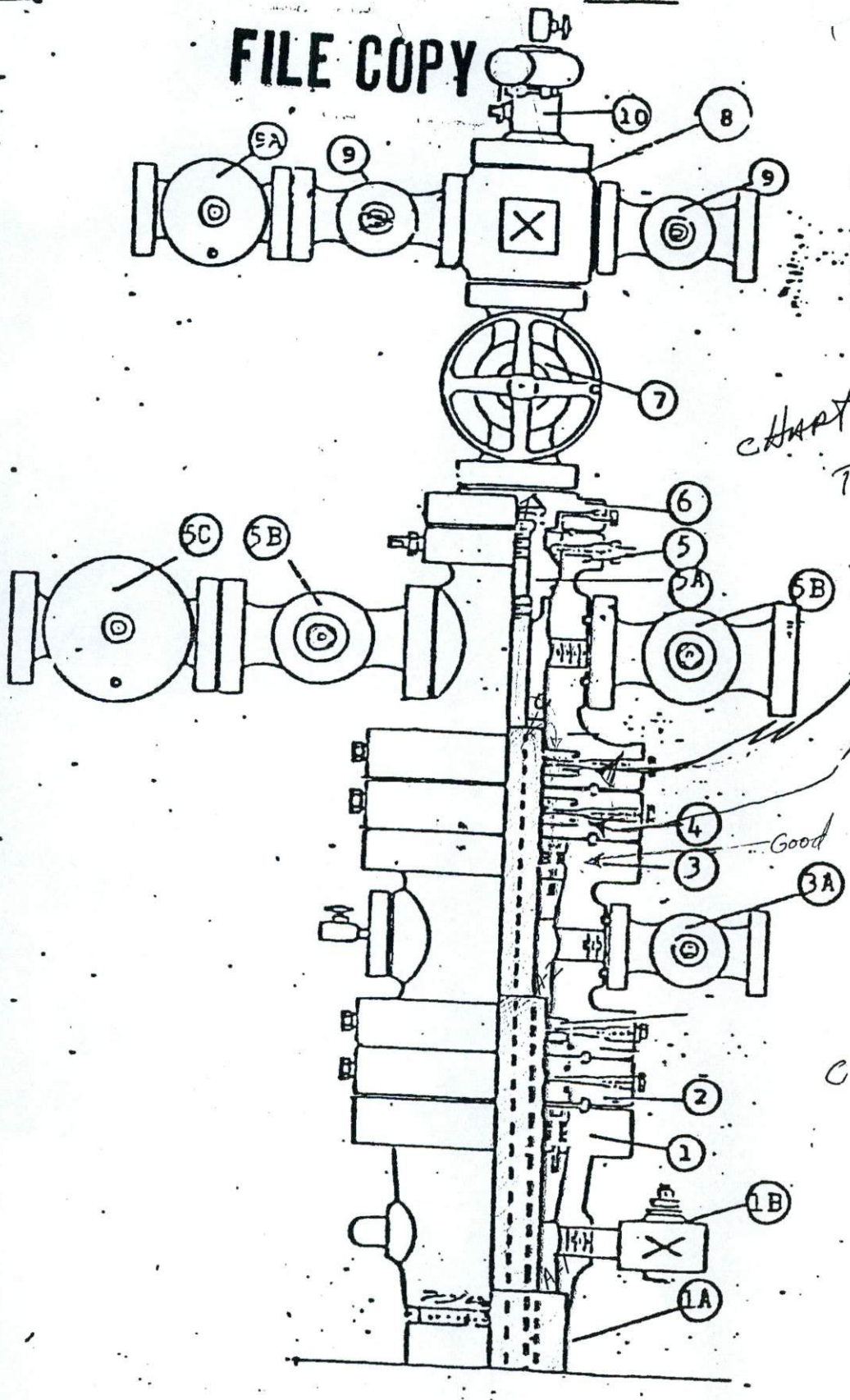


CHART A
TESTED OK

Could not test
WOULD NOT BLEED OFF
BLOWING COLD GAS
MAKING ICE

TESTED OK (Good)
CHART "B"

CHART "C"
TEST ED OK
5000 PS

TEST
7/14/92

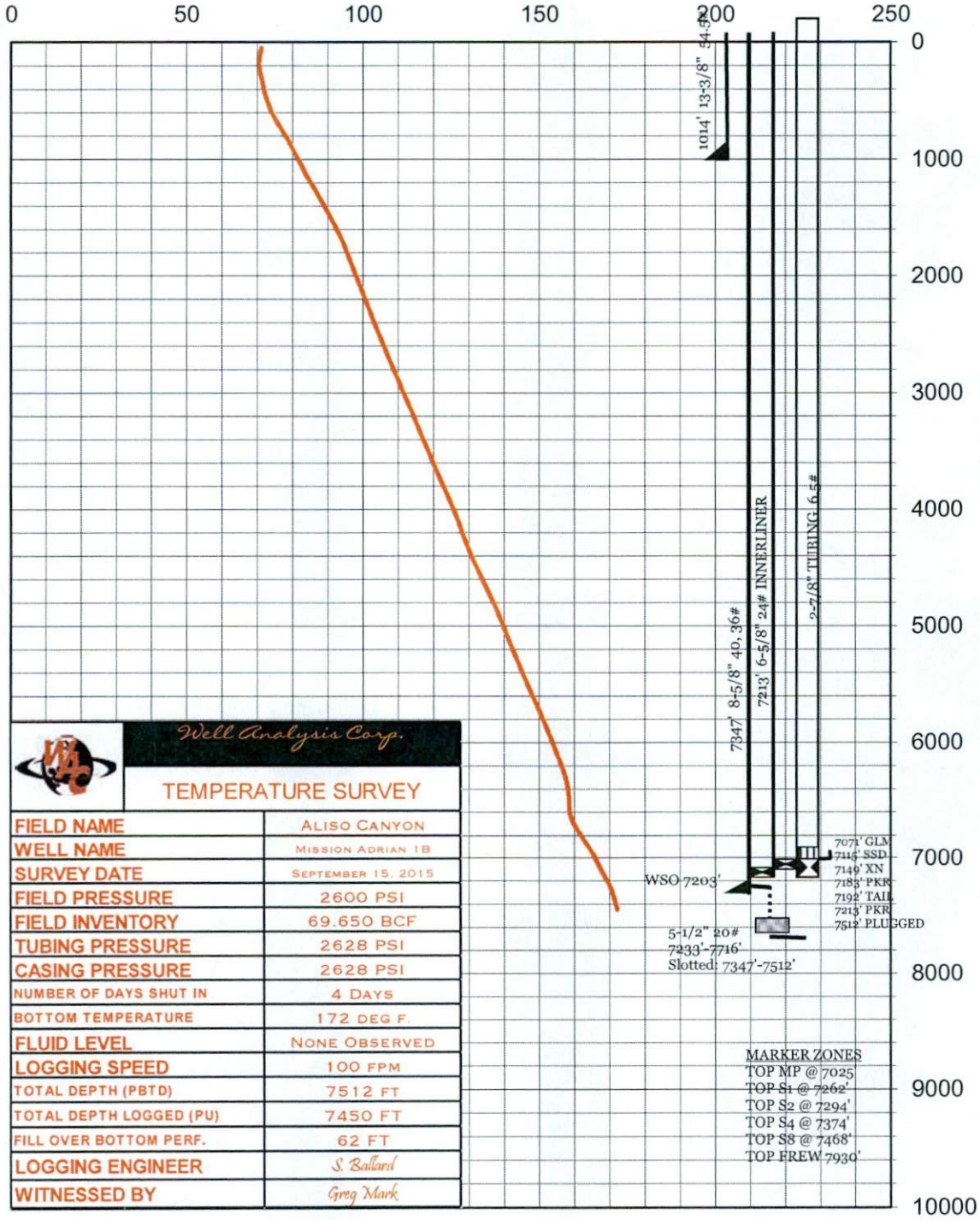
Well Name: MA-1B

Mfgr.: STAFFON

Date Prepared: 7/14/92

Ryel Lahaye

03721892_SURVEY_TEMPERATURE_09-15-2015(MA1B)



Well Analysis Corp.

TEMPERATURE SURVEY

FIELD NAME	ALISO CANYON
WELL NAME	MISSION ADRIAN 1B
SURVEY DATE	SEPTEMBER 15, 2015
FIELD PRESSURE	2600 PSI
FIELD INVENTORY	69.650 BCF
TUBING PRESSURE	2628 PSI
CASING PRESSURE	2628 PSI
NUMBER OF DAYS SHUT IN	4 DAYS
BOTTOM TEMPERATURE	172 DEG F.
FLUID LEVEL	NONE OBSERVED
LOGGING SPEED	100 FPM
TOTAL DEPTH (PBTD)	7512 FT
TOTAL DEPTH LOGGED (PU)	7450 FT
FILL OVER BOTTOM PERF.	62 FT
LOGGING ENGINEER	S. Ballard
WITNESSED BY	Greg Mark

P.O. BOX 20008 • BAKERSFIELD, CA 93390-0008 • PHONE: (661) 589-0760 • FAX: (661) 589-6822

IRAL RESOURCES AGENCY OF CALIFORN
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
1000 S. Hill Rd, Suite 116 Ventura, CA 93003-4458
Phone:(805) 654-4761 Fax:(805) 654-4765

No. T **216-0408**

REPORT ON OPERATIONS

GAS STORAGE PROJECT
"Sesnon-Frew" - Modelo (Miocene-Eocene) Formation

Amy Kitson
Southern California Gas Company (S4700)
12801 Tampa Ave., SC9382
Northridge, CA 91326

Ventura, California
September 14, 2016

Your operations at well **"Mission Adrian" 1B**, A.P.I. No. **037-21892**, Sec. **34**, T. **03N**, R. **16W**, **SB** B.&M., **Aliso Canyon** field, in **Los Angeles** County, were witnessed on **9/12/2016**, by **Chris Phillips**, a representative of the supervisor.

The operations were performed for the purpose of **determining casing integrity**.

DECISION:

APPROVED

CPH/TKC

Kenneth A. Harris Jr.
State Oil and Gas Supervisor

By
Patricia A. Abel, *District Deputy*

OG109 (Rev. 10/2011)

CK912.

T 216-0408
p1 of 2 1.6,1

State of California
Department of Conservation
Division of Oil, Gas, and Geothermal Resources

Casing and Tubing Pressure Test

Operator: Southern California Gas Co. Well Designation: Mission Adrian 1B

Sec. 34, T. 03N, R. 16W, SB B.M. API No. 037-21892 Field: Aliso Canyon

County. Los Angeles Witnessed on: 12-Sep-2016. Chris Phillips, representative

of the supervisor, was present from 1140 to 1245.

Also Present were Dave Driskill - WSM, Tom Fox - Onyx, Alex Flores - Premier pumping

Casing Record of the Well:

See NOI

The operations were performed for the purpose of Testing tubing and 8-5/8", 36#, 40# casing

Pressure Test of the Casing

Packer/ Bridge Plug at 7182 (packer)
Casing Pressured with 8.5#/gal KCl polymer
Casing Pressure Start PSI: 635
Casing Pressure End PSI: 548
Pressure Held 60 Min. Total drop in Pressure 87 psi 14 %.

Well Type Gas Storage
Volume
Start Time: 1140
End Time: 1240

Test Result: ____ Good X Not Good

Pressure Test of the Tubing

Packer/ Bridge Plug at
Tubing Pressured with
Tubing Pressure Start PSI:
Tubing Pressure End PSI:
Pressure Held Min. Total drop in Pressure psi %.

Well Type
Volume
Start Time:
End Time:

Test Result: ____ Good ____ Not Good

Remarks: Tubing plug in XN nipple at 7150', sliding sleeve in open position at 7115'

See follow up test at 13:00

CK912.

T 216-0408
16,1
p.2 of 2

State of California
Department of Conservation
Division of Oil, Gas, and Geothermal Resources

Casing and Tubing Pressure Test

Operator: Southern California Gas Co. Well Designation: Mission Adrian 1B

Sec. 34, T. 03N, R. 16W, SB B.M. API No. 037-21892 Field: Aliso Canyon

County. Los Angeles Witnessed on: 12-Sep-2016. Chris Phillips, representative

of the supervisor, was present from 1300 to 1415.

Also Present were Dave Driskill - WSM, Tom Fox - Onyx, Alex Flores - Premier pumping

Casing Record of the Well:

See NOI

The operations were performed for the purpose of Testing tubing and 8-5/8", 36#, 40# casing

Pressure Test of the Casing

Packer/ Bridge Plug at 7182 (packer)
Casing Pressured with 8.5#/gal KCl polymer
Casing Pressure Start PSI: 637
Casing Pressure End PSI: 624
Pressure Held 60 Min. Total drop in Pressure 13 psi 2 %.

Well Type Gas Storage
Volume
Start Time: ~~1140~~ 1300
End Time: ~~1240~~ 1400

Test Result: X Good ____ Not Good

Pressure Test of the Tubing

Packer/ Bridge Plug at
Tubing Pressured with
Tubing Pressure Start PSI:
Tubing Pressure End PSI:
Pressure Held ____ Min. Total drop in Pressure ____ psi ____ %.

Well Type
Volume
Start Time:
End Time:

Test Result: ____ Good ____ Not Good

Remarks: Tubing plug in XN nipple at 7150', sliding sleeve in open position at 7115'

RAL RESOURCES AGENCY OF CALIFORN
_EPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
1000 S. Hill Rd, Suite 116 Ventura, CA 93003-4458
Phone:(805) 654-4761 Fax:(805) 654-4765

No. T **216-0246**

REPORT ON OPERATIONS

GAS STORAGE PROJECT
"Sesnon-Frew" - Modelo (Miocene-Eocene) Formation

Amy Kitson
Southern California Gas Company (S4700)
12801 Tampa Ave., SC9382
Northridge, CA 91326

Ventura, California
July 13, 2016

Your operations at well **"Mission Adrian" 1B**, A.P.I. No. **037-21892**, Sec. **34**, T. **03N**, R. **16W**, **SB** B.&M., **Aliso Canyon** field, in **Los Angeles** County, were witnessed on **7/16/2016**, by **Jay N. Huff**, a representative of the supervisor.

The operations were performed for the purpose of **determining casing integrity**.

DECISION:

DEFERRED PENDING REVIEW BY THE DIVISION'S SAFETY TEAM.

JNH/TKC

Kenneth A. Harris Jr.
State Oil and Gas Supervisor

By pp. E
Patricia A. Abel, *District Deputy*

OG109 (Rev. 10/2011)

EB76.

State of California
Department of Conservation
Division of Oil, Gas, and Geothermal Resources

No. T 216-0246
#16, 3

INTERNAL MECHANICAL INTEGRITY TEST (MIT)
(Standard Annulus Pressure Test-SAPT)

Operator: SoCal Gas					Well: Mission Adrian 1-B
Sec. 34	T. 3N	R. 16W	B.&M. SB	API No.:037-21892	Field: Aliso Canyon
County: Los Angeles					Witnessed/Reviewed on: 7/6/2016

Jay Huff, representative of the supervisor, was present from 805 to 850.

Also present were: Mike Giuliani

Casing record of the well:
13-3/8" 54.5# K55 @ 1014'. Cemented to surface.
8-5/8" 40/36/40# N80 @ 7347'. Cemented to 1,656.
6-5/8" Inner Casing.
2-7/8" tubing with production packer at 7,183' and plug set at 7,149. Sliding sleeve in open position at 7,115'.

The Internal MIT was performed for the purpose of pressure testing the 6-5/8" casing above Packer at 7,183' (2) (prior to injecting fluid).
Tubing was also tested with a tubing plug set at 7,149'.

[x] The Internal MIT is approved since it indicates that the 6-5/8" casing has mechanical integrity above 7,183' at this time.

[ ] The Internal MIT is not approved due to the following reasons: (specify)

INDICATE WHERE PACKER WAS SET AND HOW LONG PRESSURE WAS HELD ALONG WITH ANY BLEEDOFF DATA.

Pressure testing of Production casing, packer, and tubing plug with 8.5 ppg polymer fluid. Well is to be idled.
Pressure Test 1. P1=1,069 psi @ 7:40. P2=1,066 psi @ 8:47.

DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

CHECK LIST-RECORDS RECEIVED AND WELL STATUS

Operator: **Southern California Gas Company** WELL DESIGNATION **"Mission Adrian" 1B**

API No. **03721892** SE **34** T: **3N** R.: **16W** , **SB** B. and M.

County: **Los Angeles** FIELD: **Aliso Canyon**

Type of Notice: **Supplementary** **Date** **8/22/2016** **Report Number:** **P216-0203**

RECORDS RECEIVED (ATTACH PAGES IF REQUIRED)

	Date	OK	NEED	Remarks
Well Summary (OG100)				
History (OG103)				
E-Log				
Mud Log				
Dipmeter				
Directional				
Core and/or SWS				

NEW STATUS

DATE: _____

NOTICE OF RECORDS DUE

DATE: _____

DATE: _____

DATE: _____

DATE: _____

WELL STATUS INQUIRY

DATE: _____

DATE: _____

Well Stat

Change Required: _____

Change Done: _____

ABANDONMENTS/REABANDONMENTS/DRILLS/REDRILLS

CalWims Abandonment Form: _____ SURFACE INSPECTION NEEDED _____ COMPLETED _____
Date and Inspector

FINAL LETTER NEEDED _____ COMPLETED _____ Calwims DRILL/REDRILL Form _____
(Date)

ENGINEER'S CHECK LIST

T-REPORT(S) _____ OPERATOR'S NAME _____ WELL DESIGNATION _____ SIGNATURE _____

Calwims Location _____ Calwims ELEVATION: _____ CONFIDENTIAL RELEASE DATE: _____ PERMIT REQUIREMENTS MET _____

CLERICAL CHECK LIST

LOCATION CHANGE (OG165) _____ ELEVATION CHANGE (OG165) _____ RELEASE OF BOND (OG150) _____

REMARKS

RECORDS SCANNED: _____
(Date)

RECORDS APPROVED: _____
(Date and Engineer)

Modflied OGD2

AOR Datbase _____

RAL RESOURCES AGENCY OF CALIFORNI
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
1000 S. Hill Rd, Suite 116 Ventura, CA 93003 - 4458

OIL, GAS & GEOTHERMAL

No. P 216-0203

Old	New
010	010
FIELD CODE	
00	00
AREA CODE	
30	30
POOL CODE	

PERMIT TO CONDUCT WELL OPERATIONS

Gas Storage
Plugback and Suspend for One Year
"Sesnon-Frew" - Modelo (Miocene-Eocene) Formation

Ventura, California
August 29, 2016

Amy Kitson, Agent
Southern California Gas Company (S4700)
12801 Tampa Ave., SC9382
Northridge, CA 91326

Your **Supplementary** proposal to **REWORK** well **"Mission Adrian" 1B**, A.P.I. No. **037-21892**, Section **34**, T. **03N**, R. **16W**, **SB** B. & M., **Aliso Canyon** field, **Any** area, **Sesnon-Frew** pool, **Los Angeles** County, dated **8/22/2016**, received **8/22/2016** has been examined in conjunction with records filed in this office. (Lat: **34.304936** Long: **-118.542763** Datum:**83**)

THE PROPOSAL IS APPROVED PROVIDED:

1. Blowout prevention equipment, as defined by this Division's publication No. M07, shall be installed and maintained in operating condition and meet the following minimum requirements:
   a. Class **I** **Note: work to be completed without the removal of the injection assembly.**
2. Hole fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
3. A pressure test is conducted to demonstrate the mechanical integrity of the **7"** casing.
4. A pressure test is conducted to demonstrate the mechanical integrity of the **8 5/8"x 7"** annulus. **This test shall be to at least 500 psi.**
5. This well is to be taken out of service and isolated from the storage reservoir. The well shall be re-evaluated or abandoned within 1 year of the completion of the pressure testing pursuant to Order #1109 and its amendments.
6. In all other respects, the provisions of Division Order #1109 and its amendments shall remain in effect.
7. This office shall be contacted by phone prior to making any program changes and no changes are made without Division approval.
8. **THIS DIVISION SHALL BE NOTIFIED TO:**
   a. Witness a pressure test of the **7"** casing.
   b. Witness a pressure test of the **8 5/8" x 7"** casing.

Continued on Next Page

Kenneth A. Harris Jr.
State Oil and Gas Supervisor

Blanket Bond Dated: 7/6/1999
UIC Project No. 0100006

Engineer Kris Gustafson
Office (805) 654-4761

By pp. C. Abel
Patricia A. Abel, *District Deputy*

KG/kg

A copy of this permit and the proposal must be posted at the well site prior to commencing operations. Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended. Issuance of this permit does not affect the Operator's responsibility to comply with other applicable state, federal, and local laws, regulations, and ordinances.

OG111 (revised 6/2011)

NOTE:

1. The base of the freshwater zone is at **800'±.**
2. No operation shall be undertaken or continued that will contaminate or otherwise damage the environment.
3. This permit is being issued as part of Division Order No. 1109 dated March 4, 2016. Any well that fails any of the testing must be taken out of service and isolated from the storage reservoir pursuant to the Safety Review Testing Regime.
4. The required History of Oil or Gas Well (OG103) shall include a complete description of the required pressure testing. **An updated casing and tubing diagram shall be included with the well history.**
5. **A Well Summary Report (Form OG 100)** and **Well History (Form OG 103)** shall to be submitted to the Division within 60 days after the well is drilled, reworked, plugged and abandoned, or if the work is suspended. Any additional well work will require an additional notice to be submitted to this office prior to resuming well operations.

Enclosure: **Attachment 1 to DOGGR Order 1109. Safety Review Testing Regime for the Aliso Canyon Natural Gas Storage Facility**

ATTACHMENT 1
TO DOGGR ORDER 1109

SAFETY REVIEW TESTING REGIME
FOR THE ALISO CANYON NATURAL GAS STORAGE FACILITY

This document identifies the requirements of this comprehensive safety review that shall be completed by the Southern California Gas Company (Operator) and verified by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division). The Operator shall use accepted industry practices and procedures.

The Division has consulted with independent technical experts from the Lawrence Berkeley, Lawrence Livermore, and Sandia National Laboratories ("National Laboratories") to develop the requirements of this facility safety review. The National Laboratories experts independently reviewed and concurred with the testing requirements for the safety review detailed below.

This comprehensive safety review requires that each of the active injection wells in the Aliso Canyon Storage facility either pass a thorough battery of tests in order to resume gas injection or be taken out of operation and isolated from the underground gas storage reservoir. Several steps, detailed below, are required in this safety review. Documentation of all testing required under this comprehensive safety review shall be provided electronically to the Division within 72 hours of completion of a test in digital (i.e. LAS) and printed (i.e. pdf) form. All pressure tests required under this comprehensive safety review shall be witnessed by Division staff. A well that is properly plugged and abandoned in accordance with Public Resources Code section 3208 is not subject to testing under this comprehensive safety review. A well that does not pass all tests must be repaired, retested, and pass all tests, or be plug and abandoned.

REQUIRED TESTS FOR EACH WELL IN THE FACILITY

Step 1: The Operator shall perform an initial casing assessment on the well consisting of temperature and noise logs.

a. Temperature Log:
A temperature survey shall be run from the surface to the packer to measure the temperature within the wellbore. A temperature survey that demonstrates no unexplained anomalous temperature changes in the well is one indication of casing integrity.

b. Noise Log:
An acoustic sensor survey capable of detecting the sound of fluid flow will be conducted the length of the well above the packer to the surface. The survey will include stops at least every 250 feet and at the midpoint of any anomaly detected by the temperature survey. The absence of anomalous sound above the packer is an indication of well integrity

Step 2: The results of the Temperature Logs and Noise Logs will be independently reviewed by Division engineers. Any unexplained abnormal findings in this set of tests shall be addressed by the Operator in one of the following ways:

a. Conduct further investigation and demonstrate to the Division's satisfaction that the abnormal finding is not an indicator of a lack mechanical integrity;
b. Remediate the well to the Division's satisfaction; or
c. With Division review and approval, remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

Necessary actions to remediate any abnormalities revealed by these tests will be reviewed by Division engineers. Once repairs or mitigations are completed, the Temperature Log and Noise Log must then be repeated on the well and reviewed by Division engineers to ensure that there are no additional abnormal test results and to confirm the issue was repaired.

Step 3: After these tests are completed on the well, and all required action has been completed, the operator shall either:

a. Conduct the additional tests and evaluations on the well, outlined in Steps 4a through 7a below, in order to gain approval for injecting gas through that well; or
b. Remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

REQUIRED TESTS IF A WELL IS INTENDED TO RESUME OPERATIONS

If Temperature and Noise Logs have been completed on a well and they indicate well integrity, and the Operator designates the well to return to injection operations, then the Operator shall perform the additional testing outlined in Steps 4a through 7a. The results of these tests will be independently reviewed by Division engineers and posted publicly. Each of the following tests requires that the production tubing be removed from the well.

Step 4a: The Operator shall conduct a **Casing Inspection log.**
The Operator shall conduct a Casing Inspection log of the well that measures the thickness of the production casing, from the surface to the bottom of the gas storage reservoir cap rock. If the inspection reveals a reduction in wall thickness, the current minimum strength of the casing will be calculated. If the current minimum strength of the casing has diminished to the point that it cannot withstand authorized operating pressures for the well plus a built-in additional safety factor of pressure, the well has failed this test. *A passing test for a casing inspection log would show no thinning of the casing that diminishes the casing's ability to contain at least 115% of the well's maximum allowable operating pressure as authorized in the current Project Approval Letter.*

Step 5a: The Operator shall conduct a **Cement Bond Log** for the well.
The Operator shall conduct a Cement Bond Log (CBL) that measures the bonding between cement and the production casing of the well, and also the bonding between the annular cement and the formation. Cement should be solidly bonded to both the well's production casing and the geologic formation to ensure a seal that prevents fluids from migrating up or down the outside of the well. *A passing test for a cement bond log shows definitive bond, as demonstrated by sonic waveform,*

between cement and casing and between cement and the gas storage formation and/or cap rock for at least 100 feet above the top of the gas storage reservoir.

Step 6a: The Operator shall conduct a **Multi-Arm Caliper Inspection** of the well.
The operator shall conduct an inspection that measures any internal degradation or significant changes to the well's geometry from the surface to the top of the gas storage reservoir, using a minimum 32-arm caliper tool. If the inspection reveals a thinning or deformity of the casing, the current strength of the casing will be calculated. If the current strength of the casing has diminished, such that it cannot withstand authorized operating pressures plus a built-in safety factor of additional pressure, the well fails this inspection. *A passing test for a Multi-Arm Caliper Inspection would show no deformation or thinning of the casing that diminishes the casing from being able to properly contain at least 115% of each well's maximum operating pressure.*

Step 7a: The Operator will conduct a **Pressure Test** of the production casing and of the well once the production tubing has been reinstalled. The Operator may conduct the casing pressure test prior to reinstalling the production tubing. Using a digital recorder, the operator will conduct a liquid-filled positive pressure test within the production tubing of the well, and in the annular space between the production tubing and the casing, to determine the well's ability to withstand normal operating pressures. The production tubing will be isolated and then pressure tested. The annular space between tubing and casing will be pressure tested. This testing also evaluates the integrity of any packers, which seal the annular space between the tubing and casing. The pressure test will be one hour and begin at a pressure of 115% of the maximum operating pressure or the minimum yield strength of the casing and tubing, whichever is less. *A passing pressure test is a pressure loss not exceeding 10% for any 30 minute period during the hour long test.*

After conducting the above tests, the Operator will conduct any indicated remediation so that the well can pass these tests. All remediation will be subject to the review of Division engineers. The well would then be required to undergo the tests once again to demonstrate well integrity.

If the well passes the Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper inspection and the Pressure Test to the Division's satisfaction, then the Division may clear the well for use for gas injections and withdrawal, once the Division has authorized resumption of injection into the gas storage reservoir. As noted below, wells approved for operation will only be permitted to inject or withdraw gas through the production tubing.

REQUIRED ACTIONS IF THE WELL IS TO BE TAKEN OUT OF OPERATION AND ISOLATED FROM THE GAS STORAGE RESERVOIR:

If the operator elects to take a well out of service, then the following steps shall be taken to isolate the well from the gas storage reservoir:

Step 4b: The Operator shall confirm the presence of cement outside the well's external casing in the section of the well that prevents the movement of gas from the underground gas storage reservoir to shallower geologic zones above the gas storage reservoir. Existing cement bond logs and well construction

records may be used to make this confirmation. This confirmation requires concurrence from Division engineers.

Step 5b: The Operator shall install a mechanical seal or "packer" within the well's production casing and install a mechanical plug within the well's production tubing, if applicable. These seals shall be set in place near the bottom of the well, within the portion of the well surrounded by cement. This kind of seal is an industry standard practice for isolating a well from reservoir gases or fluids and will further protect the casing from internal gas pressure.

Step 6b: The Operator shall fill the well with fluid to the well's surface in order to create appropriate downward hydrostatic pressure in the well that further contributes to the integrity of the well seal.

These measures will isolate a well from the underground gas reservoir, as confirmed by National Laboratory experts. Each of the above actions is subject to review and approval by Division Engineers.

Step 7b: Once the Operator has completed steps 4b, 5b, and 6b, and the seal is in place at the bottom of the well and the well is filled with fluid above the seal, the operator shall:

a. Conduct daily gas monitoring at the surface of the non-operational well, including monitoring the area around the well perimeter and in the annular space between the plugged casing string and the outmost casing;
b. Conduct noise log, temperature log and positive pressure test every six months;
c. Conduct weekly monitoring of fluid levels in the well or, install and operate real-time pressure monitors that provide immediate notification to the operator when pressures deviate from normal in the well's interior tubing and its annular space.

The above monitoring shall be reported to Division engineers and maintained as a part of the well file. Division engineers will review all submitted information for evaluation on a regular basis to ensure that the well taken out of service has maintained safety, and the operator shall take all necessary steps maintain the safety of the well.

Any well taken out of operation cannot be approved to resume operations and gas injection until the successful completion of the battery of tests outlined above in Steps 4a through 7a (Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper Extension and the Pressure Test) is completed. Those tests must be successfully completed within one year of completing step 6b. If a well cannot successfully complete all necessary steps required in this safety review after one year of completing step 6b, then the well shall be properly plugged and abandoned in accordance with Public Resources Code section 3208.

REQUIREMENTS FOR WELLS RESUMING OPERATIONS IN ALISO CANYON

The Division's authorization to resume injection in the Aliso Canyon Storage Facility will be contingent on the successful completion of this comprehensive safety review. The State Oil and Gas Supervisor must confirm in writing that all wells in the facility have either completed and passed the full battery of tests required in the safety review, been taken out of service and isolated from the underground gas storage reservoir, or been properly plugged and abandoned in accordance with Public Resources Code Section 3208.

Rec'd 08-22-16 DOGGR Ventura.

FOR DIVISION USE ONLY		
Bond	Forms ~~OGD114~~	OGD121
	CAL ✓ WIMS	N5 ✓

NATURAL RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

SUPPLEMENTARY NOTICE

P216-0203

Detailed instructions can be found at: www.conservation.ca.gov/dog/

A notice to the Division of Oil, Gas, and Geothermal Resources, dated 6/20/16, stating the intention to

Rework (Drill, Rework, Abandon) well Mission Adrian 1B, API No. 03721892,

Sec. 34, T. 3N, R. 16W, SB B.&M., Aliso Canyon Field, Los Angeles County

should be amended because of changed conditions.

The complete casing record of the well (present hole), including plugs and perforations, is as follows: (Attach wellbore schematics diagram also.)
Please see attached wellbore diagram and completed work summary

The total depth is: 7512 feet. The effective depth is: 7512 feet.

Present completion zone(s): Sesnon (Name). Anticipated completion zone(s): same (Name).

Present zone pressure: storage psi. Anticipated/existing new zone pressure: storage psi.

We now propose: (A complete program is preferred and may be attached.)
Southern California Gas Company intends to take this well out of operation and isolate from the gas storage reservoir as per the First Amended Safety Review Testing Regime: Steps 4b-7b:

7b - Apply 500 psi to 6-5/8" x 8-5/8" annulus for 1 hr. Tests casing and inner string packer at 7213'

If well is to be redrilled or deepened, show proposed coordinates (from surface location) and true vertical depth at total depth: N/A feet N/A (Direction) and N/A feet N/A (Direction) Estimated true vertical depth: N/A

Will the Field and/or Area change? Yes☐ No☒ If yes, specify New Field: N/A New Area: N/A

The Division must be notified immediately of changes to the proposed operations. Failure to provide a true and accurate representation of the well and proposed operations may cause rescission of the permit.

Name of Operator			
Southern California Gas Company			
Address: P.O. Box 2300		City/State: Chatsworth, CA	Zip Code: 91313-2300
Name of Person Filing Notice: A.J. Alshammasi	Telephone Number: (818) 700-3887	Signature: A.J. Alshammasi	Date: 08/22/2016
Individual to contact for technical questions: Jake Zachry	Telephone Number: (805) 256-5401	E-Mail Address: jzachry@semprautilities.com	

This notice must be filed, and approval given, before the operations begin. If operations have not commenced within one year of the Division's receipt of this supplementary notice, this notice will be considered cancelled.

Rec'd 08-22-16 DOGGR Ventura.

Well
Mission Adrian 1B

API #: 04-037-21892-01
Sec 34, T3N, R16W

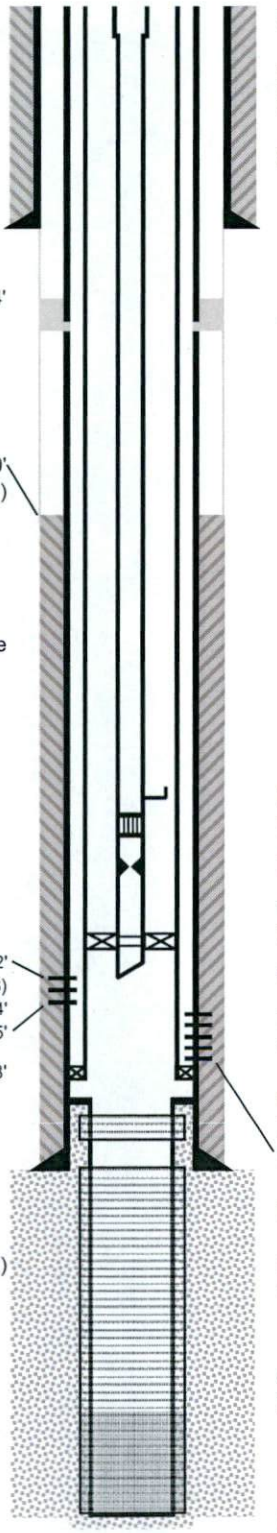
Operator: So. California Gas Co.

Lease: Mission Adrian
Field: Aliso Canyon
Status: Idle Gas Storage
BFW:
USDW:

Ground Elevation: 1725' asl
Datum to Ground: 21' KB

Spud Date: 6/30/1979
Sidetrack Kick-off Date: 9/27/1979
Completion Date: 7/15/1980
Last Rework Date: 2/18/1983

Junk: None



13-3/8" ETOC Surface

17-1/2" Hole

Surface Casing
13-3/8", 54.5#, K-55
0' - 1014'

CMT'D w/ 1030 CF 1014'

8-5/8" ETOC (after 1st SQZ*) 1464'

8-5/8" TOC 3700'
(per Welex Bond Log 8/12/1979)

Inner CSG
6-5/8", 24#, N-80 (2/15/1983)
0' - 7218'

12-1/4" Hole

Production Casing
8-5/8"
0' - 57'± 40#, N-80 (6/21/1980)
57'± - 180' 36#, N-80 (6/21/1980)
180' - 5323' 36#, N-80
5323' - 7347' 40#, N-80

CMT'D w/ 1853 CF

(8) 1/2" Holes 7191' - 7192'
(67 CF + 39 CF CMT SQZ'D Away, 2/5/1983)
(8) 1/2" Holes, 1/14/1983*** 7193' - 7194'
(8) 1/2" Holes, 1/13/1983*** 7195'

Baker Large Bore Model "D" PCKR 7213' - 7218'
7233'

7347'

15" Hole (7347' - 7510')

Liner
5-1/2", 20#, K-55
7233' - 7511'

7511'

22' 3-1/2" x 2-7/8" X-Over

Tubing (2/18/1983)
3-1/2", 6.5#, J-55
0' - 22'
2-7/8", 6.5#
22' - 31' J-55
31' - 216' N-80
216' - 7191' J-55

1594' - 1596' 8-5/8" CSG Leak
(*62 CF CMT SQZ'D Away, 10/12/1979
+ SQZ'D 7x's more w/ a total of 395 CF,
10/13 - 10/18/1979 CMT SQZ'D Away)**

7071' Otis GLM
7115' Otis Sliding Sleeve
7150' Otis No-Go Nipple
7182' Baker Latch-In-Locator
7182' Baker PCKR w/ 4 Seals (2/18/1983)
7191' Tail
7203' - 7204' Four (4) 1/2" Holes WSO (8/22/1979)***
7204' - 7205' Four (4) 1/2" Holes (115 CF + 100 CF CMT SQZ'D Away, 8/13/1979)***
7205' - 7206' Four (4) 1/2" Holes (57 CF CMT SQZ'D, 8/17/1979)***
7206' - 7207' Four (4) 1/2" Holes (57 CF CMT SQZ'D, 8/18/1979)***
7207' - 7208' Four (4) 1/2" Holes (38 CF CMT SQZ'D Away, 8/20/1979)***

7400' Sidetrack KOP (from OH) into this wellbore (See History)

Liner Perfs:
7240' - 7280', 7343' - 7510'
10 Mesh WWS

Gravel Packed w/
243 CF 20-40

(7510' - 7512') 7-5/8" Hole

Wellbore History

Orig. Hole (OH) TD @ 7716'
(See Mission Adrian 1B OH)
RD KOP @ 7400'
TD @ 7512'

Notes

**Operations were suspended on 10/20/1979 until SQZ'D again 3X's more w/ a total of 300 SKS CMT, 6/27 - 6/30/1980 (received circulation between 8-5/8" x 13-3/8" annulus during first of three SQZ's), leak @ 1594' - 1596' SQZ'D Again w/ 44 CF CMT SQZ'D Away, 1/13/1982.

***15 CF CMT SQZ'D Away thru shot holes, 1/17/1983.

Top of Zone Markers	md	(tvd)
A1	4130'	(4058')
UP	5153'	(4990')
LP	5560'	(5365')
UDA1	6075'	(5839')
LDA	6728'	(6438')
MP	7028'	(6718')
S1	7263'	(6938')
S4	7344'	(7014')

TD 7512'
TVD (Unknown, survey not run below KOP @ 7400")
Directionally Drilled: Yes (7400' MD is ±27' E, ±1623' N of Surf, ±7066' TVD)

Prepared by: CAM (8/16/2016)

InterAct

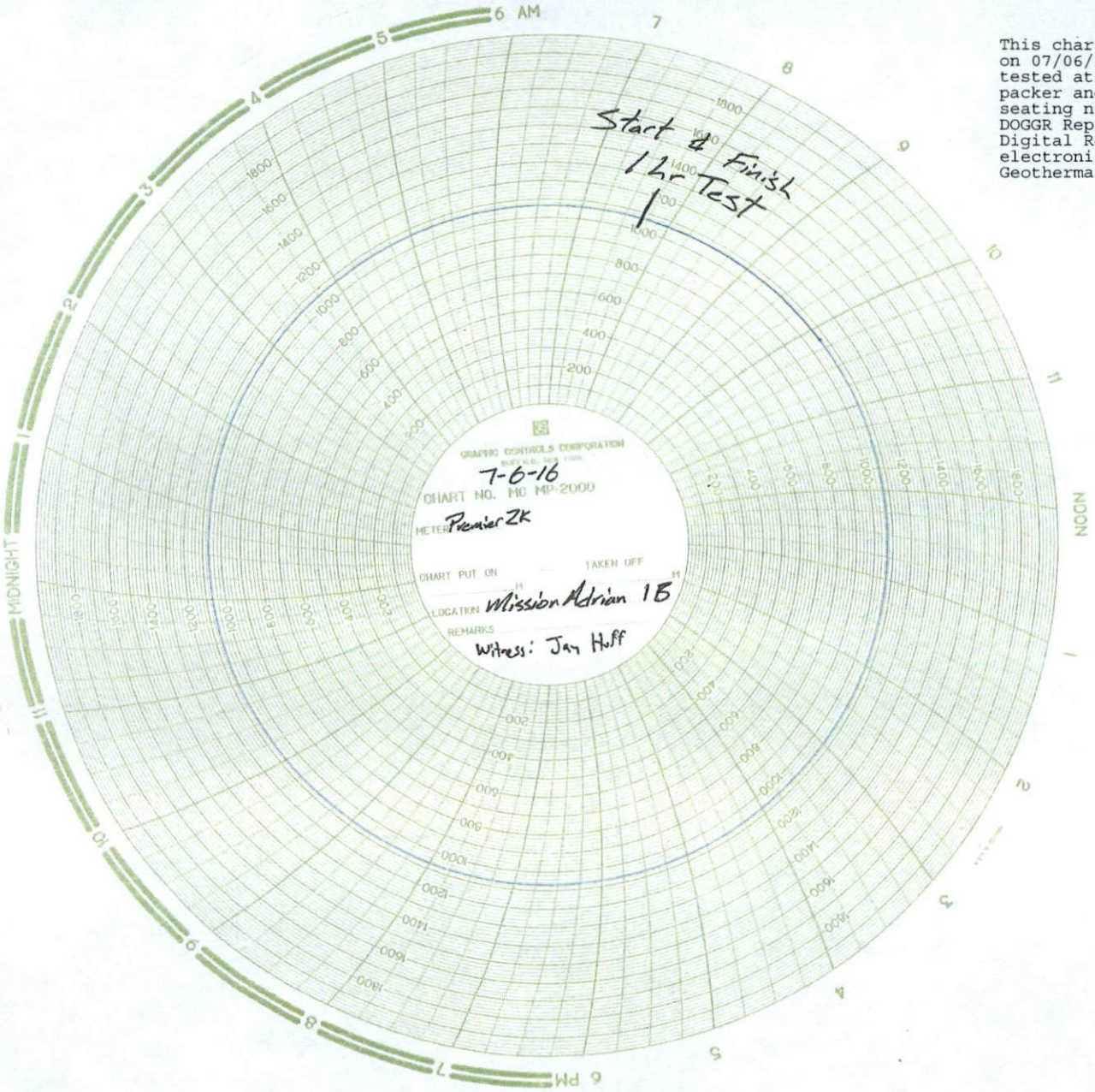
Rec'd 08-22-16 DOGGR Ventura.

Completed Work Summary -Mission Adrian 1B		
Step	**Work Completed**	**Date**
4b	200' of 90%+ bond across MP per CBL dated 8/12/1979	8/12/1979
5b	Inner string packer set in 8-5/8" casing at 7213' in good cement (per 8/12/1979 CBL)	2/14/1983
5b	6-5/8" permanent packer set in inner string at 7182'	2/18/1983
5b	Tubing plug set in No-Go nipple at 7150'	6/7/2016
6b	Inner string annulus filled with 10 ppg KCl Polymer upon installation of 6-5/8" inner string	2/15/1983
6b	Circulated inner string full of 3% KCl through sliding sleeve at 7115'	6/14/2016
7b	Pressure tested 6-5/8" packer, inner string and tubing plug to 1000 psi for 1hr. DOGGR witnessed	7/6/2016

Rec'd 08-22-16 DOGGR Ventura.

Mission Adrian 1B Casing Pressure Test Safety Check - 8-5/8" Production Casing (500 psi)

Well	Packer Depth MD/TVD	Casing Size/Grade/Weight	Depth MD	Burst PSI	85% of Burst PSI	Pressure at Depth w/500 psi Surface Pressure	Press < 85% of Burst
Mission Adrian 1B	7213	8-5/8", 40#, N-80	57	7300	6205	525	Yes
		8-5/8", 36#, N-80	5323	6490	5517	2853	Yes
		8-5/8", 40#, N-80	7347	7300	6205	3747	Yes



Rec'd 08-22-16 DOGGR Ventura.

This chart is the analog recording of Pressure Test conducted on 07/06/2016 in conjunction with DOGGR Permit P216-0098. Items tested at this time included 6-5/8" inner string, mechanical packer and seals set at 7182' MD and tubing plug set in No-Go seating nipple at 7150' MD. Test witnessed and approved by DOGGR Representative Jay Huff.

Digital Recording of 07/06/2016 Pressure Test available in electronic well file on California Division of Oil Gas and Geothermal website.

Rec'd 08-22-16 DOGGR Ventura.

From: Walker, Scott@DOC [mailto:Scott.Walker@conservation.ca.gov]
Sent: Monday, August 15, 2016 11:03 AM
To: Schwecke, Rodger <RSchwecke@semprautilities.com>
Cc: McMahon, Thomas D. <TMcMahon@semprautilities.com>; Iguaz, Jose <JIguaz@semprautilities.com>; Neville, Dan <DNeville@semprautilities.com>; Phillips, Chris@DOC <Chris.Phillips@conservation.ca.gov>
Subject: [EXTERNAL] Failed Isolation Tests for Porter 45, Porter 69A, Standard Sesnon 44A, Mission Adrian 1B

Roger,

The following wells have failed isolation testing:

Porter 45 (037-00732), 7" casing not pressure tested, 5-1/2" inner string and 2-3/8" tubing tested to 1070 psi, packer set in uncemented 5-1/2" casing at 7320'.

Porter 69A (037-22051), 9-5/8" casing not pressure tested, 7" inner string tested to 1060 psi, bridge plug set in uncemented 7" casing at 7499'.

Standard Sesnon 44A (037-21455), 8-5/8" casing not pressure tested from surface to 8590', 8-5/8" casing tested from bridge plug at 8734' up to packer setting depth at 8590'.

Mission Adrian 1B (037-21892), 8-5/8" casing not pressure tested from surface down to 7213', 6-5/8" inner string and 2-7/8" tubing tested to 1066 psi, packer set in uncemented 6-5/8" casing at 7183'.

I am available today for discussion if needed. I will be out of state from the 16th to 23rd.

Scott Walker, P.E.
Senior Oil and Gas Engineer
Department of Conservation
Division of Oil, Gas, and Geothermal Resources
5816 Corporate Avenue, Suite 100
Cypress, CA 90630
Office: 714-816-6847
www.conservation.ca.gov

This email originated outside of Sempra Energy. Be cautious of attachments, web links, or requests for information.

DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

CHECK LIST-RECORDS RECEIVED AND WELL STATUS

Operator: **Southern California Gas Company** WELL DESIGNATION **"Mission Adrian" 1B**

API No. **03721892** SE **34** T: **3N** R.: **16W** , **SB** B. and M.

County: **Los Angeles** FIELD: **Aliso Canyon**

Type of Notice: **Rework** **Date** **6/20/2016** **Report Number:** **P216-0098**

RECORDS RECEIVED (ATTACH PAGES IF REQUIRED)

	Date	OK	NEED	Remarks
Well Summary (OG100)				
History (OG103)				
E-Log				
Mud Log				
Dipmeter				
Directional				
Core and/or SWS				

NEW STATUS

DATE: _____

NOTICE OF RECORDS DUE

DATE: _____

DATE: _____

DATE: _____

DATE: _____

WELL STATUS INQUIRY

DATE: _____

DATE: _____

Well Stat

Change Required: _____

Change Done: _____

ABANDONMENTS/REABANDONMENTS/DRILLS/REDRILLS

CalWims Abandonment Form: _____ SURFACE INSPECTION NEEDED _____ COMPLETED _____
Date and Inspector

FINAL LETTER NEEDED _____ COMPLETED _____ Calwims DRILL/REDRILL Form _____
(Date)

ENGINEER'S CHECK LIST

T-REPORT(S) _____ OPERATOR'S NAME _____ WELL DESIGNATION _____ SIGNATURE _____

Calwims Location _____ Calwims ELEVATION: _____ CONFIDENTIAL RELEASE DATE: _____ PERMIT REQUIREMENTS MET _____

CLERICAL CHECK LIST

LOCATION CHANGE (OG165) _____ ELEVATION CHANGE (OG165) _____ RELEASE OF BOND (OG150) _____

REMARKS

RECORDS SCANNED: _____
(Date)

RECORDS APPROVED: _____
(Date and Engineer)

Modflied OGD2

AOR Datbase _____

JRAL RESOURCES AGENCY OF CALIFORI
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
1000 S. Hill Rd, Suite 116 Ventura, CA 93003 - 4458

No. P 216-0098

Old	New
010	010
FIELD CODE	
00	00
AREA CODE	
30	30
POOL CODE	

PERMIT TO CONDUCT WELL OPERATIONS

Corrected Copy
Gas Storage
"Sesnon-Frew" - Modelo (Miocene-Eocene) Formation
Plugback and Suspend for One Year

Ventura, California
June 30, 2016

Amy Kitson, Agent
Southern California Gas Company (S4700)
12801 Tampa Ave., SC9382
Northridge, CA 91326

Your proposal to **Rework** well **"Mission Adrian" 1B**, A.P.I. No. **037-21892**, Section **34**, T. **03N**, R. **16W**, **SB** B. & M., **Aliso Canyon** field, **Any** area, **Sesnon-Frew** pool, **Los Angeles** County, dated **6/20/2016**, received **6/20/2016** has been examined in conjunction with records filed in this office. (Lat: **34.304936** Long: **-118.542763** Datum:**83**)

THE PROPOSAL IS APPROVED PROVIDED:

1. Blowout prevention equipment, as defined by this Division's publication No. M07, shall be installed and maintained in operating condition and meet the following minimum requirements:
   a. Class **I** **Note: work to be completed without the removal of the injection assembly.**
2. Hole fluid of a quality and in sufficient quantity to control all subsurface conditions in order to prevent blowouts shall be used.
3. Prior to commencing downhole operations, a pressure test is conducted to demonstrate the mechanical integrity of the **6 5/8"** casing.
4. Injection shall be through tubing and packer only. Injection or withdrawal through the casing is not permitted.
5. This well is to be taken out of service and isolated from the storage reservoir. The well shall be re-evaluated or abandoned within 1 year of the completion of the pressure testing pursuant to Order #1109 and its amendments.
6. In all other respects, the provisions of Division Order #1109 shall remain in effect.
7. This office shall be contacted by phone prior to making any program changes and no changes are made without Division approval.
8. **THIS DIVISION SHALL BE NOTIFIED TO:**
   a. Witness a pressure test on the **6 5/8"** casing and tubing plug.

Continued on Next Page

Blanket Bond Dated: 7/6/1999
UIC Project No. 0100006
cc:

Engineer Clifford R. Knight
Office (805) 654-4761

CRK/crk

Kenneth A. Harris Jr.
State Oil and Gas Supervisor

By Patricia Ortiz for
Patricia A. Abel, *District Deputy*

A copy of this permit and the proposal must be posted at the well site prior to commencing operations. Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended. Issuance of this permit does not affect the Operator's responsibility to comply with other applicable state, federal, and local laws, regulations, and ordinances.

OG111 (revised 6/2011)

NOTE:

1. The base of the freshwater zone is at **800'±**.
2. No operation shall be undertaken or continued that will contaminate or otherwise damage the environment.
3. This permit is being issued as part of Division Order No. 1109 dated March 4, 2016. Any well that fails any of the testing must be taken out of service and isolated from the storage reservoir pursuant to the Safety Review Testing Regime.
4. The required History of Oil or Gas Well (OG103) shall include a complete description of the required pressure testing. **An updated casing and tubing diagram shall be included with the well history.**
5. **A Well Summary Report (Form OG 100)** and **Well History (Form OG 103)** shall to be submitted to the Division within 60 days after the well is drilled, reworked, plugged and abandoned, or if the work is suspended. Any additional well work will require an additional notice to be submitted to this office prior to resuming well operations.

Enclosure: Attachment 1 to DOGGR Order 1109. Safety Review Testing Regime for the Aliso Canyon Natural Gas Storage Facility

ATTACHMENT 1
TO DOGGR ORDER 1109

SAFETY REVIEW TESTING REGIME
FOR THE ALISO CANYON NATURAL GAS STORAGE FACILITY

This document identifies the requirements of this comprehensive safety review that shall be completed by the Southern California Gas Company (Operator) and verified by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division). The Operator shall use accepted industry practices and procedures.

The Division has consulted with independent technical experts from the Lawrence Berkeley, Lawrence Livermore, and Sandia National Laboratories ("National Laboratories") to develop the requirements of this facility safety review. The National Laboratories experts independently reviewed and concurred with the testing requirements for the safety review detailed below.

This comprehensive safety review requires that each of the active injection wells in the Aliso Canyon Storage facility either pass a thorough battery of tests in order to resume gas injection or be taken out of operation and isolated from the underground gas storage reservoir. Several steps, detailed below, are required in this safety review. Documentation of all testing required under this comprehensive safety review shall be provided electronically to the Division within 72 hours of completion of a test in digital (i.e. LAS) and printed (i.e. pdf) form. All pressure tests required under this comprehensive safety review shall be witnessed by Division staff. A well that is properly plugged and abandoned in accordance with Public Resources Code section 3208 is not subject to testing under this comprehensive safety review. A well that does not pass all tests must be repaired, retested, and pass all tests, or be plug and abandoned.

REQUIRED TESTS FOR EACH WELL IN THE FACILITY

Step 1: The Operator shall perform an initial casing assessment on the well consisting of temperature and noise logs.

a. Temperature Log:
A temperature survey shall be run from the surface to the packer to measure the temperature within the wellbore. A temperature survey that demonstrates no unexplained anomalous temperature changes in the well is one indication of casing integrity.

b. Noise Log:
An acoustic sensor survey capable of detecting the sound of fluid flow will be conducted the length of the well above the packer to the surface. The survey will include stops at least every 250 feet and at the midpoint of any anomaly detected by the temperature survey. The absence of anomalous sound above the packer is an indication of well integrity

Step 2: The results of the Temperature Logs and Noise Logs will be independently reviewed by Division engineers. Any unexplained abnormal findings in this set of tests shall be addressed by the Operator in one of the following ways:

a. Conduct further investigation and demonstrate to the Division's satisfaction that the abnormal finding is not an indicator of a lack mechanical integrity;
b. Remediate the well to the Division's satisfaction; or
c. With Division review and approval, remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

Necessary actions to remediate any abnormalities revealed by these tests will be reviewed by Division engineers. Once repairs or mitigations are completed, the Temperature Log and Noise Log must then be repeated on the well and reviewed by Division engineers to ensure that there are no additional abnormal test results and to confirm the issue was repaired.

Step 3: After these tests are completed on the well, and all required action has been completed, the operator shall either:

a. Conduct the additional tests and evaluations on the well, outlined in Steps 4a through 7a below, in order to gain approval for injecting gas through that well; or
b. Remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

REQUIRED TESTS IF A WELL IS INTENDED TO RESUME OPERATIONS

If Temperature and Noise Logs have been completed on a well and they indicate well integrity, and the Operator designates the well to return to injection operations, then the Operator shall perform the additional testing outlined in Steps 4a through 7a. The results of these tests will be independently reviewed by Division engineers and posted publicly. Each of the following tests requires that the production tubing be removed from the well.

Step 4a: The Operator shall conduct a **Casing Inspection log.**
The Operator shall conduct a Casing Inspection log of the well that measures the thickness of the production casing, from the surface to the bottom of the gas storage reservoir cap rock. If the inspection reveals a reduction in wall thickness, the current minimum strength of the casing will be calculated. If the current minimum strength of the casing has diminished to the point that it cannot withstand authorized operating pressures for the well plus a built-in additional safety factor of pressure, the well has failed this test. *A passing test for a casing inspection log would show no thinning of the casing that diminishes the casing's ability to contain at least 115% of the well's maximum allowable operating pressure as authorized in the current Project Approval Letter.*

Step 5a: The Operator shall conduct a **Cement Bond Log** for the well.
The Operator shall conduct a Cement Bond Log (CBL) that measures the bonding between cement and the production casing of the well, and also the bonding between the annular cement and the formation. Cement should be solidly bonded to both the well's production casing and the geologic formation to ensure a seal that prevents fluids from migrating up or down the outside of the well. *A passing test for a cement bond log shows definitive bond, as demonstrated by sonic waveform,*

between cement and casing and between cement and the gas storage formation and/or cap rock for at least 100 feet above the top of the gas storage reservoir.

Step 6a: The Operator shall conduct a **Multi-Arm Caliper Inspection** of the well.
The operator shall conduct an inspection that measures any internal degradation or significant changes to the well's geometry from the surface to the top of the gas storage reservoir, using a minimum 32-arm caliper tool. If the inspection reveals a thinning or deformity of the casing, the current strength of the casing will be calculated. If the current strength of the casing has diminished, such that it cannot withstand authorized operating pressures plus a built-in safety factor of additional pressure, the well fails this inspection. *A passing test for a Multi-Arm Caliper Inspection would show no deformation or thinning of the casing that diminishes the casing from being able to properly contain at least 115% of each well's maximum operating pressure.*

Step 7a: The Operator will conduct a **Pressure Test** of the production casing and of the well once the production tubing has been reinstalled. The Operator may conduct the casing pressure test prior to reinstalling the production tubing. Using a digital recorder, the operator will conduct a liquid-filled positive pressure test within the production tubing of the well, and in the annular space between the production tubing and the casing, to determine the well's ability to withstand normal operating pressures. The production tubing will be isolated and then pressure tested. The annular space between tubing and casing will be pressure tested. This testing also evaluates the integrity of any packers, which seal the annular space between the tubing and casing. The pressure test will be one hour and begin at a pressure of 115% of the maximum operating pressure or the minimum yield strength of the casing and tubing, whichever is less. *A passing pressure test is a pressure loss not exceeding 10% for any 30 minute period during the hour long test.*

After conducting the above tests, the Operator will conduct any indicated remediation so that the well can pass these tests. All remediation will be subject to the review of Division engineers. The well would then be required to undergo the tests once again to demonstrate well integrity.

If the well passes the Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper inspection and the Pressure Test to the Division's satisfaction, then the Division may clear the well for use for gas injections and withdrawal, once the Division has authorized resumption of injection into the gas storage reservoir. As noted below, wells approved for operation will only be permitted to inject or withdraw gas through the production tubing.

REQUIRED ACTIONS IF THE WELL IS TO BE TAKEN OUT OF OPERATION AND ISOLATED FROM THE GAS STORAGE RESERVOIR:

If the operator elects to take a well out of service, then the following steps shall be taken to isolate the well from the gas storage reservoir:

Step 4b: The Operator shall confirm the presence of cement outside the well's external casing in the section of the well that prevents the movement of gas from the underground gas storage reservoir to shallower geologic zones above the gas storage reservoir. Existing cement bond logs and well construction

records may be used to make this confirmation. This confirmation requires concurrence from Division engineers.

Step 5b: The Operator shall install a mechanical seal or "packer" within the well's production casing and install a mechanical plug within the well's production tubing, if applicable. These seals shall be set in place near the bottom of the well, within the portion of the well surrounded by cement. This kind of seal is an industry standard practice for isolating a well from reservoir gases or fluids and will further protect the casing from internal gas pressure.

Step 6b: The Operator shall fill the well with fluid to the well's surface in order to create appropriate downward hydrostatic pressure in the well that further contributes to the integrity of the well seal.

These measures will isolate a well from the underground gas reservoir, as confirmed by National Laboratory experts. Each of the above actions is subject to review and approval by Division Engineers.

Step 7b: Once the Operator has completed steps 4b, 5b, and 6b, and the seal is in place at the bottom of the well and the well is filled with fluid above the seal, the operator shall:

a. Conduct daily gas monitoring at the surface of the non-operational well, including monitoring the area around the well perimeter and in the annular space between the plugged casing string and the outmost casing;
b. Conduct noise log, temperature log and positive pressure test every six months;
c. Conduct weekly monitoring of fluid levels in the well or, install and operate real-time pressure monitors that provide immediate notification to the operator when pressures deviate from normal in the well's interior tubing and its annular space.

The above monitoring shall be reported to Division engineers and maintained as a part of the well file. Division engineers will review all submitted information for evaluation on a regular basis to ensure that the well taken out of service has maintained safety, and the operator shall take all necessary steps maintain the safety of the well.

Any well taken out of operation cannot be approved to resume operations and gas injection until the successful completion of the battery of tests outlined above in Steps 4a through 7a (Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper Extension and the Pressure Test) is completed. Those tests must be successfully completed within one year of completing step 6b. If a well cannot successfully complete all necessary steps required in this safety review after one year of completing step 6b, then the well shall be properly plugged and abandoned in accordance with Public Resources Code section 3208.

REQUIREMENTS FOR WELLS RESUMING OPERATIONS IN ALISO CANYON

The Division's authorization to resume injection in the Aliso Canyon Storage Facility will be contingent on the successful completion of this comprehensive safety review. The State Oil and Gas Supervisor must confirm in writing that all wells in the facility have either completed and passed the full battery of tests required in the safety review, been taken out of service and isolated from the underground gas storage reservoir, or been properly plugged and abandoned in accordance with Public Resources Code Section 3208.

NATURAL RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

FOR DIVISION USE ONLY		
	Forms	
Bond	~~OGD114~~	OGD121
	CAL WIMS	115

P216-0098

NOTICE OF INTENTION TO REWORK / REDRILL WELL

Detailed instructions can be found at: www.conservation.ca.gov/dog/

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework ☒ / redrill ☐ (Check one) well Mission Adrian 1-B, API No. 037-21892,

Sec. 34, T. 3N, R. 16W, S.B. B.&M., Aliso Canyon Field, Los Angeles County.

The complete casing record of the well (present hole), including plugs and perforations, is as follows: (Attach wellbore schematics diagram also.)

See attached wellbore schematic

The total depth is: 7716 feet. The effective depth is: 7512 feet.

Present completion zone(s): Sesnon (Name). Anticipated completion zone(s): Same (Name).

Present zone pressure: storage psi. Anticipated/existing new zone pressure: storage psi.

Is this a critical well as defined in the California Code of Regulations, Title 14, Section 1720(a) (see next page)? Yes☐ No☒

For redrilling or deepening only, is a California Environmental Quality Act (CEQA) document required by a local agency? Yes☐ No☒ If yes, see next page.

The proposed work is as follows: (A complete program is preferred and may be attached.)

The SCGC plans to take this well out of operation and isolate from the gas storage reservoir as per the First Amended Safety Review Testing Regime: Steps 4b-7b.

4b - Theo. TOC at 2957' as per attached wellbore mechanical.

5b - Packer set at 7183' and plug set in No-Go nipple at 7149' on 6/7/2016.

6b - Well circulated full of 8.5 ppg kill fluid on 6/14/2016.

7b - With tubing valve closed, pressure test annulus to 1000 psi. for 1 hour.

If well is to be redrilled or deepened, show proposed coordinates (from surface location) and true vertical depth at total depth: _____ feet _____ (Direction) and _____ feet _____ (Direction) Estimated true vertical depth: _____

Will the Field and/or Area change? Yes☐ No☒ If yes, specify New Field: _____ New Area: _____

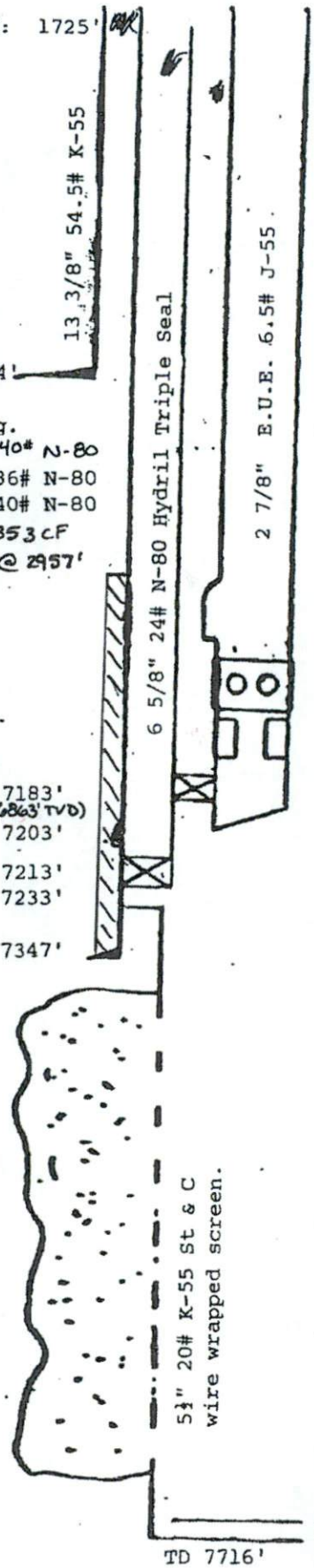
The Division must be notified immediately of changes to the proposed operations. Failure to provide a true and accurate representation of the well and proposed operations may cause rescission of the permit.

Name of Operator			
Southern California Gas Company			
Address P. O. Box 2300		City/State Chatsworth	Zip Code 91313-2300
Name of Person Filing Notice Mike Giuliani	Telephone Number: (805) 290-2074	Signature	Date 6/20/16
Individual to contact for technical questions: Mike Giuliani	Telephone Number: (805) 290-2074	E-Mail Address: mike.giuiliani@interactprojects.com	

This notice and an indemnity or cash bond must be filed, and approval given, before the workover begins. (See the reverse side for bonding information.) If operations have not commenced within one year of the Division's receipt of the notice, this notice will be considered cancelled.

Rec'd 06-20-16 DOGGR Ventura.

ELEVATION: 1725'



8 5/8" Csg.
0'-57'± 40# N-80
-5323' 36# N-80
-7347' 40# N-80
CMT'D W/1853 cF
8-5/8" TOC @ 2957'

Pkr. - 7183'
(6863' TVD)
WSO - 7203'
Pkr. - 7213'
Lnr. - 7233'
7347'

KB: 21' MV: 15'
Casing Flow String
ELEVATION: 1725' G.L.
SEC. 34, T3N, R16W

--7071' - Otis Gas Lift Mandrel (Open)

--7115' (6800') Otis Sliding Sleeve (2.313" I.D.) Open

--7149' - Otis No-Go Nipple 2.205" I.D.

MP - 7025 (top)
7045 (bottom)

--7192'

S1 - 7262'
S2 - 7294'

8/24/92: PU @ 7240' (Set down on oil sludge?)
(temp)

--S4 - 7374' (7042')

9/28/92: PU @ 7475' (Pulled thru grease, oil, or paraffin for 200-300')

--S8 - 7468' (7129')
-- 7486' (7146') (-5400')

MISSION ADRIAN 1-B

6/30/79 - Well spud.

10/29/79 - Well completed. (Suspended)

6/17/80 - Completion work begin.

7/15/80 - Well completed.

8/25/81 - Replaced Pengo csg. patch 1540'-1622'

1/18/82 - Replaced Pengo csg. patch 1564'-1606'.

11/18/82 - 2/19/83 - To repair shoe leak and casing leak. Shot 8 ½" holes at 7193'-7195' and squeezed with 50 sacks Class "G" cement. Squeeze unsuccessful. Shot 8 ½" holes from 7191'-7192' and squeezed 69 cu.ft. of neat "G" with final pressure of 2900 psi. Pressure tested holes at 1594'-1596' at 1600 psi with no breakdown. Ran 6 5/8" 24# N-80 Hydril triple seal inner string. Completed well.

WELL VOLUME

	Cu.Ft.	Bbls.
Tubing	234	42
Csg/Lnr.	50	9
Annulus	1049	187

Rec'd 06-20-16 DOGGR Ventura.

Casing Pressure Test Safety Check (1000 psi)

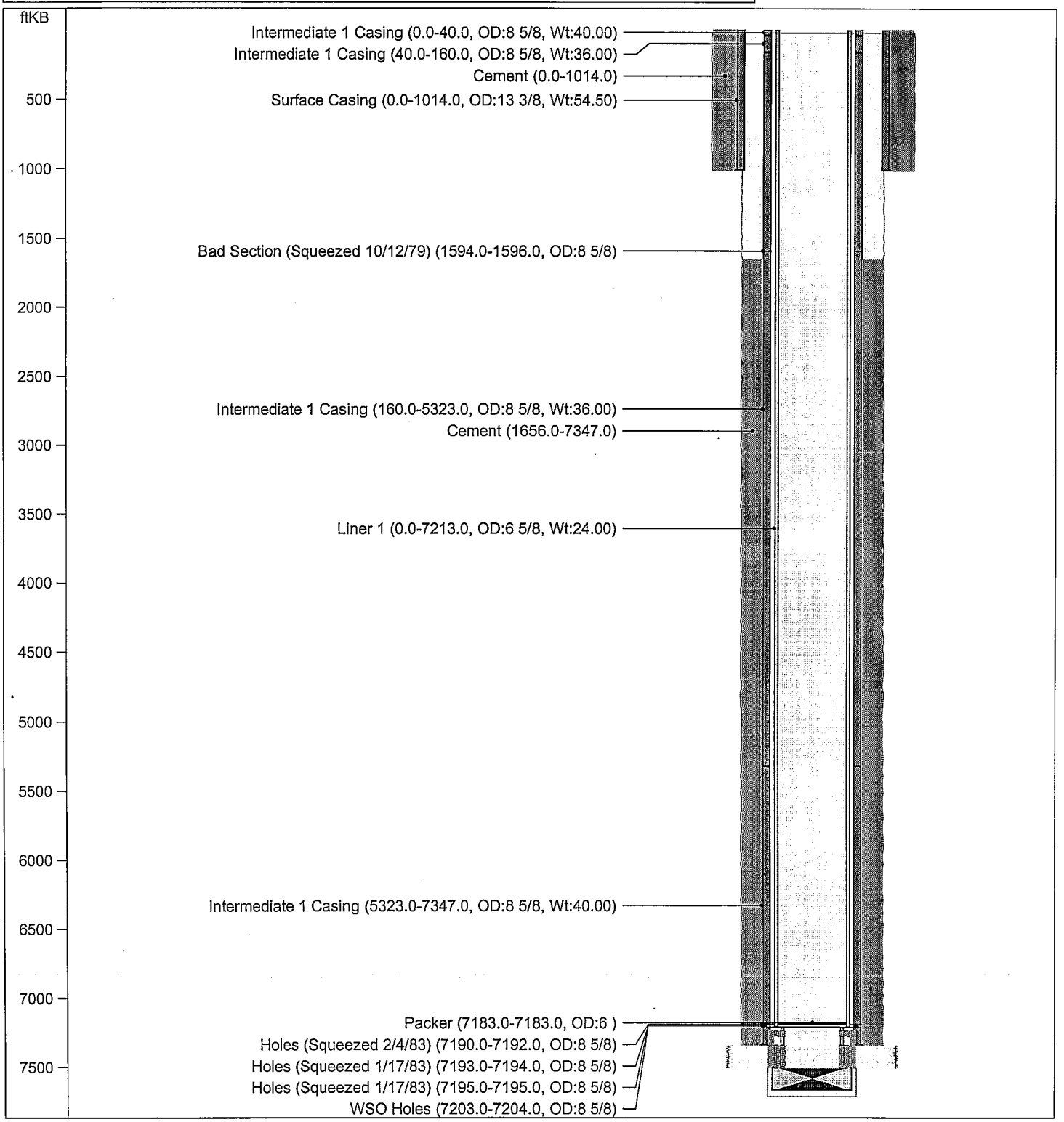
Well	Packer Depth MD/TVD	Casing Size/Grade/Weight	Depth MD	Burst PSI	85% of Burst PSI	Pressure at Depth w/1000 psi Surface Pressure	Press < 85% of Burst
Mission Adrian 1B	7183'/6863'	6-5/8", 24#, N-80	7213	7440	6324	4188	Yes
Porter 12	6843'/6842'	6-5/8", 24#, J-55*	4109	5110	4344	2816	Yes
		6-5/8", 24#, N-80*	4572	7440	6324	3021	Yes
		5", 15#, J-55*	6910	5700	4845	4054	Yes
Sesnon Fee 6	8878'/8878'	7", 29#, N-80	51	8160	6936	1023	Yes
		7", 23#, N-80	6231	6340	5389	3754	Yes
		7", 26#, N-80	8377	7240	6154	4703	Yes
		7", 29#, N-80	9268	8160	6936	5096	Yes
Standard Sesnon 30	8840'/8840'	7", 23#, N-80	1996	6340	5389	1882	Yes
		7", 23#, J-55	4199	4360	3706	2856	Yes
		7", 23#, N-80	6321	6340	5389	3794	Yes
		7", 26#, N-80	8206	7240	6154	4627	Yes
		7", 29#, N-80	9248	8160	6936	5088	Yes

* Actual pipe in well is a non-API grade so assumed closest size, weight & grade of API pipe

Rec'd 06-20-16 DOGGR Ventura.

04037218920000	
Well Name	MISSION ADRIAN 1B
Operator	SOUTHERN CA GAS CO
Field Name	ALISO CANYON
TD	7716.0 ftKB
PBTD	7400.0 ftKB
Approval Date	29-Mar-79
Spud Date	30-Jun-79
TD Date	03-Sep-79
Production Date	
Injection Date	
P/A Date	

Division of Oil & Gas Conservation



7/7/98

STATE OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT ON PROPOSED CHANGE OF WELL DESIGNATION

Ventura, California

November 12, 1991

R. D. Phillips, Agent
SOUTHERN CALIFORNIA GAS COMPANY
P.O.Drawer 3249 Mail Location 22GO
Los Angeles, CA 90051

Your request, dated July 24, 1991, proposing to change the designation of well(s) in Sec. 34, T. 3N, R 16W, S.B. B. & M., Aliso Canyon field, Los Angeles County, District No. 2, has been received.

The proposed change in designation, in accordance with Section 3203, Public Resources Code, is authorized as follows:

FROM	TO
"SFZU" FF-31 (037-00685)	"Fernando Fee" 31 (037-00685)
"SFZU" FF-33 (037-00687)	"Fernando Fee" 33 (037-00687)
"SFZU" FF-34 (037-00688)	"Fernando Fee" 34 (037-00688)
"SFZU" FF-35 (037-00689)	"Fernando Fee" 35 (037-00689)
"SFZU" MX-1A (037-21891)	"Mission Adrian" 1A (037-21891)
"SFZU" MA-1B (037-21892)	"Mission Adrian" 1B (037-21892)
"SFZU" MA 5 (037-00695)	"Mission Adrian" 5 (037-00695)
"SFZU" MA 5-A (037-22309)	"Mission Adrian" 5A (037-22309)
"SFZU" PF-3 (037-00646)	"Porter Fee" 3 (037-00646)
"SFZU" FF-34-A (037-22044)	"Fernando Fee" 34-A (037-22044)
"SFZU" FF-34-B (037-22302)	"Fernando Fee" 34-B (037-22302)
"SFZU" MA-3 (037-00693)	"Mission Adrian" 3 (037-00693)
"SFZU" MS-4 (037-00694)	"Mission Adrian" 4 (037-00694)
"SFZU" PF-1 (037-00644)	"Porter Fee" 1 (037-00644)
"SFZU" PF-2 (037-00645)	"Porter Fee" 2 (037-00645)

M. G. MEFFERD, State Oil and Gas Supervisor

By Patrick J. Kinnear
Deputy Supervisor
PATRICK J. KINNEAR

OGD157 (10/85/DWRR/1M)

OPERATOR So. Calif Gas Co.
LSE & NO "SFZU" MA-1B
MAP 254

	(1)	(2)	(3)	(4)	( )	( )
INTENTION	Drill Gas Storage	alter csg in U.S.	alter csg	alter csg in U.S.	alter csg in U.S.	alter csg in gas storage
NOTICE DATED	3-29-79	2-19-80	8-13-81	11-4-81	7-13-82	8-30-82
T-REPORT NUMBER	279-120	280-46	281-274	281-416	282-261	282-305
CHECKED BY/DATE	F.T. 7-28-80					
MAP LETTER DATED	8-2-80	N/C	N/C	N/C		
SYMBOL	*					

	REC'D	NEED	REC'D	NEED	REC'D	NEED	REC'D	NEED	REC'D	NEED	REC'D	NEED
NOTICE	4-11-79		2-22-80		8-14-81		11-6-81		7-16-82		8-31-82	
HISTORY	2-22-80		7-28-80		9-8-81		2-8-82		→		10-13-83	
SUMMARY	2-22-80		N/A		—		2-8-82					
DI-SFL IES/ELECTRIC LOG	11-21-79 9-14-86		—				—					
DIRECTIONAL SURV	2-22-80		—				—					
CORE/SWS DESCRIP	2-22-80		—				—					
OTHER Csg Insp. & Caliper LCH 12-10-79; Cont Dip 9-17-79 Cont Dip 11-1-79; CH-FD Photon 11-21-79												
RECORDS COMPLETE	✓		EPH		JR		JR				3-1-84	NE

ENGINEERING CHECK
T-REPORTS ✓
OPERATOR'S NAME ✓
WELL DESIGNATION ✓
LOC & ELEV ✓
SIGNATURE
SURFACE INSPECTION
FINAL LETTER OK

CLERICAL CHECK
POSTED TO 171 _____ 170 MAILED _____ FINAL LETTER MAILED _____
RELEASED BOND _____

REMARKS: Oper failed to notify witness of BOPE test on alter #4
Test results approved Feb 9, 1982

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

DIVISION OF OIL AND GAS
RECEIVED
OCT 13 1983
SANTA PAULA, CALIFORNIA

Operator So. California Gas Company Field Aliso Canyon County
Well MA 1-B, Sec. 34, T 3N, R 16W S.B.B. & M.
A.P.I. No. 037-21892 Name J.P. Anand (Person submitting report) Title Agent (President, Secretary or Agent)
Date March 21, 1983, 19

Signature J. P. Anand

P.O. Box 3249 Terminal Annex, Los Angeles, CA 90051 (Address) (213) 689-3561 (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date	
	MWO#99994 was issued to repair shoe leak. GWO#98865 was issued to run 6-5/8" innerstring and tubing.
1982	
11-18	Using Dowell pump truck displaced gas from well with 250 bbls of 74#/cu.ft. polymer completion fluid. Moved SPS Rig #47 from Montebello to MA 1-B.
11-19	Started rigging up SPS Rig #47.
11-20	Finished rigging up over well. Installed 3" back pressure valve in doughnut. Removed xmas tree and installed 8" 5000 psi Class III BOPE and pressure tested with water as follows. Blind and pipe rams and choke manifold at 4000 psi for 20 minutes. Hydril at 3000 psi for 20 minutes. Mr. Rob Hauser with Division of Oil and Gas declined witnessing of the BOPE test.
11-22	Finished rigging up. Welded and installed 8" flow line. Released tubing from packer. Measured out of well.
11-23	Finished pulling out of well. Layed down Baker and Otis production equipment. Picked up Kelly. Made up Midway spear and tools. Picked up 4-3/4" drill collars and ran in well. Jarred top seal from patch loose and pulled out of well. Did not recover seal. Ran in spear into seal, pulled out of well and laying down seal. Changed spear with stop sub 38' up. Ran in and jarred patch loose.
11-24	Finished pulling out of well. Recovered 40' of casing patch. Layed down casing patch and tools. Made up and ran in well with 7-5/8" flat bottom mill. Milled bottom swedge and seal loose. Pushed to packer at 7190'. Circulated well clean. Pulled out of well. Recovered bottom seals on mill. Made up Baker packer retrieving tool and ran in well.

11-26 Finished running in well to 7190'. Latched into packer. Unable to release packer. Released from packer and pulled out of well. Replaced pins in Baker pulling tool. Ran in well. Latched into packer and jarred on packer for 5 hours. Released from packer. Pulling out of well.

11-27 Finished pulling out of well. Made up Baker seals and latch-in sub. Ran in well. Slipped and cut drilling line. Latched into packer and jarred on packer. Jarred loose from packer but unable to latch back into packer. Pulled out of well. Baker pulling tool parted leaving 1' of seals and slip in packer. Made up Midway 7-1/2" O.D. mill over shoe and ran in well.

11-29 Milled on Baker retrieva "D" packer at 7190' for 7 hours. Circulated well. Pulled out and installed new 7-1/2" x 6-1/4" mill shoe on milling assembly and started back in well.

11-30 Continued milling with 7-1/2" O.D. x 6-1/4" I.D. mill #2 for 13 hours. Circulated well and started out of well.

12-01 Finished pulling out with mill #2. Installed new 7-1/2" O.D. x 6-1/4" I.D. mill shoe #3 on milling assembly and milled for 1 hour. Tubing twisted off. Pulled out with 1240' of 3-1/2" tubing. Installed 3-1/2" overshot on tubing and attempted to attach to fish at 1240'. Would not attach. Pulled out and installed spiral grapple in overshot. Attached to fish at 1240' and pulled out with fish. Started back in well.

12-02 Continued milling with 7-1/2" O.D. x 6-1/4" I.D. mill shoe #3 for 12 hours. Circulated well and started out with mill.

12-03 Finished pulling out with mill #3. Installed 7-1/2" O.D. x 6-1/4" I.D. mill shoe #4 on milling assembly and milled for 1-1/2 hours. Tubing twisted off at 1600'. Ran Bowen overshot to fish at 1600'. Attached to fish and pulled to parted pin. Replaced joint of 3-1/2" tubing and continued milling at 7194' for 1-1/2 hours. Tubing twisted off at 2523'. Pulled out and ran Bowen overshot to 2523'. Attached to fish and pulled 5 stands to secure well.

12-04 Started out of well laying down 3-1/2" EUE 8Rd tubing.

12-06 Finished laying down 3-1/2" tubing. Installed 2-7/8" pipe rams in BOPE and pressure tested at 2000 psi for 10 minutes. Made up milling assembly on 2-7/8" EUE 8Rd tubing and ran in well picking up new 2-7/8" EUE 8Rd.

12-07 Started milling on packer at 7194' with mill #4. Rotary table failed.

12-08 Completed repairs on rotary table drive. Continued milling with mill shoe #4 for 6 hours.

12-09 Continued milling with mill #4 for 5 hours. Pulled out of well. Installed 7-1/2" O.D. x 6-1/4" I.D. mill shoe #5 on milling assembly and continued milling on packer at 7194'.

12-10 Continued milling with mill shoe #5 for 12 hours. Packer released and went down to liner at 7233'. Milled on packer without circulation for 5 minutes and started out of well.

12-11 Finished pulling out with mill. Recovered 3 spiral pieces of metal. Ran 7-1/2" O.D. Impression block on sand line to 7226' (top of fish) and pulled out. Impression showed 4" ring in center and sharp piece on outside of 7-1/2" circle. Ran 7-1/2" O.D. x 6-1/4" I.D. mill shoe #6 with spiral pattern in bore to 7226' and milled for 3-1/2 hours. Started out with mill shoe.

12-13 Pulled out of well with mill shoe #6. Made up 5-3/4" dumble grab on hydraulic jars and six 4-3/4" drill collars. Ran to 7226'. Attached to fish and grab slipped off 5 times with 6000# pull. Pulled out of well with dumble grab. Reran mill shoe #6 on milling assembly.

12-14 Milled on packer with mill #6 for 4 hours. Mill torqued up and would not mill. Pulled out with mill #6. Ran 7-1/2" O.D. overshot with 6" grapple on hydraulic jars, bumper sub and six 4-3/4" drill collars. Attached to packer at 7226' and jarred packer from 7226' to 7205'.

12-15 Jarred on packer at 7205' for 7 hours. Tools would not move up or down well. Using Dialog free pointed and backed off at 7176' (wireline measurement) leaving one 4-3/4" drill collar, hydraulic jars, bumper sub and 7-1/2" x 6-1/4" overshot attached to fish in well.

12-16 Finished pulling out with 5 drill collars. Installed down hydraulic jars and up hydraulic jars on 13 drill collars with one accelerator. Ran back to top of fish and screwed back into fish at 7176'. Jarred down for 3 hours moving fish 10' down well. Jarred up for 4 hours moving fish from 7215' up to 7185' when tubing parted. Pulled out and found part at 4622'. (Last thread of pin leaving 2-7/8" box to fish).

12-17 Pulled kill string out of well. Made up Midway 5-3/4" x 2-1/2" overshot. Ran in well and latched onto fish at 4622'. Jarred on fish. Tried to release overshot from packer but unable to release. Rigged up Dialog. Ran in with 1-5/8" string shot which stopped in drill collars at

6755'. Pulled out change tool to 1". Ran in and backed off at 7178'. Pulling out of well laying down 2-7/8" tubing.

12-18 Pulled out of well laying down 2-7/8" tubing. Layed down two 4-3/4" x 1-7/8" I.D. drill collars. Made up fishing tool and drill collars. Ran in well picking up 2-7/8" drill pipe with 134 joints picked up.

12-20 Finished picking up 2-7/8" drill pipe. Screwed into fish at 7175' and jarred on fish for 4 hours. Jars stopped working. Attempted to release overshot. Pulled loose. Pulled out of well. Mandrel in bottom jars parted. Recovered one drill collar. Fish left in well, overshot, bumper sub, 6' of jars with top of fish at 7207'. Ran in well with 7-3/8" x 4-5/8" overshot to engage jars.

12-21 Circulated well. Latched on fish with overshot at 7207'. Unable to release bottom overshot on packer. Jarred on fish for 8 hours. Rigged up Dialog. Ran in well with #6 string shot. Set shot off in packer from 7232' to 7225'. Overshot did not release.

12-22 Ran string shot in well. Set string shot #2 off in packer at 7223'. Jarred on fish for 1 hour. Made up and ran string shot #3. Set off shot in packer at 7222'. Jarred on fish 1 hour. Made up and ran shot #4 at 7221' and overshot slipped off at 7207'. Attached overshot to fish and made back off. Loaded out Dialog.

12-23 Pulled out of well. Recovered jars and bumper sub from well. Left overshot and cross-over sub on packer fish with top at 7216'. Made up and ran in well with Midway 7-3/8" x 6-1/4" mill over shoe. Replaced 10 joints of bent 2-7/8" drill pipe. Milled over fish from 7218' to 7219'. Circulated well clean.

12-24 Pulled out of well. Recovered cross-over sub and drive sub from overshot. Top of fish at 7219'. Made up Servco 7-5/8" O.D. junk mill on 2 junk subs, jars and six 4-3/4" drill collars. Ran in well.

12-27 Milled with 7-5/8" concave mill #1 for 13 hours from 7219' to 7221'.

12-28 Continued milling with concave mill #1 for 4 hours. Pulled out of well. Installed 7-5/8" O.D. concave mill #2 and continued milling for 4-1/2 hours from 7221' to 7222'.

12-29 Continued milling with 7-5/8" concave mill #2 for 6 hours. Stopped milling for 2 hours to change rig brake bands. Continued milling from 7222' to 7223'.

12-30 Pulled out with concave mill #2 and ran 7-5/8" O.D. concave mill #3 to 7223' and milled to 7225'.

12-31 Pulled out of well with concave mill #3. Installed 4-5/8" O.D. concave mill on one 4' x 3-3/4" O.D. extension below one 8-5/8" stabilizer. Ran to 7200' and closed well in.

1983

1-03 Using 4-5/8" concave mill #1 milled from 7223' to 7225-1/2' in 11 hours. Pulled out with mill #1 and installed new 4-5/8" mill #2. Started in well.

1-04 Finished running in well with 4-5/8" mill #2. Milled for 7 hours. Pulled out with mill #2. Installed tapered string mill with taper from 3-1/2" to 4-5/8" and ran to 7225'.

1-05 Worked 3-1/2" x 4-5/8" string mill for 12 hours when mill started sticking in well. Lost hydraulic jar action. Started out with tapered mill.

1-06 Finished pulling out with tapered string mill #1. Reran string mill #1 with new hydraulic jars, ten 4-3/4" O.D. drill collars and accelerator. Milled on fish at 7225' for 4 hours. Mill stuck in fish and hydraulic jars failed. Worked mill loose from fish. Pulled out of well. Installed new hydraulic jars and started in well.

1-07 Finished running in well with new jars. Milled through packer with 4-5/8" mill. Pulled out of well. Installed 4-3/4" O.D. tapered mill on milling assembly and reamed through fish at 7227' to 4-3/4" I.D. Started out of well with mill.

1-08 Finished pulling out with 4-3/4" mill. Made up 4-5/8" concave mill on 308' of 2-3/8" tubing tail and ran on 2-7/8" drill pipe. Found top of fill at 7372' (T.D. 7511'). Could not clean out with mill. Pulled out of well. Removed mill. Started back in well with 308' of tubing tail below 2-7/8" drill pipe.

1-10 Hung tubing tail at 7347'. Preceded by 54 cu.ft. and followed by 4 cu.ft. of lease water mixed and equalized 18 sacks of sand but would not fall out of tubing. Equalized 18 sacks of sand preceded by 350 cu.ft. of lease water and equalized sand from 7372' to 7226'. Shut down to repair accumulator pump 3 hours. Back scuttled sand from well to 7240'. Generator failed on rig.

1-11 Located top of sand at 7259'. Pulled out of well. Using Hercules wireline, filled 5-1/2" liner with sand to 7240' and capped with cement from 7240' to 7222'. Installed 308' of 2-3/8" tubing tail on Johnston 8-5/8" retrievable retainer and started in well.

1-12 Ran 2-3/8" tubing tail to 7203' with retrievable retainer at 6895'. Equalized 75 cu.ft. of 12% HCL and 3% HF acid at holes from 7204' - 7408'. Set retrievable retainer and squeezed away 38 cu.ft. of acid into holes at 2800 psi in 10 hours. Closed well in with 2800 psi on drill pipe.

1-13 Checked pressure on drill pipe. Pipe still had 1200 psi. Pressured holes at 7204' with 2800 psi. No pressure loss in 10 minutes. Pulled out of well. Using Mc Cullough electric line shot eight 1/2" bullet holes at 7195'. Reran 308' of tubing tail below 8-5/8" retrievable retainer. Hung tail at 7090' and retainer at 6782'. Set retainer and displaced 26 cu.ft. of 12% HCL and 3% HF acid into well in 6 hours. Released retainer and back scuttled acid out of well.

1-14 Hung tail at 7201' with retainer at 6893'. Equalized 62 cu.ft. of 12% HCL and 3% HF acid at 7195'. Attempted to displace acid but found leak of 800 psi in 10 minutes from drill pipe to annulus. Released retrievable retainer and pulled out of well. Using Mc Cullough, shot eight 1/2" bullet holes from 7193'-94'.

1-15 Made up 308' of 2-3/8" tubing tail on Johnston test tool and ran tail to 7181' with test tool at 6873'. Set test tool with 1000' of water cushion. Opened tool and had light blow for 5 minutes, dead for next 15 minutes. Released tool and back scuttled well. Ran tail to 7212' with retainer at 6904'. Equalized 25 cu.ft. of 12% HCL and 3% HF acid across holes from 7193' - 7195'. Set retainer and displaced acid past holes at 8 cu.ft./minute with 2500 psi. Started out of well.

1-17 Finished pulling out of well with test tools. Rigged up Mc Cullough and ran Baker 8-5/8" 40# drillable retainer on wireline. Set at 7150'. Loaded out Mc Cullough. Ran Baker stab-in tool in well on 2-7/8" drill pipe. Squeezed holes with 25 cu.ft. of 6% HCL and 1-1/2% HF acid followed with 50 sacks of Class "G" cement with 0.5% CFR-2 and 0.6% Halad 9 and followed with 10 cu.ft. of fresh water. Squeezed 15 cu.ft. in place with a final pressure of 2800 psi. Back scuttled and pulled out of well.

1-18 Finished pulling out of well. Ran in well and set Baker retrievable bridge plug at 1663'. Equalized sand from 1663' to 1615'. Pulled out of well. Picked up 12 joints of 2-7/8" tubing (367') and Baker Model "C" retrievable retainer without unloading sub. Ran in well to 1596' and equalized 50 cu.ft. of 12% HCL 3% HF acid. Pulled 3 stands and set retrievable retainer. Attempted breakdown at 0.85 psi/ft. gradient - "no breakdown". Back scuttled acid out of well. Pulled out of well. Removed BOPE and tubing head. Installed spool for landing 6-5/8" casing. Installed BOPE.

1-19 Finished installing BOPE. Ran in well with Baker retrieving tool. Back scuttled sand from 1615' to top of bridge plug. Released bridge plug at 1663' and pulled up to 300' and reset bridge plug. Finished pulling out of well. Closed blind rams and tested spool and BOPE to 3000 psi with rig pump. Made up 7-5/8" bit, junk sub, 8-5/8" 40# casing scraper, bit sub and four 4-3/4" drill collars on 2-7/8" drill pipe. Ran in well. Drilling on retainer at 7150'.

1-20 Continued drilling on Baker 8-5/8" 40# drillable retainer at 7150'. Drilled out cement and cleaned out to Hercules cement plug set at 7222'. Back scuttled and pulled out of well. Ran in well with Cavins surge tool. Worked surge tool. Pulling out of well.

1-21 Finished pulling out of well with Cavins surge tool. Rigged up Mc Cullough dual casing inspection log but failed to work. Ran Internal electronic caliper log from 7219' to surface. Loaded out Mc Cullough. Ran retrievable retainer with 300' of tubing tail to 6000'.

1-22 Rigged up Halliburton. Set retainer at 6000' and tested casing from 6000' to 7220' at 1575 psi. Pulled to 5000' and tested 5000' - 7220' at 1300 psi. Pulled to 4000' and tested 4000' - 7220' at 1050 psi. Pulled to 2000' and tested 2000' to 7220' at 1000 psi. Pulled to 1000' and tested 1000' to 7220' at 425 psi. Closed pipe rams and tested 0' to 1000' at 1000 psi. Ran into 7193' with tail of tubing. Tested holes 7193' - 7195' at 2150 psi for 60 minutes. Pulled out of well. Layed down 8-5/8" 40# Baker retainer. Made up 4-3/4" bit on 300' of 2-3/8" tubing. Ran in well with 2-7/8" D.P. to 7284'.

1-24 Finished running in well with 4-3/4" bit. Mixed 550 bbls of 63#/cu.ft. polymer completion fluid and displaced lease water from well with 400 bbls of 63#/cu.ft. polymer completion fluid. Drilled out cement from 7222' to 7240' and cleaned out sand to 7372'.

1-25 Pulled out with 4-3/4" bit. Made up Lynes 8-5/8" test tool with 17' of tail and ran to 7222' with tail.

1-26 Ran tail to 7222' and Lynes test packer at 7205'. Set and opened tester. Drill pipe pressure reached 700 psi in 10 minutes, at which time gas began unloading polymer fluid from the annulus. Unlanded test tool and displaced gas from drill pipe. Pulled out of well checking for thread leak in drill pipe. Installed new 8-5/8" Lynes test tool with 17' of tail and started back in well.

1-27 Finished running new 8-5/8" test tools in well. With tail at 7222' and Lynes test tool at 7205' opened tool at 11:00 a.m. and flowed gas into withdrawal system for 5 hours. Maximum flow pressure was 800 psi during withdrawal. Shut in pressure reached 1920 psi in 10 minutes. Attempted to rig up Mc Cullough noise logging tool but would not go through Lynes flow manifold on drill pipe. Closed test tool in and bled gas pressure off drill pipe and closed well in.

1-28 Ran Triangle noise log #1 from 7191' to surface. Showed noise to 6800' on 200 HZ scale. Reran noise log #2 from 7191' to 6200' which showed no noise. Ran noise log #3 from 7191' to 6200' which showed noise on 200 HZ curve to 7170'. Released test tool, back scuttled gas from well and started out of well.

1-29 Finished pulling out with test tools. Installed new Lynes 8-5/8" test tool with 17' of tail. Set packer at 7205' with tail to 7222'. Opened tool and flowed into Gas Company withdrawal system for 8 hours. Gas Company withdrawal line pressure was 340 psi and flow pressure on drill pipe was 700 psi. Closed well in and bled drill pipe pressure to Ø psi.

1-31 Using Gearhart equipment ran Audio analyzer log from 7191' to surface which showed noise from 7191' to 6850'. Reran log from 7191' to 6300' which repeated log #1. Released Lynes test tool. Displaced gas from well with 63#/cu.ft. polymer completion fluid. Pulled out of well.

2-01 Ran casing inspection log from 7214' to 500'. Using Mc Cullough bullet gun shot eight 1/2" bullets from 7190'-1/2' to 7192'. Made up 323' of 2-3/8" tubing tail on 2-7/8" drill pipe and ran tail to 7360'. Using Dowell mixed 11 sacks of sand with lease water, pumped sand out and displaced sand with rig pump from 7372' to 7290'.

2-02 Hung tubing tail at 7362'. Equalized 21 sacks of sand. Pulled 20 stands of drill pipe and waited 1 hour. Ran tail back in well to 7239' and back scuttled. Pulled 20 stands. Shut well in due to bad weather.

2-03 Pulled out of well. Using Hercules wireline continued sand plug from 7249' to 7237' and capped with cement from 7237' to 7219'. Made up 308' of 2-3/8" tubing tail on Johnston 8-5/8" retrievable retainer and ran tail to 7192'.

2-04 Hung tubing tail at 7192'. Equalized 75 cu.ft. of 12% HCL and 3% HF acid at 7192'. Set retrievable retainer and obtained breakdown into holes at 7190'-1/2'-92'. Rate started at 9.8 cu.ft./min. at 2800 psi and decreased to 2.8 cu.ft./min. after displacing 56 cu.ft. into well. Equalized an additional 125 cu.ft. of 12% HCL and 3% HF acid at 7192'. After displacing 78 cu.ft. into well, pressure broke and rate increased to 13 cu.ft./min. at 2800 psi. Pulled out with retrievable retainer. Using Mc Cullough electric line, set Baker 8-5/8" Model "K" drillable retainer at 7155'. Baker setting tool failed. Pulled electric line from rope socket.

2-05 Ran 3-1/2" Bowen overshot on 4-3/4" O.D. bumper sub, hydraulic jars and four drill collars to 7194'. Attached to Baker setting tool, jarred shear stud loose from retainer and pulled out of well. Ran Baker seal assembly to retainer at 7156', pumped 25 cu.ft. of 6% HCL and 1-1/2% HF acid followed by 67 cu.ft. of Neat "G" with 0.5% D-65 and 0.6% D-108. Stabbed into retainer and over displaced cement 30 cu.ft. past holes at 7192'. Pulled out of retainer, mixed 67 cu.ft. of Neat "G" with 0.5% D-65 and 0.6% D-108. Displaced 39 cu.ft. into holes at 7192' before reaching final squeeze pressure of 2900 psi. Released from retainer and back scuttled cement from well. Started out with stinger.

2-07 Finished pulling out with stinger. Installed new 9" 5000 psi Hydril packing unit in Hydril. Made up 7-5/8" bit on 8-5/8" 40# casing scraper, 1 junk sub and six 6-3/4" O.D. drill collars and ran to 7152'. Pressure tested Hydril bag to 2000 psi. Displaced 63#/cu.ft. lease water from well with 400 bbls of 63#/cu.ft. polymer completion fluid and started drilling retainer at 7155'.

2-08 Finished drilling retainer at 7155' and drilled hard cement to 7195' before tools fell free. Drilled out cement cap from 7220' to 7226'. Back scuttled well volume and started out with drilling assembly.

2-09 Finished pulling out with 8-5/8" drilling assembly. Made up Johnston 8-5/8" retrievable retainer on 2-7/8" drill pipe and set at 7107'. Pressure tested from 7107' to 7226' at 1000 psi for 20 minutes. Pulled out with retainer. Made up 4-3/4" bit on 5-1/2" casing scraper and drilled cement from 7226' to 7240' and cleaned sand out to 7260'. Bit started sticking while cleaning out sand. Pulled out with 4-3/4" bit and started back with opened ended 2-3/8" tubing.

2-10 Continued cleaning out from 7260' to 7508'. Circulated well and pulled out with tubing tail. Made up Lynes 8-5/8" 40# test tools with 10' of tubing tail and ran tool to 7210' with tail to 7220'. Pressure tested the test tree and manifold to 3000 psi for 20 minutes.

2-11 Lynes test tool set at 7208' with tail to 7218'. Set and opened tool at 7:00 a.m. Flowed into Gas Company withdrawal system for 8 hours. Well reached maximum surface pressure of 1100 psi while flowing (withdrawal line back pressure = 340 psi). Ran Gearhart audio analyzer log from 7189' to 6500' which showed no gas movement.

2-12 Test tool set at 7108' with tail to 7218'. Reopened test tool and flowed gas into withdrawal system for 12 hours.

2-14 Rigged up Triangle. Ran Audio analyzer log from 7189' to surface which showed no gas movement. Back scuttled gas out of drill pipe. Pulled out of well. Rigged up Mc Cullough and ran collar locator from 7114' to 7280'. Located top of Model "D" junk packer - 7221' - bottom 7224'. Using wire line, set Baker large bore Model "D" packer - 7213' top - 7218' bottom. Made up locator sub and 2 seals on 2-7/8" drill pipe. Running in well.

2-15 Finished running in well to 7213' and pressured tested Baker packer and seals. Circulated gas from well. Layed down 2-7/8" drill pipe and drill collars. Installed 6-5/8" pipe rams. Ran 6-5/8" 24# N-80 Hydril triple seal casing with 6 seals and cross-over landing locator sub from seal threads to 6-5/8" 24# N-80 Hydril triple seal threads. Landed on packer with 50,000#.

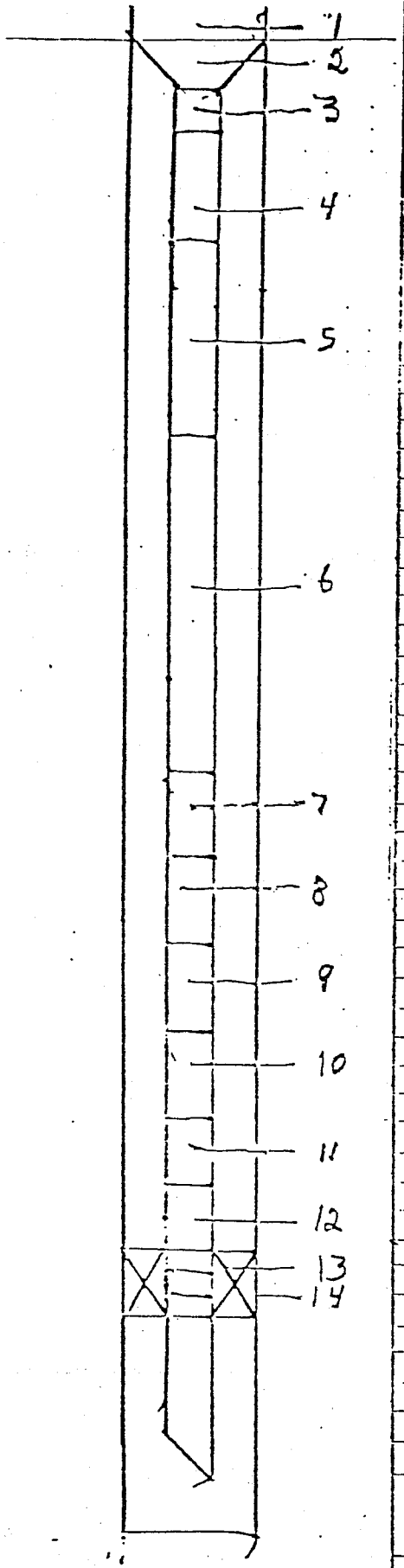
2-16 Tested 8-5/8" Baker Model "D" seals and packer. Inhibited 75#/cu.ft. polymer completion fluid between 6-5/8" casing. Stabbed into packer. Attempted to set Baker 6-5/8" bridge plug - "failed to work" - attempted to set second Baker 6-5/8" bridge plug #2 - "failed to work" - released Baker - ran and set Howco bridge plug. Cut off 6-5/8" casing. Reinstalled BOPE. Retrieved bridge plug. Picking up 2-7/8" tubing.

2-17 Pulled out of well. Removed BOPE. Installed seal flange and tubing head. Reinstall BOPE. Ran into 300' and pulled Howco 6-5/8" bridge plug up to 60'. Pulled retrieving tool. Closed shut off rams and tested BOPE connections to 3000 psi. Retrieved bridge plug. Ran in well with 2 seals and locator sub. Tongs quit working "down 3 hours". Finished picking up tubing. Circulate gas from well.

2-18 Land on packer with 10,000# closed pipe rams and tested seals and packer to 1500 psi. Pulled out of well and lay down test seals. Ran 2-7/8" 6.5# 8Rd EUE J-55 - N-80 tubing, Drift and Hydrotest tubing to 5000 psi. Spaced out and landed on packer with 10,000#. Pulled 20,000# over weight of tubing to check latch. Set back pressure valve in doughnut. Removed BOPE installed xmas tree. Tested xmas tree to 5000 psi for 20 minutes. Circulated polymer completion fluid out of well with waste salt water.

2-19 Install blind flanges. Rig down. Release rig at 3:30 p.m. 2-19-83.

WELL PROFILE



OPERATOR So. Calif. Gas Co.

WELL # MA 1-B

FIELD Aliso Canyon

COUNTY Los Angeles

STATE California

DATE 3-23-83

☐ NEW COMPLETION ☒ WORKOVER

	CASING	LINER	TUBING 1	TUBING 2	TUBING 3
SIZE					
WEIGHT					
GRADE					
THREAD					
DEPTH					

ITEM NO.	TUBING DETAILS	LENGTH	DEPTH
1.	K.B.	21.00	
2.	Tubing hanger (3-1/2" EUE 8Rd)	.85	21.8
3.	Cross-over 3-1/2"x2-7/8"	1.05	22.9
4.	1 pup joint 2-7/8" 8Rd EUE J-55	8.00	30.9
5.	6 joints 2-7/8" 6.5# 8Rd EUE N-80 tub.	185.07	215.9
6.	223 joints 2-7/8" 6.5# 8Rd EUE J-55 tub.	6855.09	7071.0
7.	2-7/8" otis gas lift mandrel open	13.05	7084.1
8.	1 joint 2-7/8" 6.5# EUE 8Rd J-55 tub.	31.13	7115.2
9.	Otis 2-7/8" sliding sleeve open	3.18	7118.4
10.	1 joint 2-7/8" 6.5# EUE 8Rd J-55 tub.	31.02	7149.4
11.	Otis 2.205 NO-GO nipple	1.28	7150.7
12.	1 joint 2-7/8" 6.5# EUE 8Rd J-55 tub.	31.41	7182.1
13.	Baker latch-in-locator	1.20	7183.3
14.	Baker 4 seals	3.75	7187.0
15.	Baker production tube	5.25	7192.3

Tested latch-in 20,000# over tubing
landed 10,000# on packer.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 283-4

DIVISION OF OIL AND GAS

Report on Operations

Mr. J. P. Anand, Agent
Southern Calif. Gas Co.
Box 3249 Terminal Annex
Los Angeles, CA 90051

Santa Paula, Calif.
Jan. 5, 1983

Your operations at well "SFZU" MA-1B, API No. 037-21892, Sec. 34, T. 3N, R. 16W SB B.& M. Aliso Canyon Field, in Los Angeles County, were witnessed on 11/21/82. R. Hauser, representative of the supervisor, was present from 0930 to 1000. There were also present

Present condition of well: 13 3/8" cem 1014'; 8 5/8" cem 7347', cp 7205', 7206', 7207' and 7208', perf 7204' WSO, casing patch 1606-1564'; 5 1/2" ld. 7233-7511', perf 7510-7343', and 7280-7243'. T.D. 7512'.

The operations were performed for the purpose of inspecting the blowout prevention equipment and installation.

DECISION:

THE BLOWOUT PREVENTION EQUIPMENT AND INSTALLATION ARE APPROVED.

b

M. G. MEFFERD
State Oil and Gas Supervisor

By
Deputy Supervisor
Murray W. Dosch

OG109(12-80-15M)

FORM OG111(10/81/DWRR/5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 282-305

010
(field code)
00
(area code)
30
(new pool code)
30
(old pool code)

REPORT ON PROPOSED OPERATIONS

Mr. J. P. Anand, Agent
Southern Calif. Gas Co.
Box 3249 Terminal Annex
Los Angeles, CA 90017

Santa Paula, California
September 1, 1982

Your supplementary proposal to alter casing in gas storage well "SFZU" MA-1B, A.P.I. No. 037-21891, Section 34, T. 3N, R. 16W, SB B. & M., Aliso Canyon field, any area, Sesnon-Frew pool, Los Angeles County, dated 8/30/82, received 8/31/82 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. In all other respects, the provisions set forth in our report No.P282-261 dated July 19, 1982 shall apply.

Blanket Bond
RLH:b

M. G. MEFFERD, State Oil and Gas Supervisor

By Murray W. Dosch
Murray W. Dosch, Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

Supplementary Notice
~~Notice of Intention~~ to Rework Well

AUG 31 1982
SANTA PAULA, CALIFORNIA

This notice and indemnity or cash bond shall be filed, and approval given, before rework begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

FOR DIVISION USE ONLY		
BOND	FORMS	
	OGD114	OGD121
BB	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention

to rework well Mission Adrian #1B (Well designation), API No. 037-21891

Sec. 34, T. 3N, R. 16W, SB B. & M., Aliso Canyon Field, Los Angeles County.

The present condition of the well is as follows:

1. Total depth 7512'

2. Complete casing record, including plugs and perforations

13-3/8" cemented 1014'
8-5/8" cemented 7347', cp'd 7205', 7206', 7207' and 7208'. WSO through 4 - 1/2" holes at 7204'
Casing patch set over leak 1606'-1564'
278' 5-1/2" landed 7511', Top 7233', 10 mesh wire wrapped 7510'-7343' and 7280'-7243'. Gravel flow packed.

3. Present producing zone name Sesnon; Zone in which well is to be recompleted -

4. Present zone pressure 3400 psi; New zone pressure -

5. Last produced Gas storage well (Date) ____ (Oil, B/D) ____ (Water, B/D) ____ (Gas, Mcf/D)

(or)

Last injected ____ (Date) ____ (Water, B/D) ____ (Gas, Mcf/D) ____ (Surface pressure, psig)

The proposed work is as follows:

1. Move in & rig up. Kill well. Install BOPE & pressure test.
2. Pull tubing. Recover casing patch & packer. Fill liner with sand 7511'-7220'. Squeeze holes 7204'-7208' with cement. Drill out cement, clean out sand, test and run Audio analyzer log to determine gas leakage has stopped.
3. Set packer near 7180'. Run 6-5/8" 24# N-80 Hydril triple seal and land on packer. Set packer near 7150', run tubing and complete.
4. Return well to gas storage service.

It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address P.O. Box 3249 Terminal Annex (Street)
LA (City) CA (State) 90051 (Zip)
Telephone Number (213) 689-3925

Southern California Gas Company (Name of Operator)
By J. P. Anand (Print Name)
J. P. Anand (Signature) 8-30-82 (Date)

OG107 (6/81/GSR1/5M)

FORM OG111(10/81/DWRR/5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 282-261

010
(field code)
000
(area code)
30
(new pool code)
30
(old pool code)

REPORT ON PROPOSED OPERATIONS

J. P. Anand, Agent
So. Calif. Gas Co.
P.O. Box 3249 Terminal Annex
Los Angeles, CA 90051

Santa Paula, California
July 19, 1982

Your _____ proposal to alter casing well "SFZU" MA-1B, A.P.I. No. 037-21891, Section 34, T. 3N, R. 16W, SB B. & M., Aliso Canyon field, any area, Sesnon-Frew pool, Los Angeles County, dated 7/13/82, received 7/16/82 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
2. Blowout prevention equipment of at least DOG Class III 3M, shall be installed and maintained in operating condition at all times.
3. This office shall be consulted before initiating any changes or additions to this proposed operation, or if operations are to be suspended.
4. THIS DIVISION SHALL BE NOTIFIED TO WITNESS A PRESSURE TEST OF THE BLOWOUT PREVENTION EQUIPMENT BEFORE COMMENCING DOWNHOLE OPERATIONS.

Blanket Bond
RLH:b

M. G. MEFFERD, State Oil and Gas Supervisor

By Murray W. Dosch
Murray W. Dosch, Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

Notice of Intention to Rework Well

DIVISION OF OIL AND GAS RECEIVED JUL 16 1982

This notice and indemnity or cash bond shall be filed, and approval given, before rework begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

FOR DIVISION USE ONLY		
BOND	FORMS	
	OGD 114	OGD 121
BB	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention

to rework well Mission Adrian #1-B (Well designation), API No. 037-21891

Sec. 34, T. 3N, R. 16W SBB. & M., Aliso Canyon Field, Los Angeles County.

The present condition of the well is as follows:

1. Total depth 7512'

2. Complete casing record, including plugs and perforations

13-3/8" cemented 1014'
8-5/8" cemented 7347', cp'd 7205', 7206', 7207' and 7208'. WSO through 4 - 1/2" holes at 7204'
Casing patch set over leak 1606'-1564'
278' 5-1/2" landed 7511', Top 7233', 10 mesh wire wrapped 7510'-7343' and 7280'-7243'. Gravel flow packed.

3. Present producing zone name Sesnon; Zone in which well is to be recompleted -

4. Present zone pressure 3400 psi; New zone pressure -

5. Last produced Gas storage well (Date) ____ (Oil, B/D) ____ (Water, B/D) ____ (Gas, Mcf/D)

(or)

Last injected ____ (Date) ____ (Water, B/D) ____ (Gas, Mcf/D) ____ (Surface pressure, psig)

The proposed work is as follows:

1. Move in & rig up. Kill well. Install BOPE & pressure test.
2. Pull tubing. Recover casing patch & packer. Fill liner with sand 7511'-7220'. Squeeze holes 7204'-7208' with cement. Drill out cement, clean out sand, test and run Audio analyzer log to determine gas leakage has stopped.
3. Set packer near 7180'. Run 3-1/2" tubing & 5-1/2" casing and land on packer and hang from tubing hanger.
4. Return well to gas storage service.

It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address P.O. Box 3249 Terminal Annex (Street)

LA (City) CA (State) 90051 (Zip)

Telephone Number (213) 689-3925

Southern California Gas Company (Name of Operator)

By J. P. Anand (Print Name)

J. P. Anand (Signature) 7-13-82 (Date)

OG107 (6/81/GSR1/5M)

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

DIVISION OF OIL AND GAS
RECEIVED
FEB 8 1982
SANTA PAULA, CALIFORNIA

Operator Southern California Gas Co. Field or County Aliso Canyon
Well MA 1-B, Sec. 34, T 3N, R 16W, SB B. & M.
A.P.I. No. 037-21892 Name J. P. Anand (Person submitting report) Title Agent (President, Secretary or Agent)
Date January 29, 1982

Signature J. P. Anand

P.O. Box 3249 Terminal Annex, Los Angeles, CA 90051 (Address) (213) 689-3561 (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date	
	MWO #99859 was issued to replace leaking casing patch.
1982	
1-05	1st Day. Using Halliburton pump truck, killed well with 81#/cu. ft. HEC polymer completion fluid. Rigged up.
1-06	2nd Day. Finished rigging up. Removed xmas tree and installed BOPE.
1-07	3rd Day. Using H&H pump tested 3-1/2" pipe rams and complete shut off rams at 4000 psi with water. Tested choke manifold at 4000 psi. Pressure tested Hydril bag at 3000 psi with water. Circulated gas from well. Measuring out of well.
1-08	4th Day. Rig and crew idle - high winds.
1-09	5th Day. Rig and crew idle - high winds.
1-11	6th Day. Finished measuring out of well. Layed down Otis and Baker equipment. Ran spear with drill collars, jars and bumper sub. Recovered top seal from casing patch. Recovered balance of casing patch. Milling on bottom seal.
1-12	7th Day. Pushed swedge to top of packer at 7190'. Circulated gas from well. Pulled out of well. Ran in and set Howco 8-5/8" 36# bridge plug at 1700'. Circulated 81#/cu. ft. polymer out of well with 63#/cu. ft. waste salt water. Capped plug with 10 sacks sand, top of sand at 1665'. Set Howco 8-5/8" 36# RTTS at 1415' but unable to obtain breakdown.
1-13	8th Day. Equalized 60 cu. ft. of 12% HCL 3% HF acid. Obtained breakdown of 8 cu. ft. per minute with 1200 psi through leak 1594'to 1596'. Squeezed with 50 sacks of Class "G" cement mixed with 0.75% CFR-2 at 1500 psi with 44 cu. ft. in place. Released Howco RTTS 8-5/8" 36# retrievable retainer. Pulled out of well. Made up bit and casing scraper on four 4-3/4" D.C Ran in well to 1200'.

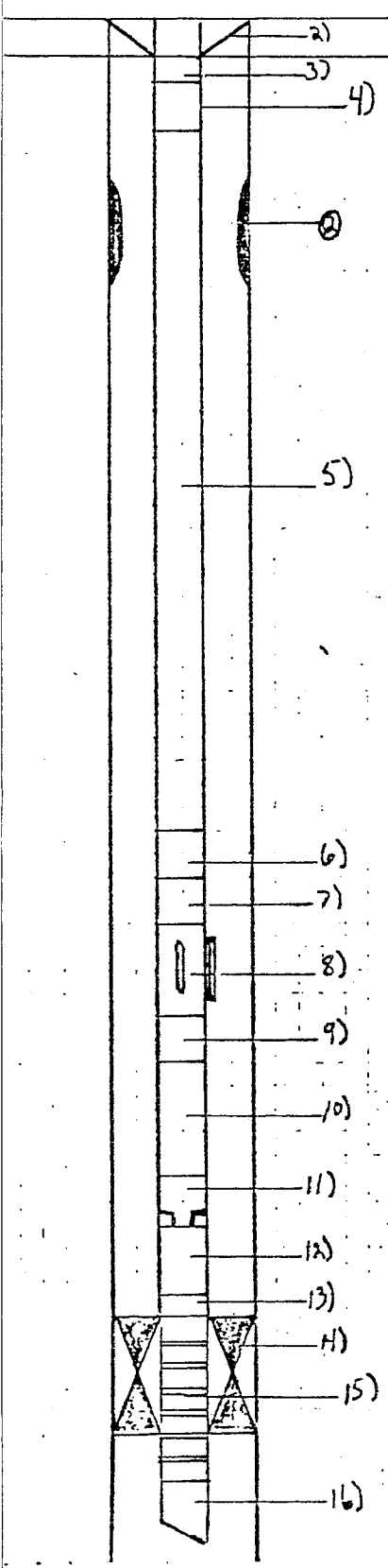
1-14 9th Day. Drilled out cement. Pressure tested leak 1594'-1596' for 1 hour. Circulated salt water out of well with 81#/cu. ft. HEC polymer completion fluid. Recovered bridge plug. Ran 3-1/2" tubing with locator and two seals and set 20,000# on packer. Closed pipe rams and pressure tested seals and packer at 1000 psi. Pulled out of well. Ran collar locator. Ran special Pengo casing patch with double seal connections and extra long seals on top and bottom. Set patch with Gearhart from 1606'-1564'.

1-15 10th Day. Pulled out of well. Rigged up hydrotester. Made up production equipment. Ran 3-1/2" 8Rd EUE N-80 tubing drifting and hydrotesting at 5000 psi. Spaced out and landed tubing with 20,000# on packer. Set back pressure valve in doughnut. Removed BOPE and installed xmas tree. Pressure tested xmas tree at 5000 psi with oil for 20 minutes. Circulated polymer completion fluid out of well with waste salt water.

1-16 11th Day. Worked crew to separate rental tools.

1-18 12th Day. Loaded rig and moved from Mission Adrian 1-B in Aliso Canyon to CPS yard in Piru. Well finished 1-15-82, and rig released when returned to yard 1-18-82 afternoon.

WELL PROFILE



OPERATOR So. Calif. Gas Co.

WELL # MA 1-B

FIELD Aliso Canyon

COUNTY Los Angeles

STATE California

DATE January 29, 1982

☐ NEW COMPLETION ☒ WORKOVER

	CASING	LINER	TUBING 1	TUBING 2	TUBING 3
SIZE					
WEIGHT					
GRADE					
THREAD					
DEPTH					

ITEM NO.	TUBING DETAILS	LENGTH	DEPTH
1.	K.B.	21.00	
2.	Doughnut	.60	21.60
3.	Pup 3-1/2" 8Rd N-80 EU, 2.992 I.D., 3.50 O.D.	5.73	27.33
4.	Pup 3-1/2" 8Rd N-80 EU, 2.992 I.D., 3.50 O.D.	10.22	37.55
5.	232 joints 3-1/2" 8Rd N-80 EU, 2.992 I.D., 3.50 O.D.	7103.47	7141.02
6.	Pup 3-1/2" 8Rd N-80 EU, 2.992 I.D., 3.50 O.D.	4.21	7145.23
7.	Otis X-nipple 3-1/2" EU 8Rd, 2.813 I.D. 3.50 O.D.	1.31	7146.54
8.	Otis annular flow system 3-1/2" 8Rd EU, 2.750 I.D., 4.50 O.D.	9.05	7155.59
9.	Pup 3-1/2" 8Rd N-80 EU, 2.992 I.D., 3.50 O.D.	2.42	7158.01
10.	Otis heavy wall tubing, 2.992 I.D., 4.00 O.D.	19.95	7177.96
11.	Otis NO-GO nipple, 2.562 I.D., 3.50 O.D.	1.46	7179.42
12.	Otis heavy wall tubing, 2.992 I.D., 4.00 O.D.	9.83	7189.25
13.	Baker locator, 2.992 I.D., 4.50 O.D.	.47	7.89.72
14.	Baker Retrieva-d packer		
15.	Baker seals, 2.44 I.D.	7.35	7197.07
16.	Baker production tubing, 2.44 I.D.	5.23	7202.30
	Tubing tail		
	Pengo patch set 1554'-1606'. Landed tubing with 20,000# comp. on packer.		

file

SOUTHERN CALIFORNIA gas COMPANY

810 SOUTH FLOWER STREET • LOS ANGELES, CALIFORNIA

Mailing Address BOX 3249 TERMINAL ANNEX, LOS ANGELES, CALIFORNIA 90051

DIVISION OF OIL AND GAS
RECEIVED
FEB 11 1982
SANTA PAULA, CALIFORNIA

February 9, 1982

State of California
Department of Conservation
Division of Oil and Gas
District 2
146 S. Ojai Street
Santa Paula, California 93060

Attn: M. W. Dosch, Deputy Supervisor

MP
RH
MS
OK

Evaluate this + if OK put in well file. gk

Dear Sir:

Please find attached a copy of pressure chart showing tests made on BOPE at Mission Adrian #1-B, Aliso Canyon on 1-7-82 during our recent remedial work. The chart shows the following pressure tests:

Hydril bag 3400 psi for 20 minutes

Complete shut-off and choke manifold 4300 psi for 30 minutes

3-1/2" pipe rams 4200 psi for 22 minutes.

Sincerely yours,

Guy C. Abrahamson

Guy C. Abrahamson
Consulting Engineer
Southern California Gas Company

FORM OG111 (11/80/DWRR/5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 281-416

010 (field code)
03 (area code)
30 (new pool code)
30 (old pool code)

REPORT ON PROPOSED OPERATIONS

Mr. Kern Guppy, Agent
Southern California Gas Co.
12801 Tampa Avenue
Northridge, CA 91324

Santa Paula, California
Nov. 9, 1981

Your proposal to alter casing in gas storage well "SFZU" MA-1B, A.P.I. No. 037-21892, Section 34, T. 3N, R. 16W, SB B. & M., Aliso Canyon field, Main area, Sesnon-Frew pool, Los Angeles County, dated 11/4/81, received 11/6/81 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
2. Blowout prevention equipment of at least DOG Class III 3M.B, shall be installed and maintained in operating condition at all times.
3. THIS DIVISION SHALL BE NOTIFIED TO WITNESS A PRESSURE TEST OF THE BLOWOUT PREVENTION EQUIPMENT BEFORE COMMENCING DOWNHOLE OPERATIONS.

Blanket Bond
MD:b

M. G. MEFFERD, State Oil and Gas Supervisor

By [signature]
John L. Hardoin, *Deputy Supervisor*

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

OG 107 (8/79)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
NOV - 6 1981
SANTA PAULA, CALIFORNIA

Notice of Intention to Rework Well

This notice and indemnity or cash bond shall be filed, and approval given, before rework begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

FOR DIVISION USE ONLY		
BOND	FORMS	
	OGD 114	OGD 121
SB	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework well Mission Adrian #1B (Well designation), API No. 037-21892

Sec. 34, T. 3N, R. 16W, SB B. & M., Aliso Canyon Field, Los Angeles County.

The present condition of the well is as follows:

1. Total depth 7512'

2. Complete casing record, including plugs and perforations

13-3/8" cemented 1014'
8-5/8" cemented 7347', cp'd 7205', 7206', 7207' and 7208' WSO on 4-1/2" holes at 7204'
278' 5-1/2" landed 7511', Top 7233', 10 mesh wire wrapped 7510'-7343' and 7280'-7243', Gravel flow packed leak 1594'-96' cemented, casing patch 1540'-1622'

3. Present producing zone name Sesnon ; Zone in which well is to be recompleted -

4. Present zone pressure 3400 psi ; New zone pressure -

5. Last produced Gas storage well (Date) (Oil, B/D) (Water, B/D) (Gas, Mcf/D)

(or)

Last injected (Date) (Water, B/D) (Gas, Mcf/D) (Surface pressure, psig)

The proposed work is as follows:

1. Move in & rig up. Kill well. Install BOPE & pressure test.
2. Pull tubing. Recover casing patch. Set bridge plug near 1700' and squeeze leak 1594'-1596' with cement & pressure test to 1000 psi.
3. Set new casing patch 1606'-1554'. Run tubing with down hole safety system.
4. Return well to gas storage service.

It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address P.O. Box 3249 Terminal Annex (Street)
LA (City) CA (State) 90051 (Zip)
Telephone Number (213) 689-3561

Southern California Gas Company (Name of Operator) JPA
By P.S. Magruder, Jr. (Print Name)
P.S. Magruder (Signature) 11/4/81 (Date)

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

DIVISION OF OIL AND GAS
RECEIVED
SEP - 8 1981
SANTA PAULA, CALIFORNIA

Operator Southern California Gas Co. Field Aliso Canyon County Los Angeles
Well MA 1B, Sec. 34, T 3N, R 16W S.B.B. & M.
A.P.I. No. 037-21892 Name P.S. Magruder, Jr. (Person submitting report) Title Agent (President, Secretary or Agent)
Date August 28, 19 81

Signature P.S. Magruder

P.O. Box 3249 Terminal Annex, Los Angeles, CA 90051 (Address) (213) 689-3561 (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

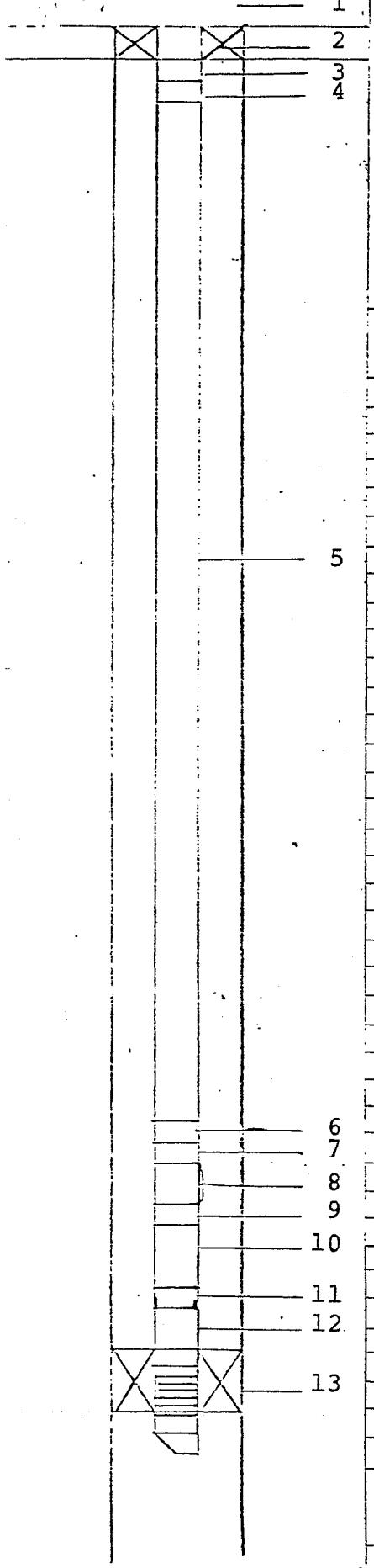
Date	
	MWO #99963 was issued to replace leaking casing patch.
1981	
8-14	1st Day. Moved CPS #D-4 on location. Rigged up equipment. Raised mast and rigged up to circulate.
8-15	2nd Day. Filled hole with 96 bbls drilling fluid. Circulated gas out of well. Removed xmas tree and installed BOPE. Division of Oil and Gas was notified, but did not witness test. Tested blind rams and manifold with 4000 psi of water. Tested pipe rams with 4000 psi for 20 minutes. Tested Hydril with 3000 psi for 20 minutes. Pulled 5 doubles and circulated bottoms up.
8-17	3rd Day. Finished pulling out of well. Picked up fishing tools and drill collars. Ran in well and recovered top seal from Pengo casing patch. Going in hole to fish for casing patch.
8-18	4th Day. Ran in hole with spear. Jarred casing patch free. Pulled patch into wellhead where it stuck. Using Alco jacks pulled patch. Layed down casing patch and tools. Ran in well with 7-5/8" bit and casing scraper, changed to chamfered collars. Stopped on bottom seal at 1545', could not knock free. Picked up Kelly.
8-19	5th Day. Pulled out of well. Ran in with 7-5/8" mill. Milled on bottom seal 1553' to 1556'. Pushed seal to 7190'. Circulated hole clean and started out of well.
8-20	6th Day. Pulled out of hole. Ran collar log and made up Pengo casing patch. Casing patch stopped at 30'. Pulled casing patch and layed down. Ran in hole, continued changing 3-1/2" chamfered collars.
8-21	7th Day. Finished changing to chamfered collars and pulled out of well. Ran 7.70" O.D. tapered mill. Milled 24' to 205' and from 1513' to 1669'. Circulated hole clean.

8-22 8th Day. Pulled mill and picked up 80' Pengo casing patch. Ran in well and set casing patch with top of 1540' and bottom 1622'. Pulled out of well. Made up seals and locator sub for Baker packer and started in well.

8-24 9th Day. Ran 3-1/2" tubing with locator and two seals and set 20,000# on packer. Closed pipe rams and pressure tested seals and packer to 1500 psi for 20 minutes. Ran 3-1/2" tubing hydrotesting to 5000 psi. Removed BOPE. Installed xmas tree.

8-25 10th Day. Tested xmas tree to 5000 psi. Circulated polymer fluid out of well with lease salt water. Released rig at 11:00 A.M. 8-25-81.

WELL PROFILE



OPERATOR So. Calif. Gas Co.

WELL # MA 1B

FIELD Aliso Canyon

COUNTY Los Angeles

STATE California

DATE August 28, 1981

☐ NEW COMPLETION ☐ WORKOVER

	CASING	LINER	TUBING 1	TUBING 2	TUBING 3
SIZE					
WEIGHT					
GRADE					
THREAD					
DEPTH					

ITEM NO.	TUBING DETAILS	LENGTH	DEPTH
1.	K.B.	21.00	
2.	Doughnut	.90	21.90
3.	Pup joint 3-1/2" EUE 8Rd	5.73	27.63
4.	Pup joint 3-1/2" EUE 8Rd	9.97	37.60
5.	232 joints tubing 3-1/2" EUE 8Rd	7103.94	7141.54
6.	Pup joint 3-1/2" EUE 8Rd	4.21	7145.75
7.	Otis "X" nipple 3-1/2" EUE 8Rd	1.33	7147.08
8.	Otis annular flow safety system	9.05	7156.13
9.	Pup joint 3-1/2" EUE 8Rd	2.42	7158.55
10.	Otis 20' heavy wall tubing 3-1/2" EUE 8Rd	20.21	7178.76
11.	Otis NO-GO nipple 3-1/2" EUE 8Rd, 2.562 I.D.	1.49	7180.25
12.	Otis 10' heavy wall tubing 3-1/2" EUE 8Rd	9.75	7190.24
13.	Baker Retrieva-D with production tube and seals landed in packer - Tubing tail	13.00	
	Bottom of tubing		7203.24
	Baker Retrieva-D packer set at 7190'		

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 281-162

DIVISION OF OIL AND GAS

Report on Operations

Mr. J. W. Tenfelder, Agent
Southern California Gas Co.
12801 Tampa Avenue
Northridge, CA 91324

Santa Paula, Calif.
Aug. 25, 1981

Your operations at well "SFZU" MA-1B, API No. 037-21892, Sec. 34 T. 3N R. 16W S.B., B.& M. Aliso Canyon Field, in Los Angeles County, were witnessed on 8/17/81. R. Navia, representative of the supervisor, was present from 1045 to 1130. There were also present J. Montgomery, Toolpusher and A. Smith, Consultant

Present condition of well: No additions to the casing record since proposal dated 8/13/81.

The operations were performed for the purpose of inspecting the blowout prevention equipment and installation.

DECISION:

THE BLOWOUT PREVENTION EQUIPMENT AND INSTALLATION ARE APPROVED.

B

M. G. MEFFERD
State Oil and Gas Supervisor

By John L. Hardoin
Deputy Supervisor

John L. Hardoin

OG109 (10-78—GSR—15M)

FORM OG111 (11/80/DWRR/5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

PW

No. P 281-274

REPORT ON PROPOSED OPERATIONS

010 (field code)
03 (area code)
30 (new pool code)
30 (old pool code)

Mr. J. W. Tenfelder, Agent
So. California Gas Co.
12801 Tampa Avenue
Northridge, CA 91324

Santa Paula, California
Aug. 17, 1981

Your proposal to alter casing in gas storage well "SFZU" MA-1B, A.P.I. No. 037-21892, Section 34, T. 3N, R. 16W, S.B. B. & M., Aliso Canyon field, Main area, Sesnon-Frew pool, Los Angeles County, dated 8/13/81, received 8/14/81 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
2. Blowout prevention equipment of at least DOG Class III 3M, shall be installed and maintained in operating condition at all times.
3. THIS DIVISION SHALL BE NOTIFIED TO WITNESS A PRESSURE TEST OF THE BLOWOUT PREVENTION EQUIPMENT BEFORE COMMENCING DOWNHOLE OPERATIONS.

Blanket Bond
MD:b

M. G. MEFFERD, State Oil and Gas Supervisor

By John L. Hardoin Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

OG 107 (8/79)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
AUG 14 1981
SANTA PAULA, CALIFORNIA

Notice of Intention to Rework Well

This notice and indemnity or cash bond shall be filed, and approval given, before rework begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

FOR DIVISION USE ONLY		
BOND	FORMS	
	OGD 114	OGD 121
BB	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework well Mission Adrian #1-B (Well designation), API No. 037-21891

Sec. 34, T. 3N, R. 16W, SB B. & M., Aliso Canyon Field, Los Angeles County.

The present condition of the well is as follows:

1. Total depth 7512'

2. Complete casing record, including plugs and perforations

13-3/8" cemented 1014'
8-5/8" cemented 7347', cp'd 7205', 7206', 7207', 7208', WSO 4-1/2" holes at 7204'
278' 5-1/2" landed 7511', Top 7233', 10 mesh wire wrapped 7510'-7343' and 7280'-~~7243.~~ Gravel flow packed. Casing patch 1575'-1615'

3. Present producing zone name Sesnon ; Zone in which well is to be recompleted -

4. Present zone pressure 3100 psi ; New zone pressure -

5. Last produced Gas storage well (Date) ____ (Oil, B/D) ____ (Water, B/D) ____ (Gas, Mcf/D)

(or)

Last injected ____ (Date) ____ (Water, B/D) ____ (Gas, Mcf/D) ____ (Surface pressure, psig)

The proposed work is as follows:

1. Move in & rig up. Kill well. Install BOPE & pressure test.
2. Pull tubing. Recover casing patch. Set casing patch 1575'-1655'. Run tubing with down hole safety system.
3. Return well to gas storage service.

It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address P.O. Box 3249 Terminal Annex (Street)
LA (City) CA (State) 90051 (Zip)
Telephone Number (213) 689-3561

Southern California Gas Company (Name of Operator)
By P.S. Magruder, Jr. (Print Name)
(Signature) (Date) 8/13/81

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
JUL 28 1980
SANTA PAULA, CALIFORNIA

PW

History of Oil or Gas Well

Operator Southern California Gas Co. Field or County Aliso Canyon
Well "SF2U" ~~Mission Adrian~~ #1-B, Sec. 34, T 3N, R 16W, S.B. B. & M.
A.P.I. No. 037-21892 Name P. S. Magruder, Jr. (Person submitting report) Title Agent (President, Secretary or Agent)
Date July 28, 1980

Signature P. S. Magruder Jr.

P.O. Box 3249 Terminal Annex, Los Angeles, Calif. 90051 (213) 689-3561
(Address) (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date 1980	
	Completion work was done using original GWO # 98470 issued to drill new gas storage well.
6.17.	1st Day. Moved in with California Production Service Rig #D-4. All equipment on location. Rigging up.
6.18.	2nd Day. Set rig and rigged up. Removed tubing head and seal flange. Removed 8 5/8" packing. Picked up spear and Alco jacks. Set spear at 80'. Unlanded 8 5/8" with 220,000# and removed slips from casing head.
6.19.	3rd Day. Welded 10' of 8 5/8" casing to 8 5/8" casing stub. Set Bowen spear at 80'. Pulled 100,000# on casing. With casing tongs tried to back off with 19,000 foot pounds. Spear would not hold casing. Ran Baash-Ross spear. Held 100,000# on casing at 80'. Backed off 8 5/8" with 22,000 foot pounds. Recovered 13' of 8 5/8" and collar on end. No damage to pipe.
6.20.	4th Day. Made up 8 5/8" with Baker lock with 10,000 foot pounds. Waited two and half hours. Backed off at same place with 14,000 foot pounds. Made up collar dry with sand to 16,000 foot pounds. Backed off at same place. Made up Baker lock and sand to 17,000 foot pounds and let set overnight.
6.21.	5th Day. Set spear inside 8 5/8" at 180'. Backed off 138' of 8 5/8", three joints and 13' cut off with 8,000 foot pounds. Ran four joints new 8 5/8" casing. Top joint 40# N-80, three below 36# N-80. Connected casing and made up with 15,000 foot pounds. Tested casing with 4,000 psi for 20 minutes. Landed casing with 250,000#. Cut off 8 5/8".
6.22.	Rig and crew idle.

DIVISION OF OIL AND GAS
RECEIVED
JUL 28 1980
SANTA PAULA, CALIFORNIA

6.23. 6th Day. Installed seal flange. Tested seals with 5,000 psi for 20 minutes. Installed BOPE. Tested blind and pipe rams, manifold with 4,000 psi of water for 20 minutes. Tested Hydril with 3,000 psi of water for 20 minutes. Broke down fishing tools. Picked up six 4 3/4" drill collars, two junk subs and 7.6" Servco mill. Picked up 2 7/8" drill pipe. Located cement at 1,537'.

6.24. 7th Day. Milled on retainer from 1,548' to 1,553'. Ran OMT 7.6" mill. Milled on parts of retainer from 1,553' to 1,555'. Pulled out of well. Recovered large pieces of retainer in junk sub.

6.25. 8th Day. Ran surge tool twice. Recovered some large pieces of junk. Ran OMT mill. Made no progress. Pulled out. Recovered about 5# junk in junk sub. Ran 7 5/8" bit. Drilling at 1,556'.

6.26. 9th Day. Ran 7.6" mill. No progress. Ran 7 1/2" OD junk basket 1,556' - 1,562'. Pulled out with no recovery. Ran junk basket 1,562' - 1,580'. Pulled out, recovered end of retainer 6 1/4" x 4". Ran 7 5/8" bit and 2 junk subs. Drilled hard cement from 1,580' - 1,631'. Soft cement 1,631' - 1,668'.

6.27. 10th Day. Drilled out cement 1,668' - 1,694'. Junk in cement at 1,674'. Pulled bit. Ran fullbore retainer and set at 1,486'. Breakdown with 16 cu.ft. at 1,900 psi. Mixed 100 sacks class "G" + 10% Calseal at 108#/cu.ft. Displaced with 54 cu.ft. water and received circulation on 8 5/8" x 13 3/8" annulus. Stopped pumping with 20 cu.ft. of cement above holes. Pulled retainer. Ran drill collars, bit, scraper and one double 2 7/8".

6.28. 11th Day. Ran in hole with 7 5/8" bit. Top of cement at 1,547'. Drilled out cement from 1,547' - 1,599'. Tested leak with 1,300 psi. Bled off to 1,100 psi in 10 minutes. Ran and set fullbore retainer at 1,486'. Breakdown at 2,000 psi with 20 cu.ft./minute Mixed 100 sacks class "G" cement with 10% Calseal at 108#/cu.ft. Displaced with 60 cu.ft. water. Pumped at 2,000 psi Stopped pumping, dropped to 1,200 psi in 1 minute. Pulled retainer. Ran drill collars, bit, scraper and one double of 2 7/8" drill pipe.

6.29. Rig and crew idle.

6.30. 12th Day. Ran in hole with 7 5/8" bit and scraper. Drilled out cement 1,549' - 1,620'. Pressure tested holes with 1,300 psi and lost 200 psi in 20 minutes. Pulled out of well. Ran fullbore retainer and set at 1,486'. Breakdown 12 cu.ft./minute at 1,900 psi. Mixed 100 sacks class "G" cement + 10% Calseal at 108#/cu.ft. Displaced with 64 cu.ft. of water. Left 10 cu.ft. of cement in 8 5/8" casing. Pumped at 2,000 psi. Dropped to 1,200 psi when pump was stopped. Pulled retainer. Ran bit and scraper.

7.01. 13th Day. Ran in hole with bit and scraper. Drilled cement 1,466' - 1,516' and 1,546' - 1,576'. Circulated hole clean. Ran WSO tester and set packer at 1,570'. Opened tool 11:47 am. Small puff, then dead. Tool open one hour. Pulled out of well. Recovered 30' of water. Ran junk basket to 1,675'. Pulled out and recovered end section of retainer. Ran junk basket on cement 1,675' - 1,698'. Started out of hole.

7.02. 14th Day. Pulled out of well and ran 7 5/8" bit and scraper. Made no progress at 1,711'. Pulled out and ran junk basket. Milled 1,711' - 1,713'. Pulled out with bridge plug. Pulled off bridge plug in wellhead. Ran retrieving tool and recovered bridge plug. Removed BOPE and installed repaired tubing head. Installed BOPE.

7.03. 15th Day. Tested seals on tubing head with 5,000 psi for 20 minutes. Tested from blind rams to bridge plug at 60' with 4,000 psi. Recovered bridge plug at 60'. Ran in hole with retrieving tool, picking up 2 7/8" drill pipe to 7,100'. Changed from lease water to 86#/cu.ft. polymer.

7.04. Rig and crew idle.

7.05. Rig and crew idle.

7.06. Rig and crew idle.

7.07. 16th Day. Cleaned out with retrieving tool to top of retrievable plug at 7,150'. Circulated sand out of well. Released plug. Circulated gas out of polymer and retrieved plug from well. Ran 7 5/8" bit and 8 5/8" scraper on drill pipe to 7,190' and started out of well with scraper.

7.08. 17th Day. Finished pulling out of well with 7 5/8" bit and 8 5/8" casing scraper. Ran 360' of 2 3/8" tubing tail below 2 7/8" drill pipe and cleaned out fill from 7,414' - 7,511' (97'). Circulated well; waited two hours and checked for fill. Cleaned out 7' of fill; circulated well and started out of well.

7.09. 18th Day. Finished pulling out of well with 2 3/8" tubing tail. Made up 7 1/2" OD x 7" ID x 42' casing patch and began assembling it while going in well. Patch prematurely set on lower end. Removed all but lower end of patch from well (pack-off ring 2" x 7 1/2" x 7" and lower swage 7 1/2" x 7" x 14"). Made up 7 5/8" concaved mill on two drill collars and pushed pack-off ring and swage to 7,180'. Started out of well with mill.

7.10. 19th Day. Finished pulling out with mill. Ran latch-in locator to 7,190'. Latched on to 8 5/8" Retrieva-D packer and pulled 30,000# over drill pipe weight to check latch. Released latch and pulled out of well. Ran and set casing patch from 1,578' - 1,620'. Pulled out of well with setting tools and started back in well with open end drill pipe.

7.11. 20th Day. Laid down 2 7/8" drill pipe, drill collars and Kelly. Started picking up new 3 1/2" EUE 8rd tubing.

7.12. 21st Day. Pulled out of well with 3 1/2" tubing. Made up 5" production tube on locator seal assembly with 6 seals; 10' x 3 1/2" heavy wall tube, 3 1/2" x 2.56" RN nipple; 20' x 3 1/2" heavy wall tube and 3 1/2" annulus flow safety system. Started in the well, sealing the tubing pins and hydrotesting the tubing to 5,000 psi, holding each test for one minute.

7.13. Rig and crew idle.

7.14. 22nd Day. Finished hydrotesting tubing. Spaced out and landed tubing with 15,000# on packer. 2.562" "XN" nipple at 7,180'. Annulus flow safety system at 7,156'. Packer at 7,190'. Set plug in "XN" nipple at 7,180'. Tested packer and seals with 1,500 psi for 20 minutes. Recovered plug.

7.15. 23rd Day. Removed BOPE. Installed xmas tree and pressure tested with 5,000 psi for 20 minutes. Circulated polymer completion fluid out of well with lease salt water. Flowed 400 bbls out of well from casing and tubing. Rig released at 10:00 pm.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 280-182

DIVISION OF OIL AND GAS

Report on Operations

J. W. Tenfelder, Agent
So. Calif. Gas Co.
12801 Tampa Avenue
Northridge, CA 91324

Santa Paula, Calif.
June 30, 1980

Your operations at well "SFZU" MA-1B, API No. 037-21892, Sec. 34, T. 3N, R. 16W S.B., B.& M. Aliso Canyon Field, in Los Angeles County, were witnessed on 6/23/80. F. Taylor, representative of the supervisor, was present from 1100 to 1300. There were also present Allen Smith, consultant

Present condition of well: 13 3/8" cem 1014', 8 5/8" cem 7347', cp at Int. 7204-7207' WSO, 7203' csg patch at 1594-1596', 5 1/2"/7233-7511'.
ld.

The operations were performed for the purpose of testing the blowout prevention equipment and installation.

DECISION:

THE BLOWOUT PREVENTION EQUIPMENT AND INSTALLATION ARE APPROVED.

b

M. G. MEFFERD
State Oil and Gas Supervisor

By John L. Hardoin
Deputy Supervisor
John L. Hardoin

OG109 (10-78-GSRI-15M)

FORM OG111

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 280-46

REPORT ON PROPOSED OPERATIONS

010 (field code)
03 (area code)
30 (pool code)

Mr. J. W. Tenfelder, Agent
Southern Calif. Gas Co.
12801 Tampa Avenue
Northridge, CA 91324

Santa Paula, California
Feb. 26, 1980

Your _____ proposal to alter casing in gas storage well "SFZU" MA-1B, A.P.I. No. 037-21892, Section 34, T. 3N, R. 16W, S.B. B. & M., Aliso Canyon field, Main area, Sesnon-Frew pool, Los Angeles County, dated 2/19/80, received 2/22/80 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
2. Blowout prevention equipment of at least DOG Class III 3M shall be installed and maintained in operating condition at all times.
3. THIS DIVISION SHALL BE NOTIFIED TO WITNESS A PRESSURE TEST OF THE BLOWOUT PREVENTION EQUIPMENT BEFORE COMMENCING DOWNHOLE OPERATIONS.

Blanket Bond
MD:b

M. G. MEFFERD, State Oil and Gas Supervisor

By _____
John L. Hordoin, Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS
RECEIVED
FEB 22 1980
SANTA PAULA, CALIFORNIA

DIVISION OF OIL AND GAS

Notice of Intention to Rework Well

This notice and indemnity or cash bond shall be filed, and approval given, before rework begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered canceled.

FOR DIVISION USE ONLY		
BOND	FORMS	
	114	121
BB	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to rework well No. Mission Adrian 1-B, API No. 037-21892, Sec. 34, T.3N, R. 16W, S.B. B. & M., Aliso Canyon Field, Los Angeles County.

The present condition of the well is as follows:

1. Total depth. 7512'

2. Complete casing record, including plugs and perforations:

	13-3/8"	cemented 1014'
	8-5/8"	cemented 7347', cp'd 7204', 7205', 7206', and 7207' WSO 7203'. Leak in casing 1594'-1596'
278'	5-1/2"	landed 7511', top 7233'. 10 mesh W.W. 7510'-7343', blank 7343'-7280', 10 mesh W.W. 7280'-7240', blank port collar and liner hanger 7240'-7233' Gravel flow packed with 20-40 mesh gravel.

Note: Drilling suspended 10-20-79 with retrievable bridge plugs at 1721' and 7152', production packer at 7190'.

3. Present producing zone name Sesnon Zone in which well is to be recompleted _____

4. Present zone pressure 3600 psi New zone pressure _____

5. Last produced _____ (Date) Gas storage well (Oil, B/D) _____ (Water, B/D) _____ (Gas, Mcf/D)

or

6. Last injected _____ (Date) _____ (Water, B/D) _____ (Gas, Mcf) _____ (Surface pressure, psig.)

The proposed work is as follows:

1. Move in and rig up. Unland 8-5/8" casing. Back off casing at 67' and install two new joints of 8-5/8" casing. Reland casing.
2. Install seal flange, tubing head, and BOPE. Pressure test BOPE.
3. Squeeze leak 1594'-1596' and pressure test. Recover bridge plugs from 1721' and 7150'. Clean out to 7511'.
4. Set casing patch 1575'-1615'.
5. Run 3-1/2" tubing with subsurface safety system and complete as gas storage well.

It is understood that if changes in this plan become necessary we are to notify you immediately.

Address P.O. Box 3249 Terminal Annex (Street)
Los Angeles (City) Calif. (State) 90051 (Zip)
Telephone Number (213) 689-3561

Southern California Gas Company (Name of Operator)
By [signature] 2/19/80
P. S. Magruder, Jr. (Name) (Date)
Type of Organization Corporation (Corporation, Partnership, Individual, etc.)

OG107 (12-73-GSR1-15M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

WELL SUMMARY REPORT

SUBMIT IN DUPLICATE

Operator So. California Gas Co., Well No. Mission Adrian 1-B, API No. 037-21892,

Sec. 34, T. 3N, R. 16W S.B. B. & M., Aliso Canyon Field, Los Angeles County.

Location 4513.55' south and 1057.31' east from station 84
(Give surface location from property or section corner, or street center line and/or lambert coordinates)

Elevation of ground above sea level 1725 feet.

All depth measurements taken from top of Kelly Bushing which is 21 feet above ground.
(Derrick Floor, Rotary Table or Kelly Bushing)

In compliance with Sec. 3215, Division 3 of the Public Resources Code, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Date January 15, 1980 Signed P. S. Magruder, Jr.

D. S. Smiley (Engineer or Geologist) Title Agent

Commenced drilling June 30, 1979

Completed drilling October 20, 1979 (suspended)

Total depth (1st hole) 7716' (2nd) 7512' (3rd) -

Present effective depth 7512'

Junk (1st hole) Plugged 7673'-7500', hole opener assembly fish 7487'-7449', plugged 7449'-7400' and sidetracked to 7512'.

GEOLOGICAL MARKERS DEPTH

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Formation and age at total depth Miocene

Commenced producing - (Date) Flowing/gas lift/pumping (Cross out unnecessary words)

Name of producing zone Sesnon (S-4 & S-8)

	Clean Oil bbl. per day	Gravity Clean Oil	Per Cent Water including emulsion	Gas Mcf. per day	Tubing Pressure	Casing Pressure
Initial production	Gas Storage Well					
Production after 30 days						

CASING RECORD (Present Hole)

Size of Casing (A. P. I.)	Depth of Shoe	Top of Casing	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Numbers of Sacks or Cubic Feet of Cement	Depth of Cementing if through perforations
13-3/8"	1014'	Surf.	54.5	K-55 Butt.	New	17-1/2"	1030 CF	-
8-5/8"	7347'	Surf.	36 & 40	N-80 Butt.	New	12-1/4"	1853 CF	-
5-1/2"	7511'	7233'	20	K-55 ST&C	New	7-5/8" opened to 15"	Gravel Packed	-

PERFORATED CASING
(Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

8-5/8" - Jet perforated four 1/2" HPF 7204'-7208' cp'd and 7203' WSO
5-1/2" - .010 wire wrapped screen 7240'-7280', 7343'-7510'

Was the well directionally drilled? Yes If yes, show coordinates at total depth 1737' north and 23' east

Electrical log depths 7347', 7716', 7509' Other surveys Neutron-Density, Sonic, Dipmeter

ATTACH ONE COPY OF EACH LOG AND SURVEY

OG 100

27907-705-10-74 5M ② OSP

PW

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator Southern California Gas Co. Field or County Aliso Canyon
Well Mission Adrian #1-B, Sec. 34, T 3N, R 16W S.B. B. & M.
A.P.I. No. 037-21892 Name P S Magruder, Jr. (Person submitting report) Title Agent (President, Secretary or Agent)
Date January 15, 1980

Signature P S Magruder, Jr.

P.O. Box 3249 Terminal Annex, Los Angeles, Calif 90051 (Address) (213) 689-3561 (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date	
1979	GWO #98476 KZ PROGRAM
	Drill and complete as a gas storage well in the S-4 and S-8 sands with an approximate bottom hole location 1663' north and 18' east of surface location. Surface location is 4513.55' south and 1057.31' east of Station #84.
6-25 to 6-30	0 Day. Moved Camrich Drilling Co. Rig #23 onto wellsite and rigged up. Spudded at 1.00 pm, June 30 1979. Drilled 17 1/2" hole to 238' with bit #1.
7-1	1st Day. Drilled 17 1/2" hole from 238' to 591' with bit #1.
7-2	2nd Day. Drilled 17 1/2" hole from 591' to 859' with bit #2.
7-3	3rd Day. Drilled 17 1/2" hole from 859' to 1,014' with bit #2. Ran 26 joints of 13 3/8", 54.5#, K-55 Buttress casing with Baker shoe at 1,014' and stop ring at 972'. Cemented with 800 cu.ft. of class "G" cement mixed with 8% gel and 3% calcium chloride followed by 200 sacks of class "G" cement mixed with 3% calcium chloride. Cement in place at 11:45 pm. Bumped plug with 400 psi.
7-4	4th Day. Cut off conductor and 13 3/8" casing. Welded on 13 5/8" 5,000 psi casing head. Pressure tested to 1,500 psi. Inspected with gamma ray device (O.K.). Installed class III 12", 5,000 psi BOPE. Set Johnson bridge plug at 60'. Tested 4 1/2" pipe rams.
7-5	5th Day. Tested complete shut off rams, 4 1/2" pipe rams, choke and kill manifold to 2,700 psi with water for 20 minute test. Tested Hydril to 2,000 psi with water, witnessed by D.O.G. Attempted to test complete shut off rams with nitrogen. Found leak in 13 3/8" casing. Removed BOPE and tightened 13 3/8" 2 turns at 10,000 ft. lbs. torque. Reinstalled BOPE and retested with nitrogen and casing leaked at 1,400 psi.

7-6 6th Day. Removed Bridge plug and cut off 13 5/8" casing head. Backed off and recovered casing at first collar. Installed one joint of new 13 3/8" and torqued to 6,000 ft. lbs. Butt welded 13 5/8" well head and X-rayed weld.

7-7 7th Day. Installed B.O.P.E. and tested blank rams, 4 1/2" pipe rams and Hydril to 2,000 psi. Made up drilling assembly. Ran in and drilled out cement to 1,012'.

7-8 8th Day. Rig down for repairs.

7-9 9th Day. Finished Master Clutch Repair. Changed Hydril rubber. Drilled out shoe at 1,014' and drilled 12 1/4" hole to 1,173' with Bit #3.

7-10 10th Day. Drilled 12 1/4" hole from 1,173' to 1,296' with Bit #3. Ran Dyna-Drill on 2 1/2° kick sub. Dyna-Drilled 12 1/4" hole from 1,296' to 1,401' with Bit #4. Dyna-Drill stopped working after 3 1/2 hours of operation.

7-11 11th Day. Ran Dyna-Drill #2 - 1st run and Bit #5. Dyna-Drilled 12 1/4" hole from 1,401' to 1,667'.

7-12 12th Day. Directionally drilled 12 1/4" hole from 1,667' to 2,118' with Bit #6.

7-13 13th Day. Directionally drilled 12 1/4" hole from 2,118' to 2,391' with Bit #7. Dyna-Drilled 12 1/4" hole from 2,391' to 2,456' with dyna-drill #2 - 2nd run and Bit #8.

7-14 14th Day. Changed kick sub. Dyna-drilled 12 1/4" hole from 2,456' to 2,610' with Bit #8 RR on Dyna-drill #2 - 3rd run. Pulled out, changed bits and kick sub from 1 1/2° to 2°. Dyna-drilled 12 1/4" hole from 2,610' to 2,733' with Bit #9 on Dyna-drill #2 - 4th run.

7-15 15th Day. Dyna-drilled 12 1/4" hole from 2,733' to 2,766' with Bit #9 on Dyna-drill #2 - 4th run. Ran Drilling assembly, reamed from 2,394' to 2,766', directionally drilled 12 1/4" hole from 2,766' to 2,868' with Bit #10. Pulling out for Dyna-drill.

7-16 16th Day. Ran 12 1/4" bit #11 on Dyna-drill #2 - 5th run. Dyna-drilled 12 1/4" hole from 2,868' to 2,998'. Pulled Dyna-drill and ran drilling assembly with 12 1/4" bit #10 RR. Reamed to 2,998'.

7-17 17th Day. Dyna-drilled 12 1/4" hole using Eastman "D.O.T." guidance tool from 2,998' to 3,126' with bit #12 on Dyna-drill #2 - 6th run.

7-18 18th Day. Directionally drilled 12 1/4" hole from 3,126' to 3,549' with bit #13.

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7-19 19th Day. Directionally drilled 12 1/4" hole from 3,549' to 3,797' with Bit #14 and to 3,987' with Bit #15.

7-20 20th Day. Directionally drilled 12 1/4" hole from 3,987' to 4,237' with Bit #15 and to 4,415' with Bit #16.

7-21 21st Day. Directionally drilled 12 1/4" hole from 4,415' to 4,423' with Bit #16 and to 4,575' with Bit #17.

7-22 22nd Day. Dyna-drilled 12 1/4" hole using Eastman "D.O.T." guidance tool from 4,575' to 4,604' with Bit #18 on Dyna-drill #2 - 7th run. Stuck pipe at 4,604' at 8:00 am. Pipe free at 10:00 am. Pulled out of hole. Rig had 2 hours down time changing out rotary table. Ran drilling set up.

7-23 23rd Day. Directionally drilled 12 1/4" hole from 4,604' to 4,668' with Bit #18. Pulled out and repaired rig 8 hours (installed #3 engine and changed rotary table). Ran in with Bit #19.

7-24 24th Day. Directionally drilled 12 1/4" hole from 4,668 to 4,949' with Bit #19. Ran in with Dyna-drill and Bit #19 to 1,000'. Repairing engine (3 hours lost time).

7-25 25th Day. Dyna-drilled 12 1/4" hole with guidance tool from 4,949' to 5,006' with Bit #20 on Dyna-drill #3. Directionally drilled to 5,082' with Bit #21.

7-26 26th Day. Directionally drilled 12 1/4" hole from 5,082' to 5,573' with Bit #22.

7-27 27th Day. Directionally drilled 12 1/4" hole from 5,573' to 5,699' with Bit #22 and to 5,880' with Bit #23.

7-28 28th Day. Directionally drilled 12 1/4" hole from 5,880' to 6,109' with Bit #23 and to 6,240' with Bit #24.

7-29 29th Day. Directionally drilled 12 1/4" hole from 6,240' to 6,260' with Bit #24 and to 6,477' with Bit #25.

7-30 30th Day. Directionally drilled 12 1/4" hole from 6,477' to 6,575' with Bit #26. Reamed from 5,257' to 6,477'.

7-31 31st Day. Directionally drilled 12 1/4" hole from 6,575' to 6,790' with Bit #27.

8-1 32nd Day. Directionally drilled 12 1/4" hole from 6,790' to 6,950' with Bit #28. Tripped for bit. Reamed 6,920' to 6,950'.

8-2 33rd Day. Directionally drilled 12 1/4" hole from 6,950' to 7,100' with Bit #29 and to 7,130' with Bit #30.

8-3 34th Day. Directionally drilled 12 1/4" hole from 7,130' to 7,347' with Bit #30. Circulated and conditioned hole for logs.

8-4 35th Day. Pulled out of hole. Ran Schlumberger Dual Induction-Sonic and FDC which stopped at 7,162'. Ran Dual Induction SFL log and recorded from 7,327' to 1,014'. Ran in with drilling assembly and cleaned out to 7,347'. Circulated for logs. Pulling out.

8-5 36th Day. Continued pulling out of hole. Schlumberger ran Gamma Ray-CNL-FDC log and recorded from 7,339' to 1,012', dipmeter from 7,332' to 1,012', Sonic and Gamma Ray from 7,332' to 1,012'.

8-6 37th Day. Laid down non-magnetic drill collar. Ran in with drilling assembly and Bit #30RR. Cleaned out fill from 7,339' to 7,347'. Circulated and conditioned for casing. Worked pipe through tight hole from 3,266' to 2,723' where drilling assembly became stuck. Jarred up and down. Rigged Dia-Log Freepoint and string shot. Backed off at 2,366'. Length of fish 357'.

8-7 38th Day. Attempted to screw into fish at 2,366' without success. Ran back to 2,366' for second attempt. Ran into 2,410' where drill string stopped. Pulled out, made up and ran Midway 11" skirted sub. Screwed into fish at 2,426'. Jarred fish loose, pulling out of hole.

8-8 39th Day. Recovered all of fish in good condition. Laid down 7" drill collars and stabilizers. Ran 12 1/4" bit, 2 stabilizers and one drill collar to 7,347'. Circulated and conditioned mud. Pulled out and laid down tools. Rigging up to run casing.

8-9 40th Day. Strung 10 lines. Pulled bit guide from 13 3/8" head. Running 8 5/8" casing.

8-10 41st Day. Ran 49 Jts. (2024.42') of 8 5/8" 40# N-80 and 130 Jts. (5322.58') of 8 5/8" 36#N-80 all with buttress thread. Landing joint was 40#N-80 buttress. Total of 7,352.82' on hook. B&W float shoe landed at 7,347', B&W float collar at 7,220'. Shoe, bottom three jts. and float collar had thread-lock applied. Two centralizers and three scratcher clusters installed on bottom three joints. Centralizers installed on every other collar up to 1,000'. Circulated casing. Dowell pumped 500 cu.ft. "CW7" ahead of 1,200 cu.ft. of 1-1 lite-poz 7 blended with 1% "D-65" and 0.5% "D-60", followed by 350 sacks of class "G" cement with 0.75% "D-65" and 0.5% "D-60", followed by 250 cu.ft. of self-stress cement with 0.5% "D-65" and 0.2% of "D-108". Used top and bottom plugs. Displaced with 2,472 cu.ft. of mud. Did not bump plug. Approximately 200 lineal feet left in pipe. Good circulation throughout job. Cement in place at 7:15 am, 8/10/79. Removed BOPE. Landed 8 5/8" casing in slips with 265,000#. Cut off 8 5/8" casing. Installed tubing head and tested all seals to 5,000 psi for 1 hour, O.K.

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8-11 42nd Day. Installed BOPE. Made up drilling assembly with scraper and 7 5/8" Bit #31. Ran in to 3,900'±. Tested pipe rams to 3,000 psi, Hydril to 2,000 psi with water and nitrogen for 20 minutes each. All tests O.K.

8-12 43rd Day. Ran in hole to 7,220'. Drilled out plugs, float collar and cement to 7,330' with Bit #31. Circulated for logs. Pulled out, rigged and ran Welex Cement Bond log from 7,308' to 3,350' (Welex measure). Ran in hole rubbering drill pipe every other joint. Changed over to brine-polymer fluid. Pulling out of hole.

8-13 44th Day. Finished pulling out of hole. Welex shot four 1/2" holes at 7,204' - 7,205'. Dowell pressured to 2,200 psi. Holes broke down immediately. Ran in with Baker model "K" cement retainer to 7,239'. Spotted 40 cu.ft. of water in annulus and 60 cu.ft. in drill pipe. Closed pipe rams. Obtained breakdown of 3 cu.ft. per minute at 2,450 psi. Backscuttled out water. Pulled up to 7,209'. Dowell pumped 30 cu.ft. of water ahead of 56 cu.ft. of acid and 30 cu.ft. of water. Spotted 30 cu.ft. of water and 20 cu.ft. of acid in annulus. Pulled up to 7,137' and set retainer. Obtained breakdown of 30 cu.ft. per minute at 1,800 psi. Dowell pumped 50 cu.ft. of water ahead of 115 cu.ft. of class "G" cement with 0.75% "D-65", followed by 50 cu.ft. of water. Displaced with 335 cu.ft. of drilling fluid and stabbed into tool. Squeezed away cement and cleared holes with 20 cu.ft. of water. Cement in place at 9:30 pm. Pulling out of hole.

8-14 45th Day. Finished pulling out of hole. Laid down 24 joints of 4 1/2" 16.60# and 18 joints of 4 1/2" heavy weight cemented up drill pipe and loaded out same. Unloaded, tallied, and picked up 23 joints of 4 1/2" 16.60# drill pipe. Measured in hole with Bit #31RR. Tagged cement at 7,129'. Bit plugged. Pulling out wet.

8-15 46th Day. Finished pulling out of hole with plugged bit. Ran back in and cleaned out from 7,080' to 7,113'. Drilled hard cement from 7,113' to 7,137'. Drilled out retainer and hard cement to 7,159'. Circulated clean. With bit at 7,250', Dowell spotted 60 cu.ft. of water (30 cu.ft in annulus). Closed rams and got breakdown of 10 cu.ft. per minute at 2,200 psi. Pulled out of hole. Ran Baker model "K" cement retainer on 4 1/2" 16.60# drill pipe to 7,202'. Dowell pumped 56 cu.ft. of acid (12% HCL and 3% HF) and displaced with 540 cu.ft. of drilling fluid. Pulled up to 7,137', closed rams, squeezed away 20 cu.ft. of acid at 8 cu.ft. per minute at 2,000 psi. Set cement retainer and squeezed away 20 cu.ft. at 35 cu.ft. per minute at 2,000 psi. Dowell pumped 50 cu.ft. of water ahead of 115 cu.ft. of class "G" cement blended with 0.75% "D-65" followed by 50 cu.ft. of water, followed by 355 cu.ft. of drilling fluid. Stabbed into model "K" retainer (7,137'). Squeezed away 100 cu.ft. of cement at 10 cu.ft. per minute at 1,000 psi. Locked up at end with 2,500 psi.

8-16 47th Day. Finished squeeze at 12:45 am, reverse circulated 600 cu.ft. of drilling fluid from 7,135'. Chained out of hole. Made up 7 5/8" Bit #32 on drilling assembly. Ran in hole to 7,137'. Drilling out retainer, cleaned out cement from 7,157' to 7,204'. Cleaned out to 7,330'. Circulated clean. Pulled up to 7,230'. Dowell pumped 100 cu.ft. of calcuim chloride 78# water. Followed by 513 cu.ft. of mud. Closed rams and pressure tested holes at 7,204' - 7,205' with 2,200 psi for 20 minutes, O.K. Pulled out of hole. Welex shot four 1/2" holes at 7,205' - 7,206'. Dowell pressure tested holes and got a breakdown of 8 cu.ft. per minute at 2,100 psi. Running in hole with Johnson "Hornet" cement retainer.

8-17 48th Day. Finished running in hole with Johnson "Hornet" cement retainer. Set retainer at 7,098'. Dowell pumped 50 cu.ft. of water followed by 57 cu.ft. of class "G" cement blended with 0.75% "D-65" and followed by 50 cu.ft. of water and 409 cu.ft. of drilling fluid. Closed tool. Displaced with 91 cu.ft. of drilling fluid. Starting breakdown at 8 cu.ft. per minute at 2,100 psi. Final pressure 2,500 psi and locked. Cement in place at 2:49 am, 8-17-79. Reverse circulated with 600 cu.ft. of drilling fluid. Ran in with drilling assembly and Bit #33. Located cement at 7,082'. Drilled out cement to 7,098' and retainer at 7,098'. Drilled out cement to 7,204'. Ran in to 7,330' and circulated clean. Pulled up to 7,207'. Dowell pumped 60 cu.ft. of calcuim chloride water ahead of 509 cu.ft. of drilling fluid. Closed rams and pressure tested holes at 7,205' - 7,206' with 2,200 psi for 20 minutes. Pulled out of hole. Rigging up Welex.

8-18 49th Day. Welex shot four 1/2" holes from 7,206' to 7,207'. Closed blind rams. Dowell obtained breakdown of 3 cu.ft. per minute at 2,100 psi. Ran in with Howco "E-Z Drill" cement retainer to 7,210'. Dowell pumped 50 cu.ft. of water and 550 cu.ft. of drilling fluid. Closed pipe rams and obtained a breakdown of 4 cu.ft. per minute at 2,300 psi. Pulled up to 7,180' and set retainer. Dowell pumped 50 cu.ft. of water ahead of 50 sacks (57 cu.ft.) of class "G" cement (neat), followed by 50 cu.ft. of water. Displaced with 442 cu.ft. of drilling fluid, stabbed in and displaced with additional 75 cu.ft. (517 cu.ft. total). Starting rate - 4 cu.ft. per minute at 2,300 psi, final pressure 2,400 psi, locked up. Cement in place at 12:50 pm, 8-18-79. Reversed with 600cu.ft. of drilling fluid. Pulled out of hole. Ran in with 7 5/8" OMT mill. Milling out Howco "E-Z Drill".

8-19 50th Day. Milled on retainer. Pulled out and ran in with Bit #34. Drilled out retainer at 7,180'. Drilled out cement to 7,207'. Ran in to 7,330'. Circulated clean. Pulled up to 7,237'. Dowell displaced 100 cu.ft. of calcuim chloride water and 513 cu.ft. of drilling fluid. Closed rams and pressured up to 2,200 psi. Rams leaked. Closed Hydril, pressure tested to 2,200 psi for 20 minutes, O.K. Pulled out of hole. Changed 4 1/2" ram rubbers. Welex shot four 1/2" holes from 7,207' - 7,208'. Pressure tested. Holes stated taking fluid at 1,800 psi. Final Breakdown 10 cu.ft. per minute at 2,000 psi.

8-20 51st Day. Ran in well with Howco "E-Z Drill" retainer and set at 7,184'. Mixed 50 sacks of class "G" cement mixed with latex. Squeezed away 38 cu.ft. at final pressure of 2,300 psi. Reverse circulated well clean. Pulled out of well. Ran in with Bit #35 and located top of retainer at 7,184'. Drilled on retainer for 6 hours from 7,184' to 7,185'. Pulled out of well. Ran in with Bit #36 to 5,500'.

8-21 52nd Day. Continued running in well with Bit #36. Drilled 5 hours on retainer from 7,185' to 7,186'. Pulled out and ran in well with 7 5/8" flat bottom mill. Milled up retainer and cleaned out to 7,330'. Circulated one hour. Pulled up to 7,207' and equalized 100 cu.ft. of calcuim chloride water. Closed pipe rams and pressured up to 2,000 psi which held for 20 minutes.

8-22 53rd Day. Using Welex wireline and jet gun, shot four 1/2" holes from 7,203' to 7,204'. Pressure tested holes to 2,000 psi for 20 minutes. Ran in well with Lynes test tools and set packer at 7,140'. Opened tool at 9:50 am, faint blow for 3 minutes and dead blance of one hour test. Pulled and recovered 25' rise of polymer drilling fluid. Test witnessed and approved by DOG. Ran in with Bit #37 and drilled out cement from 7,330' to shoe at 7,347'. Drilled to 7,353' and circulated well clean.

8-23 54th Day. Ran in well with 7 5/8" Diamond core head and cored from 7,353' to 7,379'. Pulled out and recovered 22' of 3" core.

8-24 55th Day. Diamond cored 7 5/8" hole from 7,379' to 7,403' for core #2. Recovered 23' of core.

8-25 56th Day. Diamond cored 7 5/8" hole from 7,403' to 7,428'. Recovered 23' of core. Diamond cored 7 5/8" hole 7,428' to 7,439'.

8-26 57th Day. Diamond cored 7 5/8" hole from 7,439' to 7,454' with run #4, and to 7,464' with run #5. Recovered 26' of 3" core.

8-27 58th Day. Diamond cored 7 5/8" hole from 7,464' to 7,470' for core #5 and to 7,484' with run #6. Recovered 16'.

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8-28 59th Day. Diamond cored 7 5/8" hole from 7,484' to 7,485'. Diamond cored 7 5/8" hole from 7,485' to 7,496'. Recovered 16'.

8-29 60th Day. Diamond cored 7 5/8" hole from 7,496' to 7,510'. (Recovered 12').

8-30 61st Day. Drilled 7 5/8" hole from 7,510' to 7,587' with Bit #37.

8-31 62nd Day. Diamond cored 7 5/8" hole from 7,587' to 7,604'. (Recovered 13 1/2 feet of 3" core #9). Down 1 hour repairing rotary clutch.

9-1 63rd Day. Diamond cored 7 5/8' hole from 7,604' to 7,626'. (Recovered 19 1/2 feet of 3" core).

9-2 64th Day. Diamond cored 7 5/8" hole from 7,626' to 7,656'. (Recovered thirty feet of 3" core). Drill 7 5/8" hole from 7,656' to 7,684'.

9-3 65th Day. Drilled 7 5/8" hole from 7,684' to 7,716' with Bit #37. Circulated. Pulled up to 8 5/8" casing shoe at 7,347'. Circulated. Ran in to 7,716'. Circulated for logs. Pulled out. Schlumberger ran Dual Induction - SFL, Compensated Neutron - Formation Density logs and recorded from 7,716' to 7,347'. Ran Bore Hole Compensated Sonic log and recorded from 7,716' to 7,000'. Ran continuous Dipmeter log and recorded from 7,716' to 7,347'.

9-4 66th Day. Ran #37RR to 7,716'. Circulated and pulled out of hole. Laid down 4 1/2" drill collars. Measured and picked up 11 joints of 2 7/8" tubing tail. Ran in to 7,673'. Dowell pumped 70 cu.ft. of water ahead of 100 sacks of class "G" cement with .05% water loss agent. Equalized with 570 cu.ft. of drilling fluid. Cement in place at 4:53 pm., 9-4-79. Pulled out of hole. Laid down 2 7/8" tubing. Measured and picked up six 4 1/2" drill collars. Two hours downtime repacking swivel.

9-5 67th Day. One hour down time repacking swivel. Ran in hole with 7 5/8" Bit #37RR. Tagged cement at 7,287'. Cleaned out cement to 7,500'. Circulated clean. Pulled out. Laid down and loaded out 4 1/2" drill collars. Made up Tri-State 7 1/2" x 15" under-reamer. Under-reamer would not go through bit guide. Ran bit guide retrieving tool, could not engage guide. Ran Midway 7 1/2" x 7 3/4" spear. Took hold of guide. Pulled 30,000 pounds, would not pull loose.

9-6 68th Day. Laid down spear. Hole opener stopped in protector. Attempted to run Baker bridge plug. Ran in with open ended 4 1/2" drill pipe to 6,002' and circulated. Dowell pumped 50 cu.ft. of water ahead of 57 cu.ft. of class "G" cement followed by 6 cu.ft. of water and displaced with 455 cu.ft. of drilling fluid. Cement in place at 11:45 am., 9-6-79. Pulled out of hole. Bit guide came out on last drill pipe rubber. Made up 7 5/8" bit #37RR on casing scraper and three 6" drill collars. Ran in hole and located cement at 5,828'. Drilled out cement to 6,011'. Pulled out of hole. Made up Tri-State 7 1/2" x 15" hole opener. Measuring and picking up heavy weight drill pipe.

9-7 69th Day. Ran in hole with Tri-State hole opener. Opened 7 5/8" hole to 15" from 7,347' to 7,399' with hole opener #1 and to 7,433' with hole opener #2.

9-8 70th Day. Opened 7 5/8" hole to 15" from 7,433 to 7,436' with hole opener #2 and to 7,470' with hole opener #3. Ran in with 7 5/8" bit #37RR. Cleaned out fill from 7,470' to 7,500' and drilled out cement to 7,512'. Circulated. Pulling out of hole.

9-9 71st Day. Continued out of hole with 7 5/8" bit. Ran 7 5/8" x 15" hole opener #4. Opened 7 5/8" hole to 15" from 7,470' to 7,477'. Pulled out of hole and ran 7 5/8" x 15" hole opener #5. Reamed 15" hole from 7,475' to 7,477'. Well blew out at 3:25 pm. Rigging up to kill well.

9-10 72nd Day. Rigged up choke manifold and withdrawal line. Dowell commenced pumping 80# mud at 6:40 am. at a rate of 3 bbls. per minute. Starting pressure on drill pipe was 1,200 psi with annulus pressure of 2,780 psi. Drill pipe pressure declined to zero at 570 cu.ft. (102 bbls). Well was dead and BOPE was opened at 11:30 am. Circulated and jarred on stuck pipe. Ran Dia-Log free-point indicator, free point at 7,390'. Ran string shot and backed off at 7,288'. Rigging down Dia-Log.

9-11 73rd Day. Chained out of hole. Ran in hole with Baker model "C" bridge plug and set same at 6,990'. Pulled out of hole. Replaced Hydril, pipe and blind ram rubbers. Made up and ran in hole with Baker fullbore test packer which was set at 477'. Pressure tested Pipe rams with water to 4,000 psi for 20 minutes, O.K. Pressure testing Hydril.

9-12 74th Day. Tested Hydril with water and nitrogen to 3,000 psi for 20 minutes each test, O.K. Tested pipe rams with nitrogen and would not hold. Welded up washouts in pipe ram seals in body of gate. Tested pipe rams with water to 4,000 psi for 20 minutes, O.K. Testing with nitrogen.

9-13 75th Day. Tested pipe rams with nitrogen to 4,000 psi for 20 minutes, O.K. Pulled out Full-Bore packer from 477'. Ran in the hole with Baker retrieving tool on 4 1/2" drill pipe. Found and latched on to bridge plug at 5,900'. Ran in to 7,173'. Circulated. Pulled out with Baker model "C" plug. Made up and ran Johnson retrievable bridge plug and set at 60'. Tested blind rams with water and nitrogen to 4,000 psi for 20 minutes both tests, O.K. Retrieved Johnson bridge plug. Made up Midway fishing tools, six 6" drill collars and picking up additional drill collars.

9-14 76th Day. Finished picking up 6" drill collars. Ran in hole. Circulated. Screwed into fish at 7,288'. Jarred on fish. Unable to pump through fish with rig pump. Rigged up Dowell to establish better or full circulation. Continued jarring on fish. Dowell pumped 50 bbls (280 cu.ft.) of #2 diesel fuel. Followed by 386 cu.ft. of mud when circulation was lost with 16 bbls of diesel in 7 5/8" x 15" annulus.

9-15 77th Day. Displaced diesel fuel with additional 200 cu.ft. of drilling fluid. Let diesel set for one hour. Jarred on fish with 280,000# for 17 hours. Slipped drilling line 40'. Ran free point indicator and string shot. Made one unsuccessful backoff at 7,419'. Pipe backed off up hole. Depth unknown. Screwed back in. Pulling wireline.

9-16 78th Day. Dia-Log ran shot #2 which misfired. Ran shot #3 and backed off at 7,385' drill pipe measure, 7,392' wireline measure. Chained and measured out of hole. Laid down fishing tools and fish. Recovered one joint of heavy wall drill pipe, jars, crossover sub, and one 6" drill collar. Made up one 40' joint of 7" washpipe on four 5 3/4" drill collars. Ran in hole slowly. Serviced all tool joints on heavy wall drill pipe.

9-17 79th Day. Continued running in hole with 7" washpipe to shoe of 8 5/8" casing at 7,347'. Circulated for one hour. Washed over fish from 7,385' to 7,439'. Pulled out and laid down washpipe. Made up and ran screw in fishing assembly. Stopped at shoe and circulated for one hour. Screwed into fish at 7,385'. Jarred on fish. Ran Dia-Log free point indicator and string shot. Backed off at 7,422'. Pulled up to 7,217'. Circulating.

9-18 80th Day. Pulled out of hole. Recovered one 6" drill collar. Top of fish now at 7,422'. Ran in with 45' of 7" washpipe. Washed over fish from 7,422' to 7,455'. Pulled out of hole with washpipe. Running in with screw in sub.

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9-19 81st Day. Finished running in hole to shoe of 8 5/8" casing and circulated bottoms up. Ran in and screwed into fish at 7,422'. Jarred on fish. Dia-Log ran Free-point and string shot. Attempted to back off at 7,478' with no success. Shot and backed off at 7,449' leaving fish in hole 7,449' - 7,487'. Pulled out of hole. Left one drill collar of fish, screw in sub, bumper sub, jars and two 5 3/4" drill collars of fishing tools in hole.

9-20 82nd Day. Ran in hole with screw in sub to shoe of 8 5/8" casing. Circulated bottoms up. Screwed into fish at 7,354'. Pulled out of hole. Laid down one badly damaged 6" drill collar fish. Ran 43' of 3 1/2" drill pipe probe below 4 1/2" drill pipe which stopped at 7,347'. Circulated bottoms up. Attempted to work on down. Wouldn't go. Pulling out of hole.

9-21 83rd Day. Pulled out of hole. Modified 3 1/2" drill pipe stinger. Ran in hole to 7,347'. Circulated bottoms up. Ran in to 7,449' and washed along side of fish to 7,455'. Pulled out of hole. Modifying 3 1/2" 43' stinger.

9-22 84th Day. Ran in with 40' of 3 1/2" drill pipe stinger. Washed down beside fish from 7,455' to 7,472'. Pulled out. Made up 62' of 3 1/2" drill pipe stinger. Ran in hole and circulated bottoms up.

9-23 85th Day. Washed down beside fish from 7,472' to 7,484' with 62' of 3 1/2" drill pipe stinger. Pumped down 50 bbls of high viscosity pill. Pulled up to 8 5/8" casing shoe. Set for one half hour. Ran in and tagged bottom at 7,484'. No fill. Pulled out.

9-24 86th Day. Made up screw in sub. Ran in hole. Screwed into fish at 7,449'. Unable to circulate. 7 hours jarring on fish. Ran Dia-Log collar locator. Found fill inside of fish at 7,453'. Cleaned out fill from 7,453' to 7,480'. Ran Dia-Log back off string shot which did not fire.

9-25 87th Day. Jarred on fish 4 hours. Rigged up Dia-Log. Ran a nitro gel shot which was fired at 7,479'. Circulated and jarred on fish. Jarred pin of screwin sub out of damaged drill collar box at 7,449'. Pulled out of well. Laid down fishing tools. Ran in well with 62' of 2 7/8" tubing stinger on bottom. Equalized cement plug from 7,449' up to 7,400'. CIP at 11:40 pm.

9-26 88th Day. Ran in well with 4 1/2" drill pipe and 7 1/2" junk mill. Found top of cement at 7,400'. Loaded out drill collars and fishing tools. Pulled out of well. Made up 5" bent housing Dyna-drill.

9-27 89th Day. Dyna-drilled 7 5/8" hole from 7,400' to 7,437' with Bit #38 and to 7,453' with Bit #39.

9-28 90th Day. Drilled 7 5/8" hole from 7,453' to 7,478' with Bit #39 and to 7,509' with Bit #40.

9-29 91st Day. Circulated well clean and pulled out. Ran Schlumberger Dual Induction SFL log and recorded from 7,509' to 7,342'. Ran drilling assembly. Drilled 7 5/8" hole from 7,509' to 7,512' with Bit #41.

9-30 92nd Day. Ran 7 1/4" x 15" hole opener #6 and opened 7 5/8" hole to 15" from 7,400' to 7,452'. Pulled out.

10-1 93rd Day. Opened 7 5/8" hole to 15" from 7,452' to 7,469' with hole opener #7 and to 7,476' with hole opener #8.

10-2 94th Day. Opened 7 5/8" hole to 15" from 7,476' to 7,478' with hole opener #9, to 7,486' with hole opener #10 and to 7,507' with hole opener #11. Pulling out of hole.

10-3 95th Day. Finished pulling out of hole. Made up 7 5/8" bit. Circulated for 1 hour at 8 5/8" casing shoe. Ran in and found fill at 7,483'. Cleaned out to 7,512'. Circulated clean. Pulled out of hole. Ran in with Tri-State hole opener #12. Gauge reamed 15" hole from 7,347' to 7,510'. Circulated clean. Pulled out.

10-4 96th Day. Ran Dresser Atlas Caliper log with bore hole volume integrator and recorded from 7,510' to 7,346'. Ran in hole with Bit #42RR to 8 5/8" casing shoe. Circulated. Cleaned out from 7,510' to 7,512'. Pulled back up to shoe. Cleaned mud pits and changed over to 86# gravel pack fluid. Pulled out.

10-5 97th Day. Made up and ran 6 joints and 2 pups of 5 1/2" 20# K-55 ST&C 8rd liner. Total length 278.16' including Baker lead seal hanger and port collar. Shoe landed at 7,511'. 10 mesh wire wrap from 7,510' to 7,343'. Blank from 7,343' to 7,280'. Ports at 7,238.55'. Three B&W centralizers installed on bottom three collars in open hole. 239' of 2 3/8" tubing stinger. B&W flow packing with 20 - 40 gravel.

10-6 98th Day. B&W gravel packed with 228 sacks of 20 - 40 gravel. Back-scuttled and pulled out of hole. Made up and ran washer. (2.60' between cups). Washed liner. Pulled out. Ran in with gravel packing tool. Opened port collar and circulating.

10-7 99th Day. Repacked 5 1/2" liner with 8 cu.ft. of 20 - 40 gravel. Packed off. Backscuttled out 6 cu.ft. for 230 cu.ft. in place. Closed port collar. Tested same with 1,000 psi, O.K. Pulled out. Ran Dresser Atlas Photon log. Log shows 8 lineal foot void immediately below 8 5/8" casing shoe. Ran in with Baker washer and two B&W vibrators. Rewashed and vibrated all of liner. Pulling out.

10-8 100th Day. Finished pulling out. Ran in with gravel packing tools and opened port collar. B&W packed 5 1/2" liner with 34 cu.ft. of 20 - 40 gravel. Backscuttled out 20 cu.ft., 14 cu.ft. in, 243 cu.ft. total in place. Closed and tested port collar with 1,000 psi, O.K. Pulled out of hole. Rigged and ran Dresser Atlas Photon log. Dresser Atlas set Baker 8 5/8" "Retrieva-D" packer at 7,190'.

10-9 101st Day. Ran in hole with Baker seals and locator sub. Attempted pressure test on packer. Would not test. Built up mud volume. Pulled out of hole.

10-10 102nd Day. Ran in hole with Johnson bridge plug. Unable to set at 7,150'. Pulled out of hole. Ran Baker model "C" bridge plug. Set bridge plug at 7,150'. Howco spotted 8 sacks of sand. Pulled up 3 stands. Waited 2 hours. Ran 3 stands to find top of sand. Bridge plug not set. Reset bridge plug at 7,152'. Howco spotted 8 sacks of sand on bridge plug.

10-11 103rd Day. Waited for sand to fall. Ran in and touched sand at 7,132'. Pulled out of hole. Ran in with Baker fullbore packer. Made 16 pressure tests of 8 5/8" casing. Found leak from 1,597' to 1,605'. Pulled out. Rigged and running McCullough casing inspection log.

10-12 104th Day. Finished running McCullough casing inspection log from 7,100' to surface. Found leak from 1,594' to 1,596'. Ran in and set Baker model "C" bridge plug at 1,721'. Howco pumped 8 sacks of silica sand on top of bridge plug. Pulled out of hole. Broke and laid down setting tool. Ran in with open end 4 1/2" drill pipe. Tagged sand at 1,709'. Pulled up to 1,600'. Howco equalized 67 cu.ft. of class "G" neat cement. Pulled out of hole. Closed blind rams and squeezed away 62 cu.ft. Cement in place at 4:00 pm., 10-12-79. Final pressure 800 psi. Waiting on cement.

10-13 105th Day. Ran in hole with 7 5/8" Bit #43RR and casing scraper to 1,400'. Changed calcium chloride polymer to water. Drilled cement from 1,585' to 1,600'. Circulated clean. Pressure tested casing. Pumped away at 800 psi. Pulled out. Ran back with open end 4 1/2" drill pipe to 1,601'. Howco equalized 100 cu.ft. of class "G" cement. Pulled out. Closed blind rams. Squeezed away 92 cu.ft. Cement in place at 8:30 am. Waited on cement 12 hours. Ran in with 7 5/8" Bit #43RR and 8 5/8" casing scraper. Cleaned out cement from 1,580' to 1,601'. Circulated and tested casing. Pumped away at 1,000 psi. Pulled out. Running in with 4 1/2" open end drill pipe.

10-14 106th Day. Finished running in hole with open end 4 1/2" drill pipe to 1,601'. Howco equalized 100 cu.ft. of class "G" cement blended with 3% calcuim chloride. Pulled out. Closed blind rams and squeezed away 80 cu.ft. Cement in place at 2:30 am., 10-14-79. Waited on cement 8 hours. Ran in with 7 5/8" bit and casing scraper. Cleaned out cement from 1,500' to 1,608'. Pressure test broke down at 1,200 psi. Pulled out. Ran in with 4 1/2" open ended drill pipe to 1,600'. Howco equalized 100 cu.ft. of class "G" cement blended with 3% calcium chloride. Pulled out. Closed blind rams and squeezed away 85 cu.ft. Cement in place at 3:15 pm., 10-14-79. Waited on cement 8 hours. Running in hole with bit and casing scraper.

10-15 107th Day. Finished running in hole with 7 5/8" bit and scraper. Cleaned out cement from 1,604' to 1,608'. Stringers to 1,633'. Pulled out of hole. Closed blind rams, pressured up, leak broke down at 1,250 psi. Ran in to 1,619' with 4 1/2" open ended drill pipe. Howco equalized 108 cu.ft. of class "G" cement blended with 3% calcium chloride. Pulled out. Closed blind rams. Attempted to squeeze. Cement in place at 4:00 am. Final pressure 2,600 psi. Waited on cement for 8 hours. Ran in with bit and scraper. Cleaned out cement from 1,296' to 1,620'. Ran in to 1,683'. Circulated clean. Closed pipe rams. Leak broke down at 1,150 psi. Pulled out of hole. Ran in to 1,619' with 4 1/2" drill pipe. Howco equalized 58 cu.ft. of class "G" neat cement. Pulled out. Closed blind rams. Howco squeezed away 47 cu.ft. Final pressure 1,200 psi. Cement in place at 11:00 pm. Waiting on cement.

10-16 108th Day. Waited on cement for 11 hours. Ran in hole with 7-5/8" bit #43RR. Cleaned out cement from 1,578' to 1,630'. Circulated clean. Pulled out. Testing casing to 1,250 psi. Would not hold. Ran in and set Howco "E-Z drill" retainer at 1,546'. Howco pumped 62 cu.ft. of Cal seal. Squeezed away 38 cu.ft. Final pressure 2,600 psi. Cement in place at 7:45 pm., 10-16-79. Pulled out. Waited on cement for 2 hours. Running in hole with 7 5/8" #44 and scraper.

10-17 109th Day. Drilled on "E-Z" drill retainer from 1,551' to 1,553' with 7 5/8" Bit #44. Pulled out of hole. Ran in with OMT 7 5/8" junk mill but unable to mill. Pulled out. Ran in with 7 5/8" Bit #45. Drilled out cement retainer to 1,554'. Drilled out cement to 1,568'.

10-18 110th Day. Tripped for bit. Drilled out cement from 1,568' to 1,674' with Bit #46. Circulated clean. Tested casing. Pumped away at 1,250 psi at 7 cu.ft. per minute. Pulled out of hole. Ran in and set Howco "E-Z" drill cement retainer at 1,548'. Howco squeezed away 53 cu.ft. of class "G" cement mixed with 10% Cal seal. Final pressure 2,600 psi. Cement in place at 7:00 pm., 10-18-79. Pulled out. Ran in with bit and located cement at 1,548'. Rigging up to lay down drill pipe.

10-19 111th Day. Laid down drill pipe. Broke Kelly and swivel. Laid down mouse hole and rat hole pipe. Removed BOPE.

10-20 112th Day. Installed xmas tree. Cleaned pits. Operations suspended and rig released at 11:00 am., 10-20-79.

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HIGH RESOLUTION

DIPMETER

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CLUSTER LISTING
****

037-21892

SOUTHERN CALIFORNIA GAS CO.

ALISO CANYON

LOS ANGELES , CALIFORNIA

"SFZU" MA-1B

~~MISSION ADRIAN - 1B~~

34-3N-16W

RUN NO. ONE JOB NO. 3413

CLUSTER RESULTS ONLY

4 FT. CORR. - 2 FT. STEP

30 DEG. X2 SEARCH ANGLE

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1028			4.4	269	18.0	16.6	
1030			4.4	270	18.0	16.5	
1032			4.4	270	18.0	16.6	
1034			4.4	270	18.0	16.8	
1036			4.5	271	18.0	16.9	
1038			4.6	271	18.0	17.0	
1040			4.6	271	18.0	17.1	
1042			4.6	272	18.0	17.3	
1044			4.6	273	18.0	17.4	
1046	49.7	87	4.7	273	18.0	17.6	C
1048	36.5	102	4.8	273	18.0	17.8	C
1050	46.3	99	4.8	273	18.0	17.9	C
1052	52.5	96	4.8	272	18.0	18.0	B
1054	37.4	86	4.8	274	18.0	17.9	A
1056	38.3	87	4.8	276	18.0	17.6	A
1058	43.2	94	4.8	278	18.0	17.0	C
1060	41.5	97	4.8	277	18.0	16.7	A
1062	43.5	89	4.8	273	18.0	17.0	C
1064			4.8	273	18.0	17.5	
1066			4.9	274	18.0	17.7	
1068	44.2	84	5.0	274	18.0	17.8	D
1070	28.3	179	5.0	273	18.0	17.8	D
1072	26.1	166	5.0	274	18.0	17.6	D
1074			5.0	275	17.9	17.5	
1076	55.4	75	5.1	275	17.6	17.5	D
1078			5.2	275	17.8	17.6	
1080	47.2	85	5.2	275	18.0	17.8	B
1082	47.3	80	5.2	275	18.0	17.8	B
1084	40.9	77	5.2	276	17.8	17.4	D
1086			5.2	276	17.6	16.9	
1088			5.2	276	17.2	16.7	
1090			5.2	276	17.0	16.9	
1092			5.2	276	17.6	17.1	
1094			5.2	276	18.0	17.3	
1096			5.2	277	17.6	17.2	
1098			5.2	277	16.6	16.8	
1100			5.2	277	15.8	16.7	
1102			5.3	277	16.1	16.7	
1104			5.4	277	16.3	16.9	
1106			5.3	277	16.0	17.1	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1108			5.2	277	16.1	17.1	
1110			5.2	277	16.3	17.0	
1112			5.2	278	16.3	17.0	
1114			5.3	278	16.4	17.1	
1116			5.3	278	16.6	17.2	
1118			5.4	278	16.5	16.9	
1120			5.4	278	15.8	16.2	
1122	40.0	108	5.4	279	15.3	15.7	D
1124	41.0	106	5.4	279	15.5	15.9	D
1126	47.1	101	5.4	279	16.8	16.3	D
1128			5.4	278	17.4	16.4	
1130	45.8	94	5.4	277	17.2	16.3	D
1132	46.4	94	5.4	277	16.5	16.3	D
1134	42.2	103	5.4	278	15.3	16.4	D
1136	41.9	104	5.4	279	15.4	16.9	D
1138			5.4	278	16.5	17.4	
1140	50.0	96	5.5	278	17.2	17.6	D
1142	50.1	99	5.6	280	16.8	17.6	D
1144	49.9	99	5.6	280	16.3	17.6	D
1146	49.4	93	5.7	281	16.7	17.7	D
1148	52.9	94	5.8	281	16.6	17.7	D
1150	52.6	93	5.8	282	15.5	17.5	B
1152	51.6	95	5.8	282	15.3	17.3	D
1154	53.5	99	5.8	281	16.1	17.1	D
1156	48.5	94	5.9	281	16.4	17.1	D
1158	52.5	98	6.0	282	16.3	17.2	D
1160	51.0	95	6.0	281	16.6	17.4	D
1162	53.3	69	6.0	281	16.5	17.3	B
1164			6.1	281	16.0	17.0	
1166			6.2	280	16.3	16.9	
1168	51.2	89	6.2	279	16.2	16.9	D
1170	53.6	95	6.2	279	15.9	16.6	D
1172	55.9	97	6.2	279	15.9	16.2	B
1174	52.8	95	6.2	279	16.0	15.9	D
1176			6.2	278	15.9	15.7	
1178			6.2	279	15.5	15.5	
1180			6.2	280	15.6	15.6	
1182	63.0	73	6.2	280	16.2	15.7	B
1184			6.3	280	16.2	15.7	
1186			6.4	280	16.2	15.6	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1188	61.0	72	6.4	282	16.1	15.5	B
1190	54.7	74	6.4	282	15.8	15.4	D
1192			6.4	282	15.9	15.3	
1194	51.4	77	6.4	281	16.2	15.1	D
1196	48.1	82	6.4	281	16.6	15.1	D
1198	51.9	85	6.4	280	16.9	15.2	B
1200	51.0	83	6.3	280	17.0	15.3	D
1202			6.2	280	16.7	15.2	
1204	57.4	85	6.2	280	16.8	15.0	D
1206	59.0	86	6.3	279	16.6	14.6	B
1208	55.3	80	6.4	279	16.6	14.4	D
1210	54.5	80	6.4	279	17.0	14.2	D
1212	56.2	90	6.5	278	16.6	13.9	B
1214	60.0	82	6.6	278	16.0	13.7	B
1216			6.6	278	16.1	13.6	
1218	52.3	80	6.7	277	16.1	13.5	D
1220			6.8	276	16.4	13.6	
1222	63.9	81	6.8	275	16.6	13.7	B
1224			6.8	275	16.9	13.6	
1226			6.8	276	17.2	13.5	
1228	55.8	190	6.8	275	16.8	13.7	D
1230	55.9	188	6.8	274	16.6	13.9	D
1232	59.2	92	6.8	273	17.1	14.0	D
1234	57.6	83	6.9	272	17.0	13.9	D
1236	53.8	82	7.0	274	16.7	13.7	D
1238	50.4	82	7.0	272	16.4	13.7	D
1240	48.9	81	7.0	270	16.4	14.0	D
1242	45.9	82	7.0	269	16.3	14.3	D
1244			7.0	270	15.8	14.3	
1246	45.9	88	7.0	271	15.0	14.3	A
1248	44.5	85	7.0	270	15.1	14.3	A
1250	43.4	83	7.0	271	15.4	14.4	A
1252	42.5	80	7.0	271	15.7	14.6	A
1254	39.5	85	7.0	271	15.8	14.9	A
1256	39.7	84	6.9	271	15.5	15.2	C
1258	41.1	87	6.8	271	15.1	15.5	C
1260	39.1	85	6.8	270	14.8	15.7	C
1262	39.9	85	6.8	270	14.0	16.0	C
1264	39.7	83	6.8	270	13.4	16.2	A
1266	37.6	87	6.8	270	13.1	16.5	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1268	45.0	82	6.8	269	13.1	16.9	A
1270	45.5	81	6.8	271	13.8	17.6	A
1272	49.1	82	6.8	271	15.4	17.9	A
1274	45.0	86	6.8	271	16.7	18.0	C
1276	47.5	72	6.8	272	16.2	18.0	C
1278	46.7	76	6.9	274	12.9	18.0	C
1280	47.7	83	7.0	273	12.4	18.0	C
1282	46.9	82	6.9	273	15.4	18.0	C
1284	49.4	82	6.8	275	16.6	18.0	A
1286	35.1	69	6.8	274	15.9	18.0	B
1288	36.4	65	6.8	273	12.7	18.0	B
1290			6.8	272	12.6	18.0	
1292	45.1	81	6.8	272	14.8	18.0	C
1294	41.9	86	6.7	269	13.9	18.0	C
1296	42.6	85	6.7	269	13.5	18.0	C
1298	45.8	80	6.7	270	13.1	18.0	C
1300	41.9	80	6.6	269	12.4	18.0	C
1302	42.0	78	6.6	269	12.8	18.0	C
1304	43.8	81	6.6	270	13.5	18.0	C
1306	46.4	83	6.6	268	13.6	18.0	C
1308	48.0	85	6.5	267	14.4	18.0	C
1310	46.4	84	6.4	267	15.8	18.0	C
1312	48.1	88	6.3	267	15.1	18.0	C
1314	48.1	84	6.1	265	14.1	18.0	C
1316	53.0	80	6.0	265	14.9	18.0	C
1318	53.6	84	5.9	265	16.2	18.0	C
1320	43.3	86	5.8	263	16.0	18.0	C
1322	40.3	85	5.7	262	15.2	18.0	A
1324	40.1	86	5.6	262	14.2	18.0	A
1326	40.4	74	5.6	261	14.8	18.0	D
1328			5.6	262	15.4	18.0	
1330	37.3	82	5.6	262	15.1	18.0	D
1332	35.6	78	5.5	260	16.1	18.0	D
1334	36.8	82	5.4	261	17.7	18.0	D
1336			5.3	260	17.4	18.0	
1338	44.6	75	5.2	259	16.3	18.0	D
1340	43.4	77	5.1	259	16.5	18.0	D
1342	44.3	77	5.0	257	17.0	18.0	D
1344	40.3	71	4.9	257	17.2	18.0	D
1346	43.0	83	4.8	257	16.5	18.0	D

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1348	44.5	85	4.8	257	15.2	18.0	D
1350			4.8	256	15.2	18.0	
1352			4.7	255	15.5	18.0	
1354	45.1	80	4.7	255	15.1	18.0	D
1356	45.7	84	4.7	255	15.3	18.0	D
1358	48.7	93	4.6	255	15.7	18.0	D
1360	51.3	84	4.6	256	15.2	18.0	D
1362	52.9	86	4.6	256	14.9	18.0	D
1364	52.9	87	4.5	254	15.3	18.0	D
1366			4.4	253	15.4	18.0	
1368			4.4	253	13.3	18.0	
1370			4.3	254	13.7	18.0	
1372			4.2	253	14.4	18.0	
1374			4.2	253	13.8	18.0	
1376			4.1	251	15.1	18.0	
1378			4.0	247	15.7	18.0	
1380			4.0	247	15.9	18.0	
1382			4.0	246	15.9	18.0	
1384			4.0	244	16.2	18.0	
1386	35.9	72	4.0	243	16.8	18.0	D
1388	40.1	70	4.0	242	16.5	18.0	D
1390	38.2	73	3.9	240	15.3	18.0	B
1392	39.8	73	3.8	239	15.2	18.0	D
1394			3.8	239	16.1	18.0	
1396			3.8	237	16.6	18.0	
1398	36.9	73	3.8	237	17.1	18.0	D
1400	38.0	77	3.7	238	17.3	18.0	D
1402			3.6	238	17.0	18.0	
1404	38.2	80	3.6	237	17.2	18.0	B
1406	43.5	79	3.6	235	17.3	18.0	C
1408	44.0	79	3.6	231	17.1	18.0	C
1410	44.1	78	3.6	229	16.4	18.0	A
1412	46.6	75	3.5	228	15.9	18.0	A
1414	42.0	77	3.4	225	16.3	18.0	B
1416	40.8	74	3.4	224	17.2	18.0	D
1418			3.4	222	18.0	18.0	
1420			3.5	220	18.0	18.0	
1422			3.5	219	17.3	18.0	
1424			3.4	220	16.4	18.0	
1426	40.5	78	3.5	219	15.9	17.9	D

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1428	46.0	72	3.5	218	16.3	17.6	D
1430	42.3	77	3.5	218	17.5	17.3	D
1432	39.9	80	3.5	215	17.2	17.0	D
1434			3.4	213	15.9	16.4	
1436	33.8	74	3.4	212	15.3	15.9	D
1438	42.3	80	3.4	211	15.4	15.7	D
1440	42.5	76	3.4	210	15.6	15.8	D
1442	46.9	82	3.4	208	15.6	15.9	D
1444			3.4	209	15.9	16.2	
1446			3.4	208	16.4	16.5	
1448			3.4	207	16.1	16.6	
1450	46.9	78	3.4	205	14.5	16.4	D
1452	52.6	75	3.4	203	15.3	16.1	A
1454	51.7	72	3.4	200	16.6	16.4	A
1456	48.6	73	3.5	199	16.0	16.8	A
1458	48.3	74	3.6	200	16.8	17.4	A
1460			3.5	200	16.7	17.9	
1462	50.5	71	3.5	198	15.5	18.0	A
1464	49.0	69	3.5	198	16.2	18.0	A
1466	44.8	76	3.4	197	16.9	18.0	A
1468			3.4	194	16.9	18.0	
1470	40.3	69	3.4	194	17.8	17.6	C
1472			3.3	194	17.9	17.3	
1474			3.2	192	17.7	17.1	
1476			3.2	192	17.4	17.1	
1478			3.3	192	17.1	17.2	
1480			3.4	190	17.3	17.4	
1482	44.8	69	3.4	190	17.7	17.4	B
1484	42.2	68	3.3	189	18.0	17.3	B
1486	40.3	67	3.3	189	18.0	17.4	D
1488	44.3	65	3.3	189	18.0	17.5	B
1490			3.4	190	18.0	17.7	
1492	33.9	68	3.4	190	17.9	17.8	C
1494	34.8	68	3.4	190	16.9	17.9	C
1496	36.7	70	3.3	191	15.4	17.6	C
1498	37.8	69	3.2	188	15.7	16.9	C
1500	35.7	67	3.1	187	16.3	16.7	C
1502	34.4	62	3.0	187	15.9	16.5	C
1504	34.0	62	3.0	185	16.5	16.3	C
1506	35.1	60	3.0	184	16.7	16.3	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1508	35.8	65	3.0	186	15.5	16.3	C
1510	38.7	61	2.9	184	15.0	16.3	C
1512	35.8	63	2.8	183	15.2	16.3	C
1514	34.5	68	2.7	185	14.4	16.4	C
1516	35.9	65	2.7	185	13.7	16.4	A
1518	35.7	70	2.6	185	15.4	16.9	A
1520	32.5	64	2.6	186	16.3	17.5	A
1522	31.5	69	2.5	183	14.8	17.5	A
1524	37.5	64	2.4	181	14.5	17.4	C
1526	37.9	66	2.4	182	15.1	17.5	C
1528	33.5	67	2.3	181	14.6	17.4	A
1530	31.8	62	2.2	178	14.2	17.3	A
1532	32.7	64	2.3	175	13.5	17.3	A
1534	35.4	66	2.4	174	12.5	17.1	A
1536	34.3	69	2.3	175	13.0	17.0	C
1538	35.2	70	2.2	173	13.7	16.9	C
1540	32.1	73	2.2	169	14.9	16.9	D
1542	30.8	12	2.2	168	15.7	17.1	D
1544	37.8	64	2.2	166	15.6	17.5	D
1546	35.6	62	2.2	165	15.4	17.9	D
1548	34.3	66	2.2	166	15.4	18.0	D
1550	38.4	69	2.2	167	14.9	18.0	D
1552	37.5	76	2.3	168	13.8	18.0	D
1554	34.5	76	2.4	167	13.5	18.0	D
1556			2.4	167	13.9	18.0	
1558	42.3	72	2.4	166	14.2	18.0	D
1560			2.4	165	13.1	17.9	
1562	32.2	58	2.4	165	12.5	17.9	D
1564			2.5	164	13.0	18.0	
1566	30.5	73	2.6	162	13.7	18.0	B
1568	31.5	76	2.6	161	14.8	18.0	B
1570			2.6	160	14.8	18.0	
1572			2.6	159	14.4	18.0	
1574			2.6	158	15.2	18.0	
1576			2.6	157	15.3	18.0	
1578			2.7	157	14.0	18.0	
1580			2.7	157	13.9	18.0	
1582	13.9	56	2.8	157	14.3	18.0	D
1584	4.5	49	2.9	154	14.2	18.0	D
1586	13.3	73	3.0	153	14.6	18.0	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2230	13.7	147	6.4	140	14.4	14.0	A
2232	12.2	256	6.4	139	13.4	13.8	C
2234	11.4	256	6.4	139	13.4	13.8	C
2236	7.4	214	6.4	140	13.5	13.8	A
2238	6.5	221	6.4	141	13.4	13.9	A
2240	7.3	239	6.4	141	13.2	13.8	A
2242	6.9	243	6.4	143	12.9	13.7	A
2244	6.2	237	6.4	144	12.7	13.7	C
2246	14.6	149	6.4	143	12.9	13.8	C
2248	6.5	174	6.4	143	13.0	13.9	A
2250	8.4	170	6.4	143	13.0	14.0	A
2252	5.1	195	6.3	143	13.1	14.2	A
2254	5.7	193	6.3	143	12.9	14.2	A
2256	4.1	193	6.2	142	13.0	14.3	A
2258	0.8	237	6.2	140	13.5	14.2	A
2260	4.4	170	6.2	140	14.6	14.3	A
2262	5.9	186	6.2	140	15.3	14.3	A
2264	6.3	198	6.3	141	14.7	14.2	A
2266	5.1	189	6.4	141	14.2	14.2	A
2268	6.4	185	6.4	142	14.7	14.2	A
2270	32.3	180	6.4	142	16.4	14.5	A
2272	30.5	180	6.4	142	17.9	15.0	C
2274	32.7	183	6.4	143	17.5	14.8	C
2276	31.6	187	6.4	143	15.9	14.4	C
2278	9.2	184	6.4	143	14.4	14.4	A
2280	11.8	194	6.4	143	13.7	14.4	A
2282	10.8	195	6.4	144	13.4	14.4	A
2284	7.1	192	6.3	143	13.3	14.3	A
2286	6.4	196	6.3	143	13.5	14.2	A
2288	6.2	204	6.4	143	14.9	14.2	A
2290	7.6	208	6.3	143	15.6	14.2	A
2292	8.8	199	6.3	143	14.5	14.1	A
2294	11.3	196	6.4	144	13.6	14.0	A
2296	9.3	222	6.4	144	13.2	13.8	A
2298	7.3	202	6.4	144	13.2	13.8	C
2300	11.3	209	6.4	145	13.3	13.8	C
2302	4.8	252	6.3	145	13.3	13.8	A
2304	11.5	204	6.2	144	13.2	13.9	A
2306	10.0	200	6.2	144	12.7	13.9	A
2308	8.4	197	6.2	145	12.4	14.0	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1990	10.7	211	7.8	141	18.0	17.6	B
1992	21.5	153	7.8	141	18.0	17.6	B
1994	24.1	154	7.8	140	18.0	17.5	D
1996	6.9	181	7.8	140	18.0	17.4	B
1998	5.8	180	7.8	141	18.0	17.3	B
2000	6.2	183	7.8	141	18.0	17.3	D
2002	10.7	173	7.8	141	18.0	17.3	A
2004	13.8	170	7.8	141	18.0	17.2	A
2006	9.6	179	7.8	142	18.0	17.2	A
2008	9.3	180	7.7	142	18.0	17.2	A
2010	9.3	149	7.8	142	18.0	17.2	A
2012	7.0	180	7.8	142	18.0	17.1	A
2014	14.4	181	7.8	140	18.0	17.0	A
2016			7.8	141	18.0	16.7	
2018	13.1	328	7.8	142	18.0	16.6	B
2020	12.0	318	7.8	142	18.0	16.6	B
2022	5.4	207	7.8	141	18.0	16.5	A
2024	4.4	211	7.7	141	18.0	16.5	A
2026	4.3	208	7.6	141	18.0	16.5	A
2028	6.9	200	7.6	143	18.0	16.7	A
2030	5.5	156	7.6	142	18.0	16.9	A
2032	6.5	162	7.6	141	18.0	16.9	A
2034	9.2	180	7.6	141	18.0	16.8	A
2036	8.3	176	7.6	142	18.0	16.6	A
2038	9.6	166	7.6	142	18.0	16.6	C
2040	10.8	140	7.6	142	18.0	16.7	C
2042	10.7	184	7.6	142	18.0	16.6	A
2044	9.0	182	7.6	142	18.0	16.0	A
2046	8.5	176	7.6	142	18.0	15.5	A
2048	12.4	162	7.6	140	18.0	15.2	A
2050	6.9	170	7.6	139	17.4	14.9	A
2052	6.1	179	7.7	140	17.2	15.1	A
2054			7.8	140	17.8	15.5	
2056	5.6	162	7.7	141	18.0	15.8	C
2058	8.2	189	7.6	142	18.0	15.8	A
2060	7.7	197	7.6	142	18.0	15.6	A
2062	8.7	199	7.6	141	18.0	15.7	A
2064	3.1	180	7.6	141	18.0	16.1	A
2066	11.7	163	7.6	141	18.0	16.1	A
2068	6.8	177	7.5	141	18.0	16.0	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2150	9.4	187	6.7	141	14.2	14.1	A
2152	7.0	195	6.8	140	14.6	14.2	A
2154	7.5	197	7.0	139	15.1	14.1	A
2156	8.9	196	7.0	140	15.2	14.1	A
2158	6.7	201	7.1	140	14.6	14.1	A
2160	6.4	204	7.2	140	14.3	14.0	A
2162	8.3	205	7.2	140	14.2	14.0	A
2164	7.3	223	7.2	140	14.0	14.1	A
2166	4.9	195	7.2	140	13.9	14.3	C
2168	5.2	193	7.1	140	14.8	14.6	A
2170			7.0	140	15.1	14.4	
2172	8.6	186	7.0	140	14.3	14.0	A
2174	7.4	196	7.0	140	13.9	13.9	A
2176	13.6	165	6.9	140	15.5	14.2	C
2178	6.8	175	6.8	141	17.5	14.9	C
2180	6.8	181	6.8	142	18.0	15.3	A
2182	6.4	194	6.8	142	17.3	15.1	A
2184	9.3	166	6.9	143	15.3	14.6	C
2186	10.1	146	7.0	141	14.3	14.5	C
2188	6.1	173	7.0	141	13.7	14.3	A
2190			7.0	142	13.2	14.0	
2192	9.2	254	7.0	141	13.1	13.7	C
2194	10.4	223	6.9	141	13.2	13.6	C
2196	15.1	189	6.8	140	13.3	13.8	A
2198	11.9	186	6.7	138	13.5	14.0	A
2200	6.6	180	6.6	138	13.5	13.8	A
2202	10.5	219	6.6	139	13.4	13.7	A
2204	10.6	216	6.6	139	13.5	13.5	A
2206	8.5	199	6.6	140	13.6	13.5	C
2208	6.4	208	6.6	141	13.7	13.4	A
2210	10.0	215	6.6	143	13.4	13.4	A
2212	3.0	193	6.6	144	13.1	13.4	A
2214	4.0	196	6.6	144	13.1	13.5	A
2216	17.0	114	6.6	144	12.9	13.6	C
2218	17.6	123	6.6	144	12.9	13.7	C
2220	7.5	174	6.5	143	13.1	13.8	A
2222			6.4	142	13.0	13.8	
2224			6.4	142	13.0	13.8	
2226	6.2	160	6.4	142	13.9	14.0	A
2228	11.5	150	6.4	141	15.0	14.2	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2070	5.0	169	7.4	140	18.0	15.8	A
2072	6.9	163	7.4	141	18.0	15.8	A
2074	9.3	161	7.4	141	18.0	15.6	A
2076	6.3	208	7.5	140	16.8	14.8	A
2078	11.4	167	7.6	140	15.6	14.4	A
2080	7.0	127	7.6	141	14.7	14.2	A
2082	7.1	155	7.6	142	14.8	14.1	A
2084	5.7	167	7.6	142	16.8	14.5	A
2086	4.2	195	7.5	140	18.0	15.4	A
2088	3.5	162	7.4	140	17.6	15.3	A
2090	4.4	116	7.4	140	16.0	14.5	C
2092			7.4	140	14.3	14.0	
2094			7.4	140	13.9	13.8	
2096	1.4	155	7.4	140	13.8	13.8	C
2098	2.0	124	7.4	140	13.9	13.9	C
2100	4.9	150	7.4	140	14.5	14.2	C
2102	2.6	108	7.3	143	14.6	14.3	A
2104	3.3	185	7.2	143	14.2	14.1	A
2106	8.1	217	7.1	142	14.2	14.1	A
2108	9.5	200	7.0	141	14.1	14.1	A
2110	7.7	191	7.0	141	13.9	13.9	A
2112	7.3	172	7.0	140	13.7	13.7	A
2114	7.5	204	7.1	139	13.6	13.5	A
2116	6.1	211	7.2	139	13.7	13.5	A
2118	5.7	211	7.2	139	13.8	13.5	A
2120	8.8	224	7.2	139	13.9	13.5	C
2122	8.6	243	7.2	139	13.8	13.5	A
2124	9.3	213	7.2	139	13.9	13.7	A
2126	9.5	206	7.2	139	14.0	13.8	A
2128	9.3	203	7.2	139	13.9	13.8	A
2130	6.1	237	7.2	140	13.6	13.7	C
2132	4.7	245	7.2	140	13.4	13.8	C
2134	6.2	194	7.2	140	13.4	14.0	C
2136	6.2	213	7.2	141	13.7	14.2	C
2138	7.7	191	7.1	141	13.9	14.3	A
2140	8.2	186	7.0	141	13.7	14.2	A
2142	8.2	176	6.9	140	13.3	14.0	A
2144	4.2	180	6.8	140	13.1	13.9	A
2146	8.6	166	6.8	141	13.2	14.0	A
2148	8.0	164	6.7	142	13.7	14.0	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1670	2.3	182	6.3	141	17.4	14.9	A
1672	16.0	153	6.4	142	17.5	15.1	B
1674	15.8	152	6.4	141	17.4	15.1	B
1676	2.2	123	6.4	139	16.5	15.0	C
1678	8.3	52	6.5	138	16.6	14.7	A
1680	7.1	56	6.6	137	17.5	14.4	A
1682			6.6	137	17.9	14.3	
1684	10.6	152	6.6	137	18.0	14.3	C
1686	3.1	190	6.7	137	18.0	14.3	A
1688	1.0	267	6.8	138	18.0	14.3	A
1690	2.4	342	6.8	138	18.0	14.4	A
1692	2.2	59	6.9	138	18.0	14.4	C
1694	5.7	78	7.0	138	18.0	14.2	A
1696	10.8	70	7.0	137	18.0	14.1	C
1698	6.5	60	7.0	138	18.0	14.2	C
1700	4.0	80	7.0	138	18.0	14.5	A
1702	15.9	238	7.0	138	18.0	14.9	B
1704	14.5	233	7.0	135	18.0	14.9	B
1706	1.5	35	7.0	132	18.0	14.3	A
1708	2.2	137	7.0	133	18.0	13.7	C
1710	5.2	34	7.1	132	18.0	13.9	C
1712	1.5	34	7.2	131	18.0	14.7	C
1714	1.2	214	7.3	132	18.0	15.5	A
1716	2.8	136	7.4	133	18.0	16.1	C
1718	4.4	191	7.4	132	18.0	16.1	D
1720	2.7	82	7.4	132	18.0	15.6	B
1722	2.5	149	7.4	132	18.0	15.2	B
1724	5.0	160	7.4	135	18.0	15.3	B
1726	7.1	170	7.4	136	18.0	15.4	B
1728	7.4	189	7.4	139	18.0	15.3	D
1730	4.3	299	7.4	139	18.0	14.8	D
1732	5.4	208	7.4	135	18.0	14.4	B
1734	6.0	141	7.4	136	18.0	14.5	D
1736			7.4	134	18.0	14.5	
1738	7.7	229	7.4	130	18.0	14.7	D
1740	4.5	230	7.4	129	18.0	15.2	B
1742	3.4	246	7.4	129	18.0	15.6	D
1744	3.2	197	7.4	130	18.0	16.1	B
1746	5.9	212	7.4	130	18.0	16.3	B
1748	6.6	203	7.4	130	18.0	15.9	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1588	10.5	83	3.0	153	15.5	18.0	B
1590			3.1	152	15.7	18.0	
1592	7.3	338	3.2	152	15.2	17.7	D
1594	7.6	26	3.2	153	14.7	17.4	B
1596	10.0	58	3.3	152	14.3	17.2	A
1598	11.5	85	3.4	150	14.2	17.4	A
1600	10.7	74	3.4	150	14.9	17.6	A
1602	8.9	59	3.5	150	14.6	17.4	A
1604			3.6	150	13.6	17.1	
1606	2.6	34	3.6	148	13.4	17.0	A
1608	4.1	36	3.6	147	13.4	16.9	A
1610	5.4	126	3.7	145	13.2	16.6	A
1612	6.3	115	3.8	144	13.1	16.2	A
1614	13.5	98	3.8	144	13.4	16.0	A
1616	14.8	97	3.9	145	14.2	16.2	A
1618	5.6	119	4.0	145	15.7	16.8	A
1620	4.0	115	4.1	145	16.8	17.4	A
1622	2.2	25	4.2	144	16.7	17.7	A
1626	0.7	106	4.1	142	16.0	17.6	A
1628	3.4	298	4.2	140	15.0	17.5	C
1630			4.2	140	14.8	17.4	
1632	4.9	190	4.3	141	15.3	17.4	C
1634	2.8	67	4.5	140	16.2	17.5	A
1636	1.6	29	4.7	139	17.1	17.5	A
1638	6.8	357	4.9	138	17.6	17.3	C
1640	8.0	267	5.0	138	17.8	16.9	A
1642	6.3	269	5.1	139	17.7	16.6	A
1644	9.0	128	5.2	138	17.4	16.2	C
1646	4.2	335	5.2	138	16.9	15.9	C
1648	3.2	25	5.3	138	17.2	16.0	A
1650	4.3	114	5.4	138	17.0	16.2	A
1652	2.4	208	5.5	139	16.4	16.0	A
1654	4.3	263	5.6	139	16.3	15.5	A
1656	6.0	110	5.6	139	16.9	15.4	A
1658	4.6	138	5.7	140	17.7	15.6	C
1660	3.1	201	5.9	140	18.0	15.7	A
1662	3.1	185	5.9	140	17.3	15.4	A
1664	2.9	164	6.0	140	16.4	15.1	A
1666	0.7	136	6.1	141	16.6	14.9	A
1668	4.6	15	6.2	141	17.3	14.8	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1830	3.4	136	7.8	136	18.0	16.1	C
1832	4.9	164	7.8	135	18.0	16.4	A
1834	6.6	176	7.7	136	18.0	16.5	A
1836	8.2	139	7.6	138	18.0	16.4	A
1838	1.4	150	7.6	137	18.0	16.5	A
1840	0.1	103	7.6	135	18.0	16.6	A
1842	1.1	122	7.6	134	18.0	16.5	A
1844	2.6	136	7.6	135	18.0	16.5	A
1846	6.2	162	7.6	140	18.0	16.7	A
1848	5.9	174	7.6	142	18.0	17.2	A
1850	5.7	191	7.6	134	18.0	17.2	A
1852	5.6	212	7.7	131	18.0	17.0	A
1854	6.9	180	7.8	134	18.0	17.0	A
1856	7.7	187	7.8	132	18.0	16.9	A
1858	11.9	176	7.8	133	18.0	16.3	C
1860	0.9	64	7.8	136	18.0	15.5	A
1862	1.6	6	7.8	137	18.0	15.0	A
1864	2.8	10	7.8	137	18.0	15.0	A
1866	3.9	143	7.8	139	18.0	15.3	A
1868	7.0	205	7.7	139	18.0	15.9	A
1870	7.0	219	7.6	140	18.0	15.9	A
1872	6.8	214	7.6	138	18.0	15.3	A
1874	5.6	226	7.5	139	18.0	15.0	A
1876	4.6	244	7.4	140	18.0	14.9	A
1878	3.9	235	7.4	138	18.0	15.0	A
1880	5.5	171	7.4	140	18.0	15.4	A
1882	7.2	174	7.4	140	18.0	15.8	A
1884	8.3	161	7.4	140	18.0	15.8	A
1886	7.3	162	7.4	139	18.0	15.7	C
1888	8.7	220	7.4	139	18.0	15.9	A
1890	7.4	230	7.4	140	18.0	16.3	A
1892	7.6	220	7.5	140	18.0	16.6	A
1894	6.3	208	7.6	140	18.0	16.6	A
1896	8.0	199	7.6	140	18.0	16.5	A
1898	12.6	195	7.6	140	18.0	16.5	A
1900	10.4	215	7.6	139	18.0	16.4	A
1902			7.7	141	18.0	16.2	
1904	8.1	180	7.8	142	18.0	15.9	A
1906	11.6	176	7.8	141	18.0	15.7	C
1908	17.0	186	7.8	140	18.0	15.7	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1910	12.5	183	7.7	140	18.0	15.7	A
1912	13.5	178	7.6	139	18.0	15.9	A
1914	15.3	166	7.6	137	18.0	16.1	A
1916	9.2	158	7.5	138	18.0	16.1	A
1918	8.0	166	7.5	140	18.0	16.3	A
1920			7.6	138	18.0	16.5	
1922	7.4	156	7.7	138	18.0	16.6	A
1924	13.9	153	7.8	139	18.0	17.1	A
1926			7.8	140	18.0	17.4	
1928	9.4	189	7.8	139	18.0	17.3	A
1930	10.6	162	7.7	139	18.0	17.1	C
1932	10.9	163	7.6	139	18.0	16.8	C
1934	11.7	163	7.7	140	18.0	16.4	A
1936	6.5	177	7.8	142	18.0	16.6	A
1938	9.4	171	7.8	142	18.0	17.2	A
1940	9.0	178	7.8	140	18.0	17.7	A
1942	6.1	191	7.7	139	18.0	17.7	A
1944	6.2	194	7.6	139	18.0	17.5	A
1946	7.6	210	7.6	141	18.0	17.3	A
1948	27.7	255	7.6	141	18.0	17.6	B
1950	14.4	180	7.7	140	18.0	17.9	A
1952	14.1	182	7.8	141	18.0	17.7	A
1954	17.1	179	7.8	142	18.0	17.3	A
1956	11.0	183	7.8	140	18.0	17.0	C
1958	6.0	240	7.7	139	18.0	16.9	C
1960	9.7	323	7.7	140	18.0	16.7	B
1962	4.3	206	7.7	141	18.0	16.6	C
1964			7.8	141	18.0	17.0	
1966	10.8	173	7.8	140	18.0	17.3	A
1968	13.9	175	7.7	141	18.0	17.4	A
1970	9.5	187	7.7	142	18.0	17.5	A
1972	5.6	201	7.6	141	18.0	17.5	A
1974	3.5	82	7.6	141	18.0	17.5	C
1976	7.6	150	7.7	140	18.0	17.5	A
1978	6.3	200	7.8	140	18.0	17.5	A
1980	10.9	106	7.8	140	18.0	17.4	C
1982	17.3	152	7.8	141	18.0	17.5	D
1984			7.8	140	18.0	17.6	
1986			7.8	141	18.0	17.5	
1988			7.8	142	18.0	17.5	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
1750			7.4	131	18.0	15.6	
1752	5.3	208	7.4	131	18.0	15.6	D
1754			7.5	133	18.0	15.9	
1756			7.6	133	18.0	16.5	
1758	2.3	186	7.6	130	18.0	16.7	A
1760	4.1	194	7.5	131	18.0	16.6	A
1762	4.1	216	7.4	135	18.0	16.6	A
1764	1.9	206	7.4	138	18.0	16.7	A
1766	1.7	181	7.4	138	18.0	16.7	A
1768	5.0	183	7.5	139	18.0	16.6	A
1770	5.4	186	7.6	138	18.0	16.3	A
1772	1.6	212	7.7	135	18.0	16.4	A
1774	2.6	217	7.8	134	18.0	16.7	A
1776	7.0	277	7.8	133	18.0	16.9	D
1778	6.9	280	7.8	134	18.0	16.9	D
1780	11.0	117	7.8	135	18.0	16.7	D
1782	4.4	190	7.8	135	18.0	16.5	B
1784	7.7	200	7.8	133	18.0	16.2	B
1786	5.0	179	7.8	130	18.0	16.3	B
1788	2.5	170	7.8	131	18.0	16.4	B
1790	4.2	156	7.8	131	18.0	16.4	D
1792	20.5	112	7.7	134	18.0	16.4	B
1794	18.9	118	7.6	134	18.0	16.4	B
1796	10.1	208	7.6	133	18.0	16.1	C
1798	5.5	179	7.6	134	18.0	16.3	A
1800	6.2	223	7.6	136	18.0	17.0	A
1802	2.2	188	7.6	136	18.0	17.5	A
1804	4.4	201	7.5	136	18.0	17.8	A
1806	3.6	127	7.6	136	18.0	18.0	C
1808	5.1	185	7.6	135	18.0	18.0	A
1810	6.1	199	7.6	135	18.0	17.9	A
1812	8.1	230	7.6	136	18.0	17.6	A
1814	7.8	236	7.6	134	18.0	17.2	A
1816	3.7	241	7.7	133	18.0	16.9	A
1818	3.1	243	7.8	136	18.0	16.8	A
1820	5.6	216	7.8	139	18.0	16.7	A
1822	5.6	220	7.8	138	18.0	16.3	A
1824	6.7	240	7.9	137	18.0	15.8	A
1826	4.5	233	8.0	136	18.0	15.8	C
1828	6.9	9	7.9	136	18.0	16.1	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2310	10.5	191	6.2	144	13.2	14.0	A
2312	9.8	186	6.2	143	13.8	13.9	A
2314	13.5	185	6.2	142	13.7	13.8	A
2316	12.0	196	6.2	142	14.0	13.7	A
2318	8.1	203	6.2	144	13.7	13.5	A
2320	7.0	204	6.2	144	13.3	13.5	A
2322	7.7	213	6.2	145	13.6	13.7	A
2324	8.4	226	6.1	146	13.5	13.9	A
2326	7.1	189	6.1	146	13.1	13.8	A
2328	6.5	233	6.0	145	13.2	13.8	A
2330	6.1	238	6.0	145	13.4	13.9	A
2332	7.7	199	6.0	145	13.2	14.1	A
2334	9.2	206	6.0	144	13.1	14.4	A
2336	11.7	214	6.0	144	13.3	14.7	C
2338	11.5	207	6.0	143	13.6	15.0	C
2340	10.7	196	6.0	141	13.8	14.9	A
2342	8.9	199	6.0	142	13.4	14.6	A
2344	5.2	206	6.0	142	13.0	14.4	A
2346	3.7	146	6.0	141	12.8	14.4	C
2348	10.7	206	6.0	142	12.7	14.6	C
2350	6.8	178	5.9	143	12.6	14.7	A
2352	10.5	159	5.8	145	12.2	15.2	A
2354	11.2	149	5.7	145	11.9	15.7	A
2356	6.5	167	5.6	145	11.7	16.2	A
2358	6.4	172	5.6	145	11.4	16.4	A
2360	6.8	178	5.6	145	12.0	16.7	A
2362	9.9	199	5.6	145	14.1	17.1	A
2364	10.6	180	5.6	146	16.7	17.7	A
2366	10.1	168	5.6	145	16.7	18.0	A
2368	19.5	205	5.6	144	14.0	18.0	C
2370	10.7	187	5.5	143	10.8	18.0	C
2372	16.8	178	5.4	142	11.0	18.0	C
2374	11.8	189	5.4	141	13.4	18.0	C
2376	11.8	180	5.4	141	13.9	18.0	A
2378	11.0	191	5.4	140	13.4	18.0	C
2380	12.9	193	5.4	140	13.3	18.0	A
2382	10.1	193	5.4	139	13.3	18.0	A
2384	13.1	193	5.3	138	13.0	18.0	A
2386	12.3	195	5.2	137	12.6	18.0	A
2388	9.9	225	5.2	138	12.2	18.0	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2390	9.9	206	5.2	138	12.9	18.0	A
2392	10.9	200	5.2	136	13.9	18.0	A
2394	14.0	200	5.2	135	13.8	18.0	A
2396	17.2	195	5.2	134	13.8	18.0	A
2398	14.4	182	5.1	133	13.6	18.0	A
2400	12.0	181	5.0	134	12.1	18.0	A
2402	12.7	183	5.0	132	10.7	18.0	A
2404	12.4	199	5.1	128	9.3	18.0	A
2406	11.5	185	5.2	126	7.9	18.0	A
2408	12.6	182	5.2	128	9.1	18.0	D
2410	16.4	146	5.2	131	11.4	18.0	D
2412			5.2	129	12.7	18.0	
2414	13.8	197	5.3	127	13.4	18.0	D
2416	11.5	182	5.4	127	13.8	18.0	D
2418	44.3	234	5.4	127	13.4	18.0	D
2420			5.4	124	13.1	18.0	
2422			5.4	121	13.4	18.0	
2424			5.5	119	13.7	18.0	
2426			5.5	118	13.8	18.0	
2428	9.8	183	5.6	115	14.2	18.0	B
2430	10.0	176	5.7	114	14.5	18.0	D
2432	10.4	197	5.8	114	14.5	18.0	D
2434	13.0	197	5.9	112	14.3	18.0	B
2436	13.4	186	6.0	110	14.2	18.0	B
2438			6.0	109	14.2	18.0	
2440	27.4	172	6.0	107	14.1	18.0	D
2442	27.7	169	6.0	106	14.2	18.0	B
2444	19.6	200	6.0	107	14.6	18.0	B
2446			6.0	107	14.7	18.0	
2448			5.9	105	14.3	18.0	
2450	16.5	199	5.8	103	14.1	18.0	D
2452			5.9	102	13.1	18.0	
2454			6.1	100	12.5	18.0	
2456	11.4	189	6.2	98	13.1	18.0	D
2458			6.2	97	13.2	18.0	
2460	3.5	199	6.3	98	13.2	18.0	A
2462	9.9	182	6.4	98	13.3	18.0	C
2464	9.5	197	6.4	98	12.6	18.0	A
2466	8.8	179	6.4	98	11.3	18.0	A
2468	8.2	193	6.4	100	10.5	18.0	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2470	8.4	174	6.4	101	11.3	18.0	A
2472	13.7	152	6.4	100	12.1	18.0	C
2474	13.2	174	6.4	99	12.0	18.0	A
2476	11.2	163	6.4	99	11.5	18.0	A
2478	14.3	206	6.4	99	12.6	18.0	C
2480	16.4	193	6.3	99	14.6	18.0	A
2482	15.2	197	6.2	98	14.3	18.0	A
2484	13.2	200	6.3	97	13.5	18.0	A
2486	13.6	201	6.4	96	13.2	18.0	A
2488	17.6	244	6.4	95	13.2	18.0	C
2490	11.9	207	6.4	94	13.2	18.0	C
2492	17.0	240	6.5	93	13.2	18.0	A
2494	14.5	216	6.6	94	13.2	18.0	A
2496	14.7	219	6.6	97	11.5	18.0	A
2498	24.1	235	6.6	98	8.6	18.0	A
2500			6.6	100	7.5	18.0	
2502	14.3	231	6.5	100	8.4	18.0	A
2504	19.3	223	6.4	99	11.2	18.0	A
2506	14.5	215	6.4	97	13.7	18.0	A
2508	17.2	194	6.3	96	14.5	18.0	A
2510	17.9	212	6.3	95	14.7	18.0	A
2512	16.0	214	6.2	92	15.1	18.0	C
2514	13.4	201	6.3	90	15.1	18.0	C
2516	12.4	216	6.4	88	14.6	18.0	A
2518	5.0	216	6.4	88	14.3	18.0	A
2520	5.8	185	6.4	86	14.3	18.0	C
2522	2.5	187	6.5	82	14.5	18.0	C
2524	4.3	213	6.6	84	14.3	18.0	A
2526	9.8	187	6.6	86	14.2	18.0	A
2528			6.6	86	14.2	18.0	
2530	5.1	158	6.6	88	14.4	18.0	D
2532	2.7	199	6.6	83	14.2	18.0	D
2534			6.5	83	13.7	18.0	
2536	11.7	180	6.4	83	13.3	18.0	D
2538			6.4	78	13.6	18.0	
2540			6.4	77	13.7	18.0	
2542	13.3	204	6.4	76	13.8	18.0	D
2544	13.2	202	6.3	76	13.7	18.0	D
2546	10.9	198	6.2	76	13.2	18.0	D
2548	12.2	184	6.1	75	13.1	18.0	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2550	9.1	178	6.0	72	13.3	18.0	C
2552	12.3	184	6.0	69	14.2	18.0	C
2554	4.9	211	6.0	68	14.9	18.0	C
2556			6.0	66	15.6	18.0	
2558			6.0	64	16.6	18.0	
2560			6.0	65	16.0	18.0	
2562	22.2	177	6.0	65	15.2	18.0	C
2564	19.7	180	6.1	67	15.4	18.0	C
2566	20.8	195	6.2	70	15.1	18.0	C
2568	8.1	198	6.3	72	15.8	18.0	D
2570	4.2	230	6.4	72	17.2	18.0	D
2572			6.4	71	17.9	18.0	
2574			6.4	71	17.9	18.0	
2576	4.6	243	6.4	70	17.7	18.0	D
2578			6.4	68	17.8	18.0	
2580			6.4	66	17.0	18.0	
2582	2.7	191	6.4	65	16.2	18.0	D
2584	2.7	249	6.4	65	15.9	18.0	D
2586	2.5	142	6.5	67	15.3	18.0	D
2588	10.9	142	6.6	70	14.9	18.0	D
2590			6.6	69	15.0	18.0	
2592	8.8	158	6.6	68	15.5	18.0	D
2594	8.6	163	6.6	66	15.7	18.0	D
2596	2.8	186	6.6	65	16.2	18.0	D
2598	2.2	199	6.6	63	16.9	18.0	D
2600	3.9	192	6.6	59	17.5	18.0	D
2602			6.6	57	17.9	18.0	
2604	9.8	203	6.6	57	17.6	18.0	D
2606	6.6	190	6.7	56	16.6	18.0	B
2608	6.8	159	6.8	57	16.0	18.0	D
2610	6.2	180	6.9	59	16.1	18.0	D
2612			7.0	60	16.1	18.0	
2614			7.1	60	16.0	18.0	
2616	5.4	176	7.3	61	15.9	18.0	D
2618	5.4	183	7.4	61	15.8	18.0	D
2620			7.4	58	15.6	18.0	
2622	4.8	215	7.5	55	15.8	18.0	D
2624	4.8	217	7.6	55	15.6	18.0	D
2626			7.5	55	15.0	18.0	
2628	5.9	214	7.4	54	14.6	18.0	D

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2630	6.3	163	7.4	54	14.9	18.0	D
2632	7.0	190	7.3	55	15.7	18.0	B
2634	4.7	197	7.3	55	16.0	18.0	D
2636	17.8	177	7.4	56	16.5	18.0	D
2638	4.9	226	7.4	56	16.9	18.0	D
2640	7.4	201	7.5	55	16.7	18.0	D
2642	11.4	190	7.5	54	16.2	18.0	B
2644	3.8	190	7.4	53	14.8	18.0	D
2646			7.5	51	13.8	18.0	
2648	4.8	229	7.6	51	14.2	18.0	D
2650	3.3	160	7.7	52	14.4	18.0	D
2652			7.8	53	14.0	18.0	
2654			7.9	53	14.0	18.0	
2656			8.0	52	14.4	18.0	
2658	5.6	226	8.0	50	14.4	18.0	D
2660	6.2	205	8.0	49	14.4	18.0	B
2662	6.6	190	8.0	48	14.4	18.0	B
2664	7.8	198	8.1	47	14.4	18.0	B
2666	6.0	214	8.2	47	14.9	18.0	D
2668	6.0	217	8.2	46	15.5	18.0	D
2670	7.1	200	8.2	45	15.4	18.0	D
2672	9.4	185	8.3	44	15.7	18.0	B
2674	12.2	198	8.3	45	16.2	18.0	D
2676	9.5	197	8.4	44	16.1	18.0	D
2678	10.0	174	8.4	43	15.6	18.0	B
2680			8.4	41	13.3	17.9	
2682	3.0	168	8.4	41	11.3	17.5	D
2684	11.4	218	8.4	41	10.6	17.2	D
2686			8.4	41	10.3	17.1	
2688	13.7	229	8.5	42	10.9	16.9	A
2690	10.6	244	8.6	43	12.0	16.6	A
2692	10.0	252	8.5	44	13.1	16.1	A
2694	16.6	232	8.5	42	14.3	15.7	C
2696	23.3	218	8.6	37	16.5	15.6	C
2698	7.5	215	8.6	36	17.2	15.7	A
2700	11.4	236	8.6	35	15.9	15.5	A
2702	10.4	205	8.6	33	15.2	15.4	C
2704	6.7	219	8.6	32	15.4	15.3	C
2706	9.9	222	8.6	31	15.3	15.3	A
2708	11.1	201	8.6	31	15.0	15.3	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2710	11.5	192	8.7	33	15.2	15.2	A
2712	11.8	214	8.8	33	16.3	15.1	A
2714	10.9	211	8.9	32	17.5	14.8	A
2716	8.7	186	9.0	31	18.0	14.3	A
2718	12.4	203	9.1	30	18.0	13.8	A
2720	14.9	202	9.3	27	18.0	13.5	A
2722	13.4	197	9.4	26	18.0	13.4	A
2724	13.5	196	9.5	26	18.0	13.1	A
2726	13.8	193	9.6	26	18.0	12.9	A
2728			9.6	26	18.0	12.8	
2730	9.6	185	9.5	23	18.0	12.8	D
2732	13.7	186	9.9	29	18.0	13.2	D
2734	11.8	199	10.3	34	18.0	13.9	D
2736	12.1	206	10.4	32	18.0	14.6	D
2738	14.1	190	10.4	32	18.0	14.7	D
2740			10.4	33	18.0	14.5	
2742	15.6	183	10.4	33	18.0	14.3	D
2744	12.4	198	10.4	33	18.0	13.9	B
2746			10.4	32	18.0	13.5	
2748	11.3	225	10.4	31	18.0	13.0	C
2750	13.4	208	10.4	30	18.0	12.6	C
2752	9.9	241	10.4	29	18.0	12.7	C
2754	6.9	214	10.3	29	18.0	12.8	A
2756	9.6	209	10.3	30	18.0	13.1	A
2758	11.5	206	10.3	33	18.0	13.3	A
2760	10.5	189	10.3	34	18.0	13.3	A
2762	14.3	199	10.3	31	18.0	13.1	C
2764	10.6	206	10.2	30	18.0	12.8	A
2766	16.6	245	10.2	30	18.0	13.0	A
2768	14.8	241	10.1	30	18.0	13.5	C
2770	12.7	195	10.1	31	18.0	13.6	A
2772	16.6	184	10.1	31	18.0	13.6	A
2774	11.4	163	10.2	29	18.0	13.5	A
2776	12.2	199	10.2	29	18.0	13.5	A
2778	12.6	201	10.1	29	18.0	13.5	A
2780	9.8	210	10.1	28	17.7	13.6	A
2782	10.5	222	10.2	30	15.8	13.4	A
2784	8.0	216	10.3	32	14.5	13.4	A
2786	8.4	215	10.4	31	15.4	13.9	A
2788	10.2	201	10.4	31	15.9	14.3	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2790	10.2	196	10.4	31	15.7	14.4	A
2792	9.4	208	10.4	33	14.3	13.9	A
2794	10.0	211	10.4	36	13.2	13.6	C
2796	14.4	201	10.3	35	13.7	13.7	A
2798	12.5	210	10.2	34	14.0	13.8	A
2800	11.6	215	10.2	36	13.3	13.5	A
2802	13.7	214	10.2	36	13.0	13.3	A
2804	13.5	210	10.2	37	12.9	13.2	A
2806	10.8	225	10.1	37	13.0	13.2	A
2808	12.9	204	10.0	35	13.3	13.1	A
2810	13.3	206	10.0	35	13.4	13.2	A
2812	11.8	214	10.0	36	13.2	13.2	A
2814	11.6	218	9.9	39	12.8	13.1	A
2816	10.5	215	9.9	40	13.7	13.2	A
2818	7.2	221	9.9	39	15.6	13.7	C
2820	14.8	213	9.8	37	16.3	14.1	C
2822	14.4	218	9.8	36	15.7	14.0	A
2824	13.2	223	9.7	38	15.2	14.0	A
2826	13.0	217	9.7	39	15.0	14.3	A
2828	10.8	205	9.7	38	15.4	14.7	A
2830	11.5	219	9.8	37	15.7	15.2	A
2832	11.3	202	9.9	38	15.7	15.7	A
2834	12.8	230	9.9	40	14.7	15.8	A
2836	13.5	239	9.9	41	13.8	16.0	A
2838	7.0	238	9.8	41	13.4	16.3	A
2840	10.9	227	9.8	41	12.8	16.4	A
2842	12.7	240	9.8	40	12.4	16.5	A
2844	14.3	231	9.8	41	11.8	17.0	A
2846	15.3	223	9.7	43	11.3	17.5	A
2848	6.1	213	9.6	45	11.2	17.8	A
2850	13.1	227	9.6	45	12.0	18.0	A
2852	11.2	228	9.6	43	12.5	18.0	B
2854	10.4	212	9.6	44	12.3	18.0	D
2856	11.8	205	9.6	44	12.3	18.0	D
2858	14.0	209	9.6	46	12.0	18.0	D
2860			9.5	46	12.5	18.0	
2862	11.5	208	9.3	45	13.1	18.0	D
2864	10.8	222	9.3	40	13.1	18.0	D
2866	12.7	220	9.4	37	12.8	18.0	B
2868	13.6	222	9.3	36	11.0	18.0	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2870	11.7	208	9.3	37	7.5	18.0	D
2872	13.3	210	9.2	36	9.0	18.0	A
2874	11.0	226	9.2	34	11.5	18.0	C
2876	14.9	235	9.3	36	8.5	18.0	C
2878			9.3	36	9.4	18.0	
2880			9.3	31	12.8	18.0	
2882	15.1	196	9.2	28	13.2	18.0	A
2884	12.5	202	9.2	28	12.4	18.0	A
2886	11.1	211	9.2	30	9.8	18.0	A
2888			9.2	30	8.9	18.0	
2890	6.0	218	9.2	28	11.3	18.0	A
2892	9.7	208	9.2	27	14.0	18.0	A
2894	11.2	210	9.3	27	14.9	18.0	A
2896	11.9	208	9.3	27	15.0	18.0	A
2898	9.5	193	9.2	25	14.7	18.0	C
2900	7.3	218	9.2	27	12.5	18.0	C
2902	8.4	224	9.2	28	12.4	18.0	C
2904	7.9	216	9.3	26	14.2	18.0	A
2906	8.9	214	9.4	25	14.2	18.0	A
2908	11.1	224	9.4	25	14.5	18.0	A
2910	11.9	216	9.4	25	15.1	18.0	A
2912	12.0	216	9.4	21	15.3	18.0	A
2914	11.1	214	9.4	20	14.4	18.0	A
2916	9.9	216	9.4	21	13.3	18.0	A
2918	9.4	216	9.4	20	13.6	18.0	A
2920	11.6	180	9.4	17	15.0	18.0	A
2922	11.4	221	9.5	17	15.9	18.0	C
2924	10.3	189	9.7	21	15.8	18.0	A
2926	10.8	222	9.9	22	15.4	18.0	C
2928	12.1	222	10.1	22	15.4	18.0	A
2930	13.5	198	10.4	20	14.9	17.9	A
2932	5.6	51	10.6	21	12.9	17.8	D
2934	4.1	98	10.7	22	12.5	17.7	B
2936	9.9	225	10.8	21	13.4	17.7	B
2938	15.8	198	10.9	19	14.7	17.6	D
2940	7.3	223	11.0	19	16.7	17.6	D
2942	11.8	213	11.1	20	17.3	17.5	B
2944	11.2	212	11.2	19	17.3	17.3	B
2946	11.2	214	11.2	17	17.4	17.1	B
2948	11.6	214	11.2	17	17.7	16.9	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
2950	14.2	209	11.3	17	17.9	16.7	D
2952	13.6	198	11.4	17	18.0	16.6	A
2954	13.8	227	11.4	18	18.0	16.5	A
2956	10.6	219	11.3	19	17.7	15.9	A
2958	9.9	222	11.3	18	16.6	15.2	A
2960	10.0	212	11.4	17	16.7	15.2	C
2962	11.0	208	11.4	16	17.6	15.3	A
2964	9.7	217	11.4	16	17.0	15.2	A
2966	12.2	218	11.4	15	16.2	15.1	A
2968	13.1	209	11.4	10	15.8	15.1	A
2970	12.7	205	11.4	6	15.5	15.1	A
2972	11.2	199	11.3	6	15.3	14.7	C
2974	9.0	173	11.3	7	14.5	14.2	A
2976	9.7	190	11.4	9	14.3	14.3	A
2978	10.7	216	11.4	12	15.8	15.3	A
2980	8.3	207	11.4	13	17.5	16.1	A
2982	11.5	208	11.4	12	18.0	16.1	A
2984	9.9	211	11.5	11	18.0	16.0	A
2986	13.0	205	11.6	8	18.0	15.9	C
2988	15.5	210	11.6	8	18.0	15.7	C
2990	13.4	208	11.6	9	18.0	15.5	A
2992	15.1	181	11.7	10	18.0	15.2	A
2994	16.7	180	11.8	10	18.0	15.0	A
2996	11.4	221	11.8	11	18.0	14.8	A
2998	11.3	215	11.9	10	18.0	14.8	A
3000	16.1	190	12.0	11	18.0	14.8	A
3002	12.6	201	12.0	12	18.0	14.9	A
3004	10.9	212	12.0	13	18.0	15.0	A
3006	11.4	200	12.0	12	18.0	15.0	A
3008	13.9	257	11.9	10	18.0	14.8	A
3010	15.2	177	11.8	10	18.0	14.6	A
3012	9.2	190	11.8	10	18.0	14.3	A
3014	9.3	194	11.8	10	18.0	13.9	A
3016	9.4	209	11.8	11	18.0	13.7	A
3018	10.1	212	11.8	11	18.0	13.6	A
3020	10.7	213	11.8	11	18.0	13.6	A
3022	10.9	222	11.8	11	18.0	13.5	A
3024	13.3	228	11.7	11	18.0	13.5	A
3026	12.4	200	11.7	10	18.0	13.2	A
3028	12.3	201	11.8	11	18.0	13.1	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3030	11.4	211	11.8	11	18.0	13.2	A
3032	12.2	211	11.8	12	18.0	13.1	A
3034	12.2	210	11.8	12	18.0	13.3	A
3036	11.1	216	11.9	11	18.0	13.5	A
3038	12.3	211	12.0	10	18.0	13.5	A
3040	11.2	210	12.0	10	18.0	13.5	A
3042	9.9	210	11.9	9	18.0	13.4	A
3044	9.5	180	11.9	8	18.0	13.1	A
3046	12.6	163	12.0	7	18.0	12.9	A
3048	10.9	190	12.0	7	18.0	12.7	A
3050	10.1	200	12.0	7	18.0	12.7	C
3052	13.5	203	12.0	9	18.0	12.7	A
3054	12.4	206	12.0	11	18.0	12.7	A
3056	11.2	208	12.0	14	18.0	12.6	A
3058	11.3	208	12.1	15	18.0	12.6	A
3060	13.2	200	12.2	15	18.0	12.7	A
3062	12.3	189	12.3	15	18.0	12.8	A
3064	10.8	193	12.5	14	18.0	12.8	A
3066	9.9	181	12.7	13	18.0	12.7	A
3068	12.9	197	12.8	12	18.0	12.8	A
3070	12.4	197	12.8	11	18.0	12.9	A
3072	10.2	199	12.8	10	18.0	12.9	A
3074	9.5	195	12.9	10	18.0	12.8	A
3076	12.5	196	13.0	10	18.0	12.6	A
3078	13.8	202	13.0	11	18.0	12.5	A
3080	11.1	208	13.0	12	18.0	12.5	A
3082	12.3	212	13.0	12	18.0	12.5	A
3084	14.7	205	13.0	12	18.0	12.5	A
3086	13.6	208	13.0	13	18.0	12.5	A
3088	13.2	197	13.0	12	18.0	12.7	A
3090	13.8	186	12.9	11	18.0	12.9	A
3092	13.1	193	12.9	10	18.0	12.9	A
3094	12.0	194	13.0	9	18.0	12.7	A
3096	9.8	186	13.0	8	18.0	12.4	A
3098	11.4	177	13.0	8	18.0	12.3	A
3100	23.0	123	13.2	6	18.0	12.3	B
3102	23.7	122	13.3	6	18.0	12.3	B
3104			13.5	6	18.0	12.3	
3106			13.6	9	18.0	12.3	
3108			13.6	11	18.0	12.4	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3110	9.9	232	13.6	11	18.0	12.4	C
3112			13.6	12	17.9	12.3	
3114	11.8	207	13.6	11	17.8	12.2	C
3116	12.0	205	13.6	10	17.8	12.2	A
3118	12.3	202	13.6	11	17.4	12.1	A
3120	17.5	220	13.6	13	16.6	12.0	A
3122	19.2	219	13.6	13	16.2	12.0	A
3124	15.1	222	13.7	11	16.6	12.1	D
3126	28.6	237	13.7	10	17.2	12.1	B
3128			13.7	12	17.6	12.1	
3130			13.7	13	17.4	12.1	
3132			13.6	13	17.2	12.1	
3134	12.4	232	13.6	11	17.8	12.3	D
3136	14.1	216	13.5	13	18.0	12.4	B
3138	16.3	214	13.5	16	18.0	12.3	B
3140	16.9	204	13.5	17	18.0	12.3	D
3142	15.6	200	13.6	18	18.0	12.3	D
3144	11.1	193	13.6	18	18.0	12.3	A
3146	16.4	202	13.7	17	18.0	12.2	A
3148	16.6	204	13.8	17	18.0	12.2	A
3150	15.6	208	13.8	16	18.0	12.3	A
3152	15.8	206	13.8	17	18.0	12.3	A
3154	15.0	204	13.8	18	18.0	12.3	A
3156	13.2	208	13.8	18	18.0	12.3	A
3158	11.8	206	13.8	18	18.0	12.3	A
3160	12.4	209	13.8	19	18.0	12.3	A
3162	13.2	207	13.8	19	18.0	12.2	A
3164	10.9	200	13.9	18	18.0	12.1	A
3166	10.9	203	14.0	18	18.0	12.2	A
3168	13.6	207	13.9	18	18.0	12.3	A
3170	15.0	212	13.9	18	18.0	12.2	A
3172	14.6	207	14.0	17	18.0	12.1	A
3174	6.3	172	14.0	17	18.0	12.1	A
3176	8.4	208	14.0	18	18.0	12.1	A
3178	13.1	214	14.1	17	18.0	12.1	A
3180	15.3	215	14.2	17	18.0	12.1	A
3182	16.6	214	14.3	18	18.0	12.1	A
3184	13.5	207	14.3	19	18.0	12.2	A
3186	11.9	209	14.2	20	18.0	12.2	A
3188	12.1	213	14.2	21	18.0	12.2	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3190	12.8	209	14.2	20	18.0	12.2	A
3192	13.0	211	14.2	18	18.0	12.1	A
3194	12.2	207	14.3	18	18.0	12.1	A
3196	12.2	205	14.4	19	18.0	12.1	A
3198	14.9	209	14.4	19	18.0	12.1	A
3200	15.9	211	14.4	18	18.0	12.0	A
3202	14.5	216	14.5	17	18.0	12.0	A
3204	12.3	212	14.6	18	18.0	12.1	A
3206	12.0	210	14.6	19	18.0	12.2	A
3208	11.9	207	14.6	19	18.0	12.2	A
3210	12.0	200	14.6	19	18.0	12.1	A
3212	9.8	215	14.6	19	18.0	12.1	A
3214	11.7	222	14.7	19	18.0	12.2	A
3216	13.9	231	14.7	23	18.0	12.2	A
3218	15.1	226	14.7	20	18.0	12.2	A
3220	13.2	206	14.6	15	18.0	12.1	A
3222	12.4	205	14.6	16	18.0	12.0	A
3224	11.3	216	14.5	17	18.0	11.9	C
3226	6.1	165	14.5	17	18.0	12.0	C
3228	15.8	206	14.6	18	18.0	12.0	C
3230	14.4	196	14.8	18	18.0	12.0	A
3232	13.5	209	14.8	18	18.0	12.0	C
3234	12.1	211	14.8	19	18.0	12.1	A
3236	12.5	215	14.9	20	18.0	12.2	A
3238	13.5	211	15.0	21	18.0	12.1	A
3240	12.2	199	15.0	20	18.0	12.2	A
3242	12.6	210	15.0	21	18.0	12.3	A
3244	16.5	216	15.0	22	18.0	12.3	A
3246	14.6	220	15.0	19	18.0	12.3	C
3248	15.4	205	15.1	15	18.0	12.4	A
3250	16.6	209	15.1	16	18.0	12.4	A
3252	13.4	214	15.2	17	18.0	12.3	A
3254	14.3	213	15.2	17	18.0	12.3	A
3256	15.6	196	15.2	16	18.0	12.3	A
3258	17.8	211	15.3	16	18.0	12.4	A
3260	14.1	215	15.4	18	18.0	12.3	A
3262	13.1	208	15.5	19	18.0	12.2	A
3264	12.9	202	15.6	18	18.0	12.2	A
3266	14.8	212	15.6	19	18.0	12.3	A
3268	12.3	205	15.6	19	18.0	12.3	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3270	10.5	213	15.6	19	18.0	12.2	A
3272	8.6	204	15.6	19	18.0	12.2	A
3274	10.0	210	15.6	19	18.0	12.2	A
3276	12.1	213	15.6	20	18.0	12.3	A
3278			15.6	20	18.0	12.3	
3280	13.2	218	15.6	20	18.0	12.3	C
3282	13.3	223	15.6	20	18.0	12.2	A
3284	14.2	223	15.6	20	18.0	12.3	A
3286	13.2	208	15.7	20	18.0	12.3	A
3288	10.3	202	15.8	21	18.0	12.2	A
3290	13.8	218	15.8	22	18.0	12.2	A
3292	15.4	224	15.9	22	18.0	12.3	A
3294	15.5	221	16.0	23	18.0	12.3	A
3296	18.2	208	16.0	20	18.0	12.2	A
3298	19.2	208	16.0	19	18.0	12.1	C
3300	17.5	211	16.1	20	18.0	12.2	D
3302	13.1	210	16.1	18	18.0	12.2	B
3304	13.9	189	16.2	17	18.0	12.2	B
3306	14.7	203	16.2	18	18.0	12.2	D
3308	22.4	219	16.2	20	18.0	12.3	B
3310	12.9	210	16.3	22	18.0	12.3	D
3312	16.2	212	16.3	21	18.0	12.3	D
3314	27.7	213	16.2	21	18.0	12.3	D
3316	11.3	205	16.2	21	18.0	12.3	D
3318	11.5	206	16.2	22	18.0	12.3	D
3320	19.9	202	16.3	22	18.0	12.3	D
3322	10.9	137	16.4	20	18.0	12.3	D
3324	25.9	257	16.4	19	18.0	12.2	D
3326	11.9	230	16.4	19	18.0	12.2	D
3328	15.0	218	16.5	18	18.0	12.1	B
3330	14.4	215	16.7	18	18.0	12.0	B
3332	9.7	215	16.8	18	18.0	12.0	B
3334	13.3	214	16.8	18	18.0	12.1	B
3336	14.9	217	16.8	20	18.0	12.2	B
3338	23.3	256	16.8	20	18.0	12.2	B
3340	15.0	217	16.8	21	18.0	12.3	A
3342	16.5	220	16.8	20	18.0	12.2	C
3344	15.3	221	16.8	19	18.0	12.1	A
3346	15.1	207	16.9	17	18.0	12.0	A
3348	14.9	205	17.0	16	18.0	12.0	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3350	15.3	212	17.0	17	18.0	12.0	A
3352	16.8	217	17.1	17	18.0	12.0	A
3354	16.1	217	17.2	16	18.0	12.1	A
3356	9.1	212	17.2	17	18.0	12.2	A
3358	12.6	225	17.2	20	18.0	12.1	A
3360	12.5	221	17.2	21	18.0	12.1	A
3362	12.4	200	17.2	19	18.0	12.2	A
3364	15.8	205	17.2	18	18.0	12.2	A
3366	8.9	219	17.2	18	18.0	12.2	A
3368	13.2	231	17.2	18	18.0	12.2	A
3370	12.7	227	17.2	18	18.0	12.2	A
3372	20.4	220	17.3	19	18.0	12.2	C
3374	22.6	222	17.4	19	18.0	12.3	C
3376	11.0	203	17.4	19	18.0	12.3	A
3378	12.4	212	17.4	19	18.0	12.3	A
3380	11.0	214	17.4	18	18.0	12.3	A
3382	12.1	209	17.5	19	18.0	12.2	A
3384	11.7	210	17.5	19	18.0	12.3	A
3386	14.3	232	17.6	17	18.0	12.3	C
3388	15.3	225	17.6	15	18.0	12.1	A
3390	11.5	238	17.7	14	18.0	12.2	C
3392	14.7	243	17.8	15	18.0	12.3	A
3394	10.2	200	17.8	16	18.0	12.3	A
3396	12.7	212	17.8	18	18.0	12.3	A
3398	14.1	217	17.8	18	18.0	12.3	A
3400	9.6	217	17.8	20	18.0	12.3	A
3402	16.3	200	17.8	21	18.0	12.3	A
3404	17.6	199	17.8	19	18.0	12.2	A
3406	18.5	208	17.8	18	18.0	12.3	A
3408	15.1	212	17.9	18	18.0	12.3	A
3410	14.9	219	18.0	17	18.0	12.3	A
3412	9.8	231	18.0	17	18.0	12.3	C
3414	12.6	214	18.1	17	18.0	12.4	A
3416	16.3	218	18.2	16	18.0	12.4	A
3418	14.4	230	18.2	15	18.0	12.5	A
3420	15.2	208	18.3	15	18.0	12.5	A
3422	15.8	204	18.3	16	18.0	12.4	A
3424	8.4	188	18.4	15	18.0	12.3	A
3426	13.7	194	18.4	16	18.0	12.3	C
3428	30.6	151	18.4	16	18.0	12.3	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3524	15.9	203	19.6	20	18.0	12.6	A
3526	14.7	214	19.7	20	18.0	12.5	A
3528	15.1	212	19.8	17	18.0	12.8	A
3530	13.4	207	19.8	13	18.0	13.2	A
3532	10.9	187	19.8	13	18.0	13.2	C
3534	12.1	181	19.9	14	18.0	13.1	A
3536	12.5	196	20.0	14	18.0	12.9	A
3538	12.7	225	20.0	15	18.0	12.7	C
3540	16.1	204	20.1	16	18.0	12.4	A
3542	15.8	206	20.2	17	18.0	12.3	A
3544	13.3	213	20.2	19	18.0	12.2	A
3546	14.6	209	20.2	19	18.0	12.1	A
3548	15.1	207	20.2	14	18.0	12.1	A
3550	16.2	208	20.3	14	18.0	12.2	A
3552	12.9	214	20.4	18	18.0	12.3	A
3554	12.1	203	20.4	19	18.0	12.3	A
3556	16.1	203	20.4	18	18.0	12.2	A
3558	15.9	208	20.4	19	18.0	12.2	A
3560	11.8	212	20.4	19	18.0	12.2	A
3562	15.3	220	20.4	18	18.0	12.2	A
3564	15.8	215	20.4	19	18.0	12.2	A
3566	15.2	203	20.5	19	18.0	12.3	A
3568	13.9	219	20.6	20	18.0	12.3	A
3570	13.9	207	20.6	19	18.0	12.3	A
3572	13.3	214	20.7	18	18.0	12.2	A
3574	14.9	214	20.7	21	18.0	12.2	A
3576	16.0	207	20.6	18	18.0	12.2	A
3578	16.6	201	20.7	16	18.0	12.3	A
3580	16.2	220	20.7	17	18.0	12.4	A
3582	13.2	216	20.7	16	18.0	12.3	A
3584	11.2	223	20.6	15	18.0	12.3	A
3586	17.7	216	20.6	16	18.0	12.3	A
3588	19.0	205	20.6	16	18.0	12.3	A
3590	12.3	198	20.6	16	18.0	12.3	A
3592	14.5	210	20.6	19	18.0	12.3	C
3594	14.0	205	20.6	19	18.0	12.3	A
3596	12.9	243	20.8	19	18.0	12.3	A
3598	13.1	241	21.0	19	18.0	12.3	A
3600	15.1	212	21.1	18	18.0	12.3	A
3602	22.4	215	21.2	17	18.0	12.2	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3430	10.9	211	18.5	16	18.0	12.3	A
3432	11.8	205	18.6	16	18.0	12.3	A
3434	15.4	209	18.6	16	18.0	12.3	A
3436	16.4	201	18.6	14	18.0	12.3	A
3438	11.2	231	18.6	13	18.0	12.3	A
3440	10.5	217	18.7	16	18.0	12.3	A
3442	17.1	217	18.8	19	18.0	12.3	A
3444	9.8	200	18.7	20	18.0	12.4	A
3446	18.9	193	18.7	18	18.0	12.7	C
3448	16.8	201	18.8	15	18.0	12.8	C
3450	14.5	207	18.9	15	18.0	12.6	A
3452	9.8	202	19.0	15	18.0	12.4	A
3454	15.2	214	19.0	13	18.0	12.3	C
3456	15.1	219	19.1	15	18.0	12.3	C
3458	12.1	209	19.2	17	18.0	12.3	A
3460	16.6	211	19.2	18	18.0	12.3	A
3462	13.7	240	19.2	18	18.0	12.3	C
3464	14.8	218	19.2	20	18.0	12.2	A
3466	13.2	221	19.2	20	18.0	12.2	A
3468	17.0	215	19.3	21	18.0	12.3	A
3470	15.8	224	19.4	22	18.0	12.3	C
3472	10.4	225	19.4	21	18.0	12.3	A
3474	14.3	224	19.4	20	18.0	12.3	A
3476	20.0	228	19.4	21	18.0	12.3	C
3478	18.4	220	19.4	19	18.0	12.2	C
3480	12.5	233	19.5	18	18.0	12.2	C
3482	16.0	237	19.5	20	18.0	12.2	A
3484	15.5	232	19.5	20	18.0	12.3	A
3486	17.3	206	19.5	18	18.0	12.2	A
3488	14.7	223	19.5	17	18.0	12.2	A
3490	16.2	226	19.5	17	18.0	12.3	A
3492	16.4	211	19.4	19	18.0	12.3	A
3494	18.0	217	19.4	20	18.0	12.2	A
3510	13.4	212	19.8	18	18.0	12.4	C
3512			19.8	18	18.0	12.4	
3514	17.5	220	19.8	19	18.0	12.4	A
3516	17.1	211	19.7	18	18.0	12.4	A
3518	15.7	206	19.6	17	18.0	12.4	A
3520	14.5	202	19.5	17	18.0	12.5	C
3522	16.9	206	19.4	19	18.0	12.6	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3604	14.2	204	21.2	16	18.0	12.1	A
3606	13.8	205	21.2	16	18.0	12.2	A
3608	13.5	203	21.2	17	18.0	12.2	A
3610	14.0	210	21.2	17	18.0	12.2	A
3612	16.5	214	21.2	17	18.0	12.0	A
3614	15.9	214	21.2	19	18.0	12.0	A
3616	14.5	214	21.2	25	18.0	11.9	A
3618			21.1	23	18.0	12.2	
3620	21.6	210	21.0	14	18.0	12.9	C
3622	16.2	189	21.0	11	18.0	13.1	A
3624	17.8	202	21.0	10	18.0	12.8	A
3626	19.6	220	21.1	9	18.0	12.8	A
3628	17.5	219	21.2	10	18.0	12.8	A
3630	18.2	217	21.3	11	18.0	12.7	A
3632	19.1	208	21.4	9	18.0	12.5	A
3634	19.1	207	21.5	10	18.0	12.6	A
3636	15.8	205	21.6	14	18.0	12.7	A
3638	17.1	190	21.6	15	18.0	12.5	E
3640	24.7	200	21.6	15	18.0	12.4	C
3642	21.1	200	21.6	16	18.0	12.4	C
3644	19.2	200	21.6	19	18.0	12.4	A
3646	29.0	220	21.6	20	18.0	12.5	C
3648	17.6	205	21.7	15	18.0	12.6	A
3650	17.6	191	21.7	11	18.0	12.5	A
3652	20.3	200	21.8	10	18.0	12.3	A
3654	20.1	204	21.8	10	18.0	12.3	A
3656	22.4	211	21.8	14	18.0	12.3	A
3658			21.9	17	18.0	12.3	
3660	15.9	218	22.0	16	18.0	12.3	C
3662	16.6	217	22.0	15	18.0	12.3	A
3664	15.8	216	22.0	15	18.0	12.4	A
3666	16.3	208	22.0	15	18.0	12.3	A
3668	17.0	207	22.1	14	18.0	12.3	A
3670	16.3	206	22.1	15	18.0	12.3	B
3672	17.0	203	22.2	16	18.0	12.3	D
3674	19.5	200	22.2	17	18.0	12.3	B
3676	13.1	151	22.2	16	18.0	12.2	F
3678	8.1	226	22.2	16	18.0	12.2	D
3680	12.6	233	22.1	17	18.0	12.3	D
3682	15.7	216	22.1	17	18.0	12.3	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3684	13.4	216	22.2	13	18.0	12.3	A
3686	17.8	203	22.3	12	18.0	12.3	A
3688	16.5	205	22.4	13	18.0	12.3	E
3690	14.3	214	22.4	15	18.0	12.3	A
3692	12.0	216	22.5	16	18.0	12.2	A
3694	15.9	214	22.5	17	18.0	12.2	A
3696	16.9	211	22.6	16	18.0	12.2	E
3698	12.5	209	22.6	13	18.0	12.3	A
3700	15.7	210	22.6	14	18.0	12.3	A
3702	11.9	192	22.7	17	18.0	12.3	A
3704	13.3	195	22.7	18	18.0	12.2	A
3706	17.0	206	22.7	18	18.0	12.4	A
3708	19.7	221	22.7	17	18.0	12.5	A
3710	19.5	207	22.8	16	18.0	12.4	A
3712	23.2	210	22.9	13	18.0	12.5	A
3714	18.3	207	23.0	14	17.2	12.3	A
3716	26.6	211	23.0	16	15.5	11.9	A
3718	10.8	209	23.0	16	14.9	11.8	C
3720	8.3	181	23.0	17	15.1	11.8	A
3722	18.0	194	23.1	16	15.5	12.0	A
3724	17.8	196	23.2	14	15.8	12.2	A
3726	21.0	200	23.1	8	15.7	12.2	A
3728	24.6	194	23.0	6	13.9	11.9	A
3730	8.1	195	23.0	12	12.2	11.8	A
3732	8.4	198	23.0	14	12.3	12.0	A
3734	15.5	177	23.0	14	13.0	12.4	A
3736	13.4	198	23.0	16	13.5	12.7	A
3738	10.8	209	23.0	14	13.8	12.9	A
3740	14.0	208	23.1	13	14.1	13.3	A
3742	15.1	203	23.2	15	13.3	13.2	A
3744	10.0	227	23.2	16	12.9	13.0	A
3746	11.2	225	23.2	16	14.0	13.1	A
3748	15.1	212	23.2	16	15.4	13.5	A
3750	13.6	208	23.2	16	15.7	13.7	A
3752	14.9	216	23.3	16	15.1	13.7	A
3754	11.5	232	23.4	14	14.9	13.8	A
3756	14.3	231	23.4	14	15.0	14.1	E
3758	12.5	225	23.5	16	14.8	14.3	C
3760	17.3	198	23.6	15	14.8	14.4	C
3762	16.2	209	23.7	15	14.7	14.4	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3764	20.5	201	23.7	16	14.5	14.5	A
3766	21.2	193	23.8	14	14.5	14.4	A
3768			23.8	14	13.2	14.1	
3770			23.8	17	11.5	14.1	
3772	13.1	206	23.8	20	12.3	14.4	C
3774	8.8	220	23.8	16	14.1	14.4	C
3776			23.7	14	14.3	14.5	
3778	13.5	213	23.6	16	14.2	14.4	A
3780	11.9	222	23.7	17	14.3	14.3	A
3782	10.9	220	23.7	17	14.6	14.5	A
3784	12.0	195	23.7	17	14.9	14.7	A
3786	20.7	205	23.8	18	14.6	14.7	E
3788	14.5	195	23.9	17	14.2	14.6	A
3790	13.9	209	23.9	17	14.1	14.8	A
3792	13.5	217	23.8	18	14.0	14.9	A
3794	12.0	212	23.7	17	13.6	14.9	A
3796	13.3	214	23.7	16	13.9	14.9	A
3798	10.9	204	23.9	15	14.6	15.0	A
3800	11.7	201	23.9	16	14.6	15.0	A
3802	12.9	216	23.9	16	14.4	15.0	A
3804	14.8	203	23.9	16	14.3	15.1	A
3806	16.3	205	24.0	15	14.3	15.1	A
3808	16.5	206	24.0	14	13.9	15.1	A
3810	9.1	210	24.1	14	12.9	15.0	A
3812	13.5	215	24.2	14	12.1	15.0	A
3814	14.1	212	24.2	14	11.1	15.0	A
3816	13.9	212	24.1	14	10.4	15.0	A
3818	13.7	221	23.9	13	10.6	15.0	A
3820	14.7	223	23.9	14	11.7	15.0	A
3822	14.7	217	23.8	15	13.0	14.9	A
3824	11.0	213	23.8	13	13.2	14.9	A
3826	9.4	212	23.8	14	13.1	14.9	A
3828	10.0	219	23.8	14	12.6	14.9	A
3830	11.3	213	23.8	14	12.4	14.9	A
3832	12.5	222	23.8	15	12.5	14.9	A
3834	9.3	208	23.8	14	12.0	14.7	C
3836			23.8	13	12.3	14.6	
3838	13.4	218	23.8	14	12.6	14.6	A
3840	13.5	214	23.9	14	12.6	14.6	A
3842	13.6	210	23.9	14	12.1	14.5	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3844	6.5	217	24.0	15	11.2	14.2	C
3846	12.8	222	23.9	14	10.8	13.9	C
3848	18.5	225	23.8	15	10.9	13.9	D
3850	5.0	228	23.7	15	11.0	13.8	D
3852	9.8	232	23.6	15	11.2	13.8	D
3854	27.9	242	23.5	15	11.2	13.8	D
3856	24.4	244	23.2	16	11.6	13.9	D
3858	22.0	252	23.0	15	13.3	14.0	D
3860			23.0	13	14.3	14.1	
3862	15.0	200	23.1	14	14.3	14.2	D
3864	13.0	223	23.2	14	14.5	14.4	B
3866	10.9	200	23.2	14	14.4	14.4	D
3868	10.1	201	23.3	14	14.0	14.4	B
3870			23.4	15	13.0	14.1	
3872			23.4	15	11.9	13.6	
3874	14.0	199	23.5	15	11.6	13.2	D
3876	16.1	238	23.6	15	11.6	13.2	D
3878			23.4	15	11.6	13.1	
3880	11.8	218	23.3	14	11.8	13.1	D
3882	10.2	228	23.1	14	11.9	13.2	D
3884	5.8	258	22.9	14	11.8	13.4	D
3886	20.2	213	22.8	15	12.3	13.8	D
3888	16.4	213	22.8	15	13.1	14.1	B
3890	13.5	216	22.8	15	13.3	14.2	B
3892	12.4	229	22.8	15	13.1	14.1	D
3894			22.8	16	13.0	14.1	
3896			22.9	16	12.5	14.0	
3898	28.1	149	23.0	15	11.8	13.7	D
3900	30.8	148	23.0	15	11.6	13.3	B
3902	18.5	240	23.1	15	11.6	13.1	D
3904			23.2	15	11.6	13.1	
3906	23.2	217	23.1	15	11.6	13.1	D
3908			23.0	15	11.6	13.2	
3910	14.9	232	22.8	15	11.6	13.2	D
3912	29.2	230	22.7	15	11.8	13.5	B
3914			22.6	15	12.5	13.9	
3916	68.3	199	22.6	17	12.9	14.1	B
3918	70.1	201	22.6	18	12.6	14.2	D
3920			22.6	17	11.6	14.3	
3922	31.3	228	22.7	16	11.4	14.3	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
3924	10.0	238	22.7	15	13.2	14.6	B
3926	10.2	234	22.8	15	14.2	14.7	B
3928	13.3	212	22.8	15	12.9	14.2	A
3930	9.8	225	22.8	15	11.5	13.7	A
3932	11.9	203	22.8	16	11.3	13.6	A
3934	13.8	197	22.9	16	11.3	13.7	A
3936	9.4	218	22.8	16	11.4	13.7	A
3938	7.7	224	22.6	16	11.6	13.9	A
3940	8.8	218	22.5	16	12.2	14.1	A
3942	10.9	221	22.4	17	12.7	13.8	A
3944	12.9	214	22.4	16	12.8	13.5	E
3946	16.4	208	22.4	16	13.2	13.2	E
3948	15.6	203	22.5	16	13.7	13.2	F
3950	8.1	226	22.6	15	14.2	14.0	F
3952	12.5	249	22.6	15	14.2	14.6	B
3954	12.8	215	22.7	15	13.7	14.7	B
3956	15.2	256	22.8	16	13.0	14.6	B
3958	10.8	300	22.9	16	12.0	14.0	B
3960	12.0	208	23.0	16	11.5	13.5	D
3962	9.9	204	23.1	16	11.6	13.4	B
3964	18.6	216	23.0	16	11.7	13.4	D
3966	18.4	218	23.0	16	12.5	13.6	D
3968	57.5	259	22.9	16	12.3	13.6	B
3970			22.8	15	11.5	13.4	
3972			22.7	15	11.6	13.2	
3974			22.6	15	11.5	13.2	
3976	17.6	203	22.6	15	11.5	13.2	C
3978	13.0	227	22.5	15	11.5	13.3	A
3980	12.7	227	22.4	15	11.9	13.4	A
3982	13.4	214	22.4	16	13.1	13.9	A
3984	16.4	211	22.4	16	13.5	14.1	A
3986	16.1	218	22.4	16	13.0	14.1	A
3988	10.7	219	22.5	16	13.0	14.1	A
3990	9.8	231	22.6	16	12.9	14.1	A
3992	13.6	249	22.6	17	12.2	13.7	C
3994	17.5	244	22.7	17	11.6	13.1	A
3996	18.1	244	22.8	17	11.6	12.9	A
3998	21.0	239	22.8	16	11.6	12.9	C
4000			22.8	16	11.6	12.9	
4002			22.8	16	11.6	12.9	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4004			22.7	17	11.6	12.9	
4006	23.3	234	22.6	17	11.6	12.9	C
4008			22.5	17	11.5	13.0	
4010	10.6	279	22.4	17	11.5	13.1	C
4012	24.6	236	22.4	17	11.6	13.3	C
4014	22.5	231	22.4	17	11.4	13.4	A
4016	16.9	232	22.4	17	11.3	13.4	A
4018	18.1	241	22.3	17	11.2	13.5	C
4020	14.7	227	22.2	17	11.3	13.7	A
4022	14.8	228	22.2	18	11.4	13.8	A
4024			22.2	18	11.3	13.8	
4026	16.4	263	22.3	18	11.9	13.8	A
4028	17.0	238	22.4	18	12.6	13.8	A
4030	16.7	230	22.4	18	13.0	14.1	A
4032	15.1	225	22.4	17	12.8	14.3	A
4034	17.2	224	22.5	18	12.7	14.2	A
4036	12.0	224	22.6	18	12.4	14.0	A
4038	14.5	218	22.6	17	11.8	13.8	A
4040	12.6	219	22.6	18	12.1	13.9	A
4042	14.1	239	22.6	18	12.8	13.9	E
4044	11.1	238	22.6	16	14.1	14.1	E
4046	13.6	239	22.6	18	14.6	14.4	A
4048	10.0	221	22.5	18	13.8	14.3	C
4050	14.0	220	22.4	16	12.6	14.2	A
4052	14.9	229	22.4	17	12.5	14.2	A
4054	15.3	226	22.3	17	12.3	13.8	A
4056	17.2	233	22.3	17	11.6	13.6	A
4058	10.8	236	22.2	19	12.0	13.7	A
4060	10.1	231	22.3	18	13.5	14.0	A
4062	17.3	212	22.4	15	14.2	14.1	A
4064	17.6	215	22.4	15	13.5	14.1	A
4066	18.0	217	22.4	17	12.8	14.1	A
4068	18.0	219	22.3	17	12.0	13.9	A
4070	18.0	221	22.3	17	11.4	13.7	A
4072	16.1	222	22.3	18	11.8	13.7	A
4074	15.1	221	22.4	18	11.6	13.6	A
4076			22.4	18	11.0	13.4	
4078	16.4	219	22.4	16	11.3	13.5	A
4080	14.2	211	22.3	16	12.1	13.7	A
4082	13.8	205	22.3	17	12.2	13.7	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4084	14.3	206	22.2	18	12.4	13.8	A
4086	16.1	218	22.3	20	12.5	13.9	A
4088	16.1	214	22.4	17	11.6	13.6	A
4090	17.2	206	22.3	16	11.2	13.3	A
4092	19.6	206	22.3	17	11.2	13.3	C
4094	15.1	235	22.4	17	11.3	13.4	A
4096	15.4	215	22.3	16	11.5	13.6	A
4098	17.7	205	22.2	16	11.5	13.5	C
4100	13.0	223	22.2	16	11.4	13.3	A
4102	11.0	225	22.1	16	11.3	13.2	A
4104	10.1	224	22.0	16	11.5	13.5	A
4106	9.8	215	22.0	19	12.6	13.9	A
4108	10.9	217	22.0	19	12.9	14.0	A
4110	19.2	208	22.0	16	11.9	13.8	A
4112	14.1	208	22.0	17	11.9	13.9	A
4114	11.4	210	22.0	19	12.1	13.9	A
4116	19.9	204	22.0	19	12.2	13.8	A
4118	12.7	226	22.1	18	12.9	13.7	A
4120	11.7	228	22.2	17	13.0	13.5	C
4122			22.2	18	12.2	13.2	
4124			22.2	19	11.6	13.0	
4126	25.7	218	22.2	19	11.6	12.9	A
4128	19.1	229	22.2	20	11.6	12.9	A
4130	7.6	239	22.2	19	11.6	12.9	D
4132	7.6	233	22.2	19	11.6	12.9	D
4134			22.1	19	11.6	12.9	
4136	9.0	199	22.0	19	11.6	13.0	B
4138	8.0	205	22.0	19	11.6	13.0	D
4140	11.2	203	22.0	20	11.6	12.8	D
4142	11.8	227	22.0	20	11.6	12.7	D
4144	11.2	206	22.0	19	11.6	12.6	D
4146			22.0	20	11.6	12.5	
4148			22.0	20	11.6	12.5	
4150	12.7	222	22.0	20	11.6	12.4	D
4152	9.2	196	21.9	20	11.7	12.4	D
4154	13.7	228	21.8	21	11.8	12.4	D
4156	14.0	230	21.8	21	11.7	12.4	D
4158	8.4	201	21.8	21	11.6	12.4	D
4160			21.8	21	11.7	12.4	
4162	17.7	244	21.8	21	11.8	12.4	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4164	10.7	253	21.7	20	11.7	12.4	D
4166	12.0	225	21.6	18	11.7	12.4	D
4168	14.0	221	21.6	18	11.7	12.4	D
4170	13.1	183	21.6	19	11.6	12.4	B
4172	12.7	171	21.6	20	11.6	12.4	D
4174	15.2	171	21.6	21	11.6	12.4	D
4176	22.1	208	21.6	21	11.6	12.5	D
4178	15.1	202	21.6	21	11.6	12.5	D
4180			21.6	20	11.7	12.6	
4182	8.4	237	21.6	20	11.6	12.6	B
4184	9.9	206	21.6	20	11.7	12.6	B
4186	13.1	221	21.5	22	11.7	12.6	B
4188	11.4	207	21.3	23	11.8	12.7	B
4190	17.5	219	21.3	22	13.3	13.1	A
4192	17.9	215	21.4	20	13.7	13.1	C
4194	9.3	221	21.4	19	12.2	12.8	A
4196	18.6	211	21.4	20	11.6	12.7	C
4198	16.3	220	21.3	23	11.6	12.7	A
4200	17.4	210	21.2	23	12.4	12.7	A
4202	16.7	201	21.3	20	13.2	12.8	E
4204	11.3	240	21.5	21	13.0	12.7	A
4206	11.0	249	21.7	20	12.4	12.6	A
4208	14.1	241	21.7	20	12.0	12.5	A
4210	4.2	237	21.6	22	11.9	12.4	C
4212	6.7	237	21.7	22	11.8	12.4	A
4214	10.7	220	21.8	23	11.8	12.3	A
4216			21.8	23	11.9	12.3	
4218	7.3	196	21.8	23	11.9	12.2	E
4220	7.8	218	21.7	22	12.0	12.2	E
4222	10.2	228	21.8	22	12.0	12.2	A
4224	10.8	202	21.8	22	12.0	12.2	C
4226	7.4	207	21.8	22	12.0	12.3	E
4228	7.6	250	21.8	23	12.0	12.3	E
4230	16.2	205	21.8	23	12.0	12.2	D
4232	22.5	232	21.8	22	12.0	12.1	B
4234	17.6	237	21.8	23	12.0	12.1	B
4236	16.6	243	21.8	22	12.0	12.1	F
4238	18.1	252	21.8	22	12.0	12.1	D
4240			21.8	22	12.0	12.1	
4242	19.3	245	21.8	23	12.0	12.1	D

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4244	18.3	232	21.8	22	11.9	12.1	B
4246	15.6	232	21.7	23	12.0	12.1	B
4248			21.6	23	12.0	12.1	
4250	3.2	342	21.6	22	11.9	12.1	D
4252	1.8	345	21.7	22	11.9	12.1	D
4254			21.9	22	11.9	12.1	
4256			21.9	23	11.9	12.1	
4258			21.9	23	11.9	12.1	
4260	4.2	243	21.9	23	11.9	12.1	D
4262	1.6	99	21.8	22	11.9	12.1	D
4264			21.8	22	12.0	12.1	
4266	9.7	39	21.8	22	12.0	12.1	F
4268	6.5	103	21.9	22	11.9	12.1	D
4270	9.7	115	22.0	22	11.9	12.1	D
4272			22.0	22	11.8	12.1	
4274			22.1	22	11.8	12.1	
4276			22.3	22	11.9	12.1	
4278			22.4	22	11.9	12.1	
4280			22.4	22	11.9	12.2	
4282	10.2	184	22.4	22	11.9	12.2	B
4284	8.6	189	22.5	22	12.0	12.3	B
4286			22.6	22	12.0	12.3	
4288			22.6	22	12.0	12.3	
4290			22.7	23	11.8	12.3	
4292			22.7	23	11.7	12.3	
4294			22.7	23	11.7	12.3	
4296	16.7	209	22.6	23	11.7	12.3	D
4298	16.2	220	22.7	23	11.7	12.3	D
4300	13.4	220	22.8	23	11.8	12.3	B
4302	13.3	210	22.9	23	11.7	12.3	B
4304	14.0	210	23.0	23	11.6	12.3	B
4306	22.8	218	23.0	23	11.6	12.3	D
4308	14.5	204	23.0	23	11.6	12.3	D
4310	24.0	191	23.1	23	11.6	12.3	C
4312	14.3	211	23.1	23	11.6	12.3	A
4314	24.9	211	23.0	23	11.6	12.4	C
4316			22.9	23	11.6	12.5	
4318	15.9	213	22.9	24	12.0	13.1	A
4320	19.1	209	23.0	23	12.7	13.6	A
4322	17.9	194	23.0	25	12.7	13.6	E

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4324	10.2	207	23.0	25	12.4	13.4	A
4326	6.8	190	23.0	23	12.3	13.4	C
4328			22.9	22	12.2	13.4	
4330			23.0	22	12.3	13.5	
4332	10.5	258	23.3	23	12.5	13.2	D
4334			23.6	24	12.1	12.7	
4336	15.1	238	23.6	23	11.6	12.4	B
4338	15.4	237	23.7	23	11.6	12.3	B
4340			23.8	23	11.6	12.3	
4342			23.8	23	11.6	12.3	
4344	13.7	211	23.7	23	11.6	12.3	D
4346			23.7	23	11.6	12.3	
4348			23.7	22	11.6	12.3	
4350	12.0	215	23.8	23	11.6	12.3	E
4352	12.6	224	23.8	23	11.6	12.3	A
4354	13.6	190	23.7	23	11.6	12.3	A
4356	14.0	186	23.7	23	11.6	12.3	A
4358	16.9	242	23.7	23	11.6	12.3	A
4360	15.8	244	23.7	23	11.6	12.3	A
4362	14.5	224	23.8	23	11.6	12.3	A
4364	15.6	229	23.8	23	11.6	12.3	A
4366	8.4	263	23.8	23	11.6	12.3	C
4368	5.2	243	23.9	22	11.6	12.2	C
4370	3.8	109	24.0	22	11.6	12.2	A
4372	5.5	147	24.0	22	11.6	12.1	E
4374	4.8	137	24.1	22	11.6	12.0	A
4376	2.6	225	24.3	22	11.6	12.0	A
4378	2.8	245	24.4	23	11.6	12.0	A
4380	3.0	117	24.5	23	11.6	12.0	C
4382	12.6	208	24.6	22	11.5	12.0	C
4384	13.9	215	24.6	22	11.5	12.0	C
4386			24.6	21	11.6	12.0	
4388	9.3	215	24.6	21	11.6	12.0	C
4390	17.1	222	24.6	22	11.6	12.0	A
4392	14.5	243	24.6	21	11.6	12.0	A
4394	17.1	247	24.7	22	11.6	12.0	A
4396	17.3	243	24.8	22	11.6	12.1	A
4398	11.0	219	24.8	22	11.6	12.0	A
4400	17.4	208	24.9	22	11.6	12.0	A
4402	13.0	237	25.0	22	11.6	12.1	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4404	13.2	237	25.0	22	11.6	12.1	A
4406	14.9	230	25.1	22	11.6	12.0	A
4408	15.1	227	25.3	22	11.6	12.0	A
4410	13.3	214	25.4	22	11.6	12.0	A
4412	14.6	213	25.4	23	11.6	12.0	E
4414	11.7	214	25.4	23	11.6	12.0	A
4416	14.0	210	25.4	23	11.6	11.9	A
4418	15.3	212	25.4	22	11.6	12.0	A
4420	10.2	233	25.4	22	11.6	12.0	A
4422	13.5	246	25.4	22	11.6	12.0	C
4424			25.4	22	11.6	12.1	
4426	11.1	302	25.4	23	11.6	12.1	F
4428	10.5	301	25.4	22	11.6	12.1	B
4430	15.2	236	25.5	22	11.6	12.1	A
4432	11.1	256	25.5	22	11.6	12.1	A
4434	13.9	255	25.6	22	11.6	12.1	A
4436	15.4	199	25.6	22	11.6	12.1	A
4438	14.6	190	25.6	22	11.6	12.1	A
4440	15.1	247	25.6	22	11.6	12.1	A
4442	15.1	262	25.6	23	11.6	12.1	A
4444	16.5	237	25.6	23	11.6	12.1	A
4446	13.6	224	25.7	22	11.6	12.1	A
4448	12.0	190	25.8	22	11.6	12.0	A
4450	11.9	202	25.8	22	11.6	12.0	A
4452	13.6	205	25.9	21	11.6	12.0	A
4454	15.4	205	25.9	22	11.6	12.0	A
4456	16.1	201	25.9	22	11.6	12.0	A
4458	20.7	201	25.9	22	11.6	12.0	E
4460	18.0	208	25.8	23	11.6	12.0	C
4462	9.2	207	25.9	22	11.6	12.1	A
4464	8.8	206	25.9	21	11.9	12.2	A
4466			26.0	21	11.8	12.2	
4468	12.6	224	26.0	21	11.5	12.0	C
4470	19.8	224	26.0	21	11.6	12.0	E
4472	14.7	234	26.0	21	11.5	12.1	A
4474	15.5	220	26.0	21	11.5	12.1	A
4476	16.0	218	26.0	22	11.5	12.1	A
4478	7.0	233	26.0	22	11.5	12.1	C
4480	8.8	229	25.9	21	11.8	12.3	A
4482	10.6	232	25.9	21	12.3	12.6	E

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4484	18.3	236	25.8	21	12.2	12.6	E
4486	10.5	219	25.9	21	11.5	12.5	A
4488	10.6	220	26.0	21	11.7	12.7	A
4490	6.0	232	26.1	23	12.5	13.0	B
4492	18.4	247	26.1	24	13.1	13.1	F
4494	18.2	252	26.2	24	12.3	12.6	F
4496	17.0	255	26.3	23	11.9	12.3	D
4498	16.3	241	26.4	20	12.7	12.3	D
4500	38.2	165	26.4	20	12.2	12.2	B
4502	39.0	161	26.4	21	11.2	11.9	B
4504	11.4	218	26.4	19	10.9	11.8	D
4506	13.6	240	26.4	12	10.8	11.8	B
4508	17.3	230	26.4	7	10.8	11.8	B
4510	20.0	225	26.4	7	11.0	11.8	B
4512	13.4	215	26.5	11	11.2	11.8	B
4514	13.3	209	26.5	14	11.3	11.8	B
4516	9.1	212	26.4	17	11.4	11.8	D
4518			26.4	19	11.5	11.8	
4520	26.4	202	26.4	20	11.6	11.8	D
4522	11.4	181	26.4	21	11.6	11.8	B
4524	10.8	179	26.4	22	11.6	11.8	D
4526	11.4	139	26.4	23	11.6	11.8	D
4528			26.4	23	11.6	11.8	
4530			26.5	21	11.6	11.8	
4532	32.4	263	26.6	20	11.6	11.8	D
4534	36.4	281	26.6	20	11.6	11.8	D
4536	33.5	269	26.6	20	11.6	11.8	B
4538	36.6	260	26.6	20	11.7	11.8	B
4540			26.6	20	11.8	11.8	
4542			26.7	20	11.9	11.8	
4544			26.8	20	11.9	11.8	
4546	35.9	263	26.8	20	12.1	11.8	B
4548	35.4	264	26.8	21	12.3	11.8	B
4550			26.8	20	12.4	11.8	
4552			26.7	19	12.5	11.8	
4554			26.6	18	12.6	11.8	
4556	12.9	307	26.6	16	12.7	11.8	F
4558	6.0	313	26.6	13	12.8	11.8	D
4560			26.5	11	13.0	11.9	
4562			26.4	15	12.8	12.4	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4564	22.0	320	26.4	21	12.4	12.7	D
4566			26.4	21	12.2	12.4	
4568			26.4	16	12.0	12.1	
4570			26.4	14	11.8	11.9	
4572	25.6	244	26.4	15	11.6	11.8	D
4574	21.6	244	26.4	13	11.6	11.8	B
4576	22.6	233	26.4	11	11.8	11.8	B
4578			26.4	10	12.0	11.8	
4580			26.4	11	12.0	11.8	
4582			26.4	12	11.9	11.8	
4584	15.7	250	26.4	15	11.9	11.9	D
4586	12.0	243	26.4	15	11.9	11.9	D
4588			26.3	15	11.9	11.8	
4590	22.0	286	26.2	18	11.9	11.8	D
4592	19.0	312	26.2	23	11.9	11.8	B
4594	17.0	267	26.2	22	11.7	11.8	B
4596	15.7	272	26.2	16	11.6	11.8	D
4598	25.8	244	26.3	16	11.7	11.8	D
4600	31.7	252	26.4	16	11.7	11.8	D
4602			26.4	15	11.8	11.8	
4604	15.2	272	26.4	17	11.8	11.8	B
4606	15.1	267	26.4	20	11.9	11.8	B
4608	25.0	255	26.4	22	11.8	11.8	F
4610			26.4	23	11.8	11.8	
4612	25.6	223	26.4	22	11.8	11.8	D
4614	32.7	229	26.4	22	11.8	11.9	B
4616			26.4	24	11.9	11.8	
4618	33.1	237	26.4	24	11.9	11.8	D
4620			26.4	22	11.9	11.8	
4622	24.5	201	26.4	21	11.9	11.8	D
4624	19.0	228	26.4	23	11.9	11.8	B
4626	18.6	224	26.4	21	11.9	11.8	B
4628			26.4	19	11.9	11.8	
4630			26.4	21	11.9	11.8	
4632			26.4	21	11.9	11.8	
4634			26.4	19	12.0	11.8	
4636			26.4	21	12.0	11.8	
4638			26.5	19	11.9	11.8	
4640			26.6	17	11.9	11.8	
4642			26.6	18	11.9	11.8	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4644			26.6	18	12.0	11.8	
4646			26.6	19	12.0	11.8	
4648			26.6	19	12.0	11.8	
4650	8.9	192	26.6	18	12.0	11.8	D
4652	15.7	220	26.6	18	12.1	11.8	D
4654	11.1	200	26.6	18	12.0	11.8	B
4656	14.1	194	26.6	19	12.0	11.8	B
4658			26.6	19	12.1	11.8	
4660	13.9	199	26.6	19	12.1	11.8	B
4662	11.4	226	26.6	19	12.1	11.8	D
4664	11.3	202	26.6	19	12.3	11.8	B
4666			26.6	20	12.3	11.8	
4668			26.6	20	12.3	11.9	
4670	7.8	170	26.6	21	12.3	11.9	D
4672	17.6	167	26.6	22	12.5	11.9	B
4674	17.1	165	26.6	22	12.5	11.9	B
4676			26.6	21	12.3	11.9	
4678			26.6	21	12.3	11.9	
4680			26.6	22	12.5	11.9	
4682	12.6	281	26.6	23	12.6	11.9	D
4684	21.3	304	26.6	24	12.6	11.9	B
4686	17.2	298	26.6	24	12.6	11.9	F
4688	20.1	315	26.6	24	12.4	11.9	D
4690	17.0	246	26.6	23	12.4	11.9	A
4692	17.0	247	26.7	23	12.4	11.9	A
4694	19.8	275	26.7	23	12.3	11.9	C
4696	16.1	261	26.7	22	12.3	11.9	C
4698	30.6	234	26.8	22	12.4	11.9	A
4700	19.3	256	26.8	22	12.4	11.9	A
4702	18.9	247	26.7	22	12.4	12.0	A
4704	24.3	239	26.7	23	12.4	12.0	A
4706	13.1	244	26.8	22	12.5	12.1	C
4708	23.2	218	26.7	23	12.5	12.0	C
4710			26.7	22	12.6	11.9	
4712	16.1	227	26.6	22	12.5	11.9	D
4714	15.3	244	26.7	23	12.5	11.9	B
4716	10.1	252	26.7	23	12.5	11.9	B
4718	4.4	251	26.7	22	12.6	11.9	D
4720	5.7	251	26.7	21	12.6	11.9	D
4722			26.7	22	12.6	11.9	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4724			26.7	23	12.5	11.9	
4726	19.6	252	26.7	23	12.5	11.9	D
4728			26.8	23	12.6	11.9	
4730	18.6	226	26.8	23	12.6	11.9	C
4732	15.9	237	26.8	23	12.6	11.9	A
4734	15.3	229	26.8	22	12.5	12.0	A
4736	15.7	229	26.8	21	12.5	12.0	A
4738	18.5	236	26.8	19	12.7	12.1	C
4740	15.5	255	26.8	19	12.5	12.0	C
4742	15.7	252	26.8	20	12.3	11.9	C
4744	19.6	233	26.8	18	12.3	11.9	C
4746	17.4	260	26.8	18	12.3	11.9	C
4748			26.8	19	12.3	11.9	
4750	17.9	234	26.8	20	12.4	11.9	C
4752	21.1	253	26.8	21	12.5	11.9	C
4754	20.2	234	26.8	21	12.6	11.9	A
4756	16.4	253	26.8	21	12.6	12.0	A
4758	17.0	241	26.8	20	12.7	12.0	A
4760	16.9	240	26.8	20	12.6	11.9	C
4762			26.8	20	12.7	11.9	
4764			26.8	21	12.7	12.0	
4766	15.8	218	26.8	20	12.7	12.1	C
4768	15.5	218	26.8	20	12.7	12.1	A
4770	14.7	203	26.8	19	12.9	12.1	A
4772	15.2	182	26.8	19	12.9	12.0	A
4774	14.7	204	26.8	20	12.8	11.9	A
4776	16.6	235	26.8	20	13.0	11.9	A
4778	15.8	235	26.8	21	13.1	11.9	A
4780	10.8	234	26.8	21	13.1	11.9	C
4782			26.8	20	13.1	11.9	
4784	13.6	240	26.8	21	13.1	11.9	C
4786	14.6	245	26.8	21	13.1	11.9	A
4788	18.3	224	26.8	21	13.1	11.9	C
4790	19.7	224	26.8	21	13.3	11.9	B
4792	19.2	227	26.8	22	13.5	11.8	B
4794			26.8	22	13.5	11.8	
4796	26.1	214	26.8	22	13.5	11.8	D
4798	27.7	220	26.8	22	13.5	11.8	D
4800			26.8	22	13.5	11.8	
4802	12.8	233	26.8	21	13.4	11.8	D

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4804			26.8	21	13.3	11.8	
4806	18.0	230	26.8	22	13.1	11.8	F
4808	18.1	227	26.8	22	13.1	11.8	D
4810			26.9	24	13.2	11.8	
4812	15.9	244	26.9	24	13.2	11.8	A
4814	16.0	257	26.8	23	13.2	11.8	A
4816	15.9	223	26.8	23	13.3	11.8	A
4818	16.0	233	26.8	23	13.5	11.8	A
4820			26.8	23	13.5	11.8	
4822			26.8	22	13.5	11.8	
4824	20.4	253	26.9	23	13.5	11.8	C
4826	18.5	236	27.0	23	13.5	11.8	C
4828	14.6	229	27.0	23	13.5	11.8	C
4830			27.0	23	13.5	11.8	
4832	15.1	241	27.0	24	13.5	11.8	A
4834	13.7	235	27.0	23	13.7	11.8	A
4836	14.1	228	26.9	23	13.9	11.8	A
4838	14.4	224	26.8	23	14.2	11.8	A
4840			26.8	24	14.5	11.8	
4842			26.8	25	14.7	11.8	
4844	14.6	241	26.8	24	14.9	11.8	A
4846	14.5	238	26.8	24	15.1	11.8	A
4848	17.4	234	26.8	24	15.0	11.8	A
4850	14.9	239	26.8	25	14.8	11.8	B
4852	14.1	246	26.9	25	14.8	11.8	B
4854	19.5	252	27.0	25	14.9	11.8	D
4856	12.7	315	27.0	25	15.0	11.7	D
4858	18.0	255	27.0	25	15.4	11.7	D
4860	17.3	242	27.0	26	15.7	11.7	D
4862	16.6	241	27.0	27	15.8	11.7	D
4864	10.2	288	27.0	26	15.9	11.8	D
4866			27.0	26	15.9	11.8	
4868	21.3	278	27.0	27	15.9	11.8	D
4870	27.7	254	27.0	27	15.9	11.7	D
4872	28.3	249	27.0	27	16.0	11.7	B
4874	30.7	246	27.0	28	16.0	11.7	D
4876	21.0	279	27.0	32	16.0	11.7	B
4878	20.8	277	27.0	35	16.0	11.7	B
4880	31.4	253	27.0	35	16.1	11.7	D
4882			27.0	34	16.5	11.7	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4884			27.0	33	16.8	11.7	
4886	14.3	278	27.0	33	16.9	11.6	D
4888	28.4	245	27.0	33	16.9	11.6	D
4890	19.6	266	26.9	33	16.7	11.6	A
4892	20.2	261	26.8	33	16.7	11.6	A
4894	12.8	242	26.8	32	16.8	11.6	C
4896	12.8	229	26.8	30	16.9	11.6	A
4898			26.9	29	16.8	11.6	
4900	12.1	257	26.9	30	16.6	11.6	A
4902	13.9	241	26.9	30	16.5	11.6	C
4904	20.4	236	26.8	30	16.3	11.6	E
4906	12.6	240	26.8	30	16.3	11.6	C
4908	14.7	252	26.8	30	16.5	11.6	A
4910	15.7	279	26.8	31	16.8	11.6	D
4912	13.1	245	26.8	31	17.3	11.6	D
4914	17.3	278	26.8	34	17.9	11.7	D
4916	21.2	287	26.8	37	18.0	11.7	D
4918	14.8	275	26.7	32	18.0	11.7	B
4920	10.7	268	26.6	27	18.0	11.8	B
4922			26.6	25	18.0	11.8	
4924	7.0	325	26.7	26	18.0	11.8	D
4926	20.0	285	26.7	25	18.0	11.8	F
4928	21.1	288	26.7	23	18.0	11.8	D
4930	16.7	256	26.7	22	18.0	11.9	B
4932	7.7	258	26.6	22	18.0	11.9	D
4934	15.4	272	26.6	24	18.0	11.7	D
4936	16.2	241	26.6	26	18.0	11.6	B
4938	13.2	264	26.5	24	18.0	11.6	D
4940			26.4	22	18.0	11.6	
4942	12.7	258	26.4	19	18.0	11.7	D
4944			26.3	18	18.0	11.7	
4946	19.4	230	26.2	18	18.0	11.8	D
4948	16.8	231	26.2	18	18.0	11.9	D
4950			26.1	17	18.0	12.1	
4952	16.8	247	26.0	18	18.0	12.1	C
4954	16.6	242	26.0	19	17.8	12.0	C
4956	18.2	240	26.0	18	17.5	12.1	A
4958			26.0	17	17.3	12.2	
4960	10.1	293	26.0	19	16.7	12.3	C
4962	10.0	254	26.0	19	16.2	12.3	E

Schlumberger

DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
4964	16.9	245	26.0	17	16.0	12.2	A
4966	16.0	240	26.0	16	16.0	12.2	A
4968	11.5	258	26.0	16	16.1	12.2	A
4970	16.9	242	25.9	16	15.3	12.2	A
4972	15.5	240	25.8	16	14.7	12.2	A
4974	14.8	221	25.8	16	15.2	12.3	A
4976	15.4	220	25.7	16	16.0	12.3	A
4978	12.3	224	25.6	15	16.4	12.3	A
4980	19.2	227	25.6	15	16.1	12.3	A
4982	19.1	229	25.5	15	15.6	12.3	A
4984	15.1	224	25.4	15	15.5	12.2	A
4986	14.4	218	25.4	15	15.8	12.2	A
4988	15.0	232	25.3	15	16.2	12.2	A
4990	15.4	263	25.2	14	16.4	12.0	A
4992	14.9	242	25.2	13	16.6	12.0	A
4994	16.1	246	25.1	12	17.1	12.0	A
4996	13.9	207	25.1	14	17.3	12.2	C
4998			25.1	14	17.2	12.3	
5000	15.2	253	25.1	11	17.2	12.4	C
5002	15.4	225	25.1	10	17.2	12.5	A
5004	15.0	212	25.1	11	16.9	12.6	A
5006	15.0	217	25.1	13	15.4	12.4	A
5008			25.0	15	14.1	12.2	
5010			25.0	15	14.0	12.0	
5012			25.0	15	14.0	12.0	
5014			24.9	13	13.8	11.9	
5016			24.9	11	13.8	11.9	
5018	14.1	210	24.8	10	14.2	12.1	D
5020	20.6	213	24.7	11	14.9	12.4	B
5022	20.3	222	24.6	13	15.3	12.7	B
5024	16.4	228	24.5	13	15.0	12.8	B
5026	16.8	220	24.4	12	14.6	12.6	D
5028	21.4	213	24.3	12	14.5	12.6	D
5030	19.6	243	24.2	13	14.5	12.6	D
5032	16.3	279	24.2	12	14.6	12.5	D
5034			24.2	11	15.4	12.3	
5036			24.2	10	16.9	12.3	
5038	14.7	277	24.2	7	17.9	12.4	D
5040			24.2	3	18.0	12.4	
5042			24.3	359	18.0	12.4	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5044	13.2	231	24.4	358	17.5	12.4	D
5046	15.6	236	24.4	359	16.3	12.4	D
5048			24.4	359	15.8	12.4	
5050			24.4	0	15.6	12.4	
5052			24.4	1	15.5	12.3	
5054			24.4	2	15.4	12.2	
5056			24.4	3	15.1	12.2	
5058			24.4	1	14.8	12.1	
5060			24.4	359	14.8	12.1	
5062			24.4	359	14.8	12.2	
5064			24.4	1	14.9	12.2	
5066			24.4	5	15.5	12.2	
5068			24.4	7	15.7	12.0	
5070			24.4	6	15.6	11.8	
5072	15.1	220	24.4	6	15.7	11.8	B
5074	16.4	219	24.4	8	15.9	11.8	B
5076			24.4	8	15.9	11.8	
5078			24.4	7	15.9	11.8	
5080	11.4	235	24.3	7	15.9	11.8	D
5082	19.3	244	24.2	6	15.9	11.8	F
5084			24.2	5	15.9	11.8	
5086	16.6	215	24.2	5	15.9	11.8	D
5088			24.3	5	15.9	11.8	
5090	8.8	243	24.4	6	15.9	11.7	D
5092	4.2	265	24.4	7	15.9	11.7	D
5094	12.1	268	24.4	9	15.9	11.6	D
5096	17.0	225	24.4	9	15.8	11.6	B
5098			24.4	9	15.7	11.6	
5100	14.0	249	24.4	9	15.5	11.7	B
5102	12.4	241	24.3	9	15.1	11.6	B
5104	15.6	231	24.3	10	15.1	11.6	F
5106	15.8	232	24.2	11	15.7	11.6	F
5108	21.6	239	24.2	10	16.4	11.6	D
5110	18.9	254	24.2	9	16.8	11.6	A
5112	20.8	262	24.2	9	17.1	11.7	C
5114	17.4	248	24.2	9	17.2	11.7	A
5116	22.3	258	24.2	11	17.3	11.8	A
5118	20.2	243	24.2	12	17.5	11.8	A
5120	23.0	244	24.2	11	17.6	11.8	C
5122	19.5	279	24.2	10	17.5	11.8	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5124	18.4	275	24.2	9	17.3	11.8	C
5126			24.2	9	17.2	11.7	
5128	17.4	265	24.3	11	17.3	11.7	C
5130	16.8	232	24.4	11	17.4	11.8	A
5132	18.0	231	24.4	11	17.5	12.0	A
5134	15.5	237	24.4	12	17.8	12.2	A
5136	18.1	228	24.4	13	17.6	12.2	A
5138	17.6	223	24.4	12	17.5	12.0	A
5140	21.4	218	24.4	9	17.5	12.0	C
5142	16.7	224	24.4	9	17.2	12.0	C
5144	17.2	216	24.4	11	16.1	11.8	A
5146	20.8	230	24.4	14	15.6	11.7	C
5148	30.4	230	24.2	14	16.8	11.7	C
5150	17.8	244	24.1	12	17.6	11.8	A
5152	16.8	233	24.2	12	17.8	11.9	A
5154	18.1	232	24.2	12	17.9	11.8	A
5156	18.4	234	24.1	11	17.5	11.5	A
5158	15.7	163	24.0	11	17.3	11.4	B
5160			23.9	11	17.7	11.5	
5162	13.4	240	23.9	11	18.0	11.5	B
5164	14.0	232	24.1	11	18.0	11.5	D
5166	50.7	183	24.1	11	18.0	11.5	B
5168	52.7	180	24.1	10	18.0	11.4	D
5170	16.8	186	24.1	10	18.0	11.3	B
5172	16.6	189	24.0	10	18.0	11.3	B
5174	12.9	182	24.0	10	18.0	11.3	B
5176	11.4	175	24.0	10	18.0	11.3	B
5178	17.7	186	24.0	10	18.0	11.3	B
5180	15.3	256	24.0	9	18.0	11.2	D
5182	19.7	245	24.0	9	18.0	11.3	D
5184	26.7	285	24.0	9	18.0	11.5	A
5186	23.9	290	24.0	10	18.0	11.8	E
5188	29.7	275	24.0	10	18.0	11.8	C
5190	25.9	280	24.0	9	18.0	11.8	A
5192	23.3	287	24.0	9	18.0	11.8	A
5194	25.5	279	24.0	10	18.0	11.8	E
5196	19.5	271	24.0	11	18.0	11.9	C
5198	20.3	272	24.0	10	18.0	11.8	C
5200	16.7	225	24.0	10	18.0	11.8	B
5202	16.7	225	24.0	9	18.0	11.9	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5204			24.0	9	18.0	11.9	
5206	17.9	242	24.0	8	18.0	12.0	E
5208	19.2	272	24.0	9	18.0	11.9	C
5210	16.4	231	24.0	9	18.0	11.8	A
5212			24.0	9	18.0	11.8	
5214	18.8	230	24.0	10	18.0	11.8	E
5216	17.6	246	24.0	10	18.0	11.8	A
5218			24.0	10	18.0	11.8	
5220	21.4	263	24.0	9	18.0	11.7	C
5222	13.0	283	24.0	9	18.0	11.5	D
5224	14.8	269	24.0	9	18.0	11.3	D
5226	13.2	279	24.0	9	18.0	11.4	D
5228	13.0	286	24.0	9	18.0	11.5	D
5230	12.0	262	24.0	9	18.0	11.3	D
5232	21.0	248	24.0	9	18.0	11.3	D
5234	13.3	286	24.0	9	18.0	11.5	D
5236	20.8	252	24.0	9	18.0	11.6	B
5238	42.2	287	24.0	10	18.0	11.4	F
5240	22.8	250	24.0	10	18.0	11.3	D
5242			24.0	11	18.0	11.3	
5244	23.4	269	24.0	11	18.0	11.4	D
5246	22.4	247	23.9	10	18.0	11.5	D
5248	23.3	282	23.8	9	18.0	11.6	D
5250	29.8	286	23.8	9	18.0	11.7	B
5252	29.3	285	23.8	9	18.0	11.8	B
5254	32.4	286	23.8	10	18.0	11.8	D
5256	20.9	235	23.8	9	18.0	11.7	F
5258	21.8	241	23.9	8	18.0	11.7	D
5260	22.7	252	23.9	8	18.0	11.6	D
5262	25.9	263	24.0	8	18.0	11.6	C
5264	22.0	241	24.1	8	18.0	11.5	A
5266	21.2	190	24.2	9	17.6	11.4	C
5268	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5270	22.2	243	24.2	10	17.2	11.4	C
5272	30.8	235	24.2	10	17.3	11.4	C
5274	23.1	231	24.1	10	17.4	11.4	A
5276	18.6	220	24.0	11	17.5	11.4	A
5278	20.7	234	24.0	12	17.5	11.4	C
5280			23.9	11	17.6	11.5	
5282			23.8	10	17.7	11.4	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5284			23.8	10	17.8	11.4	
5286			23.8	10	18.0	11.4	
5288			23.8	9	18.0	11.6	
5290			23.8	9	18.0	11.6	
5292			23.8	9	17.9	11.5	
5294			23.9	9	17.7	11.5	
5296			23.9	9	17.4	11.6	
5298			24.0	9	17.2	11.8	
5300			24.0	9	17.2	11.8	
5302	16.9	233	24.0	9	17.2	11.9	A
5304	19.1	236	24.0	8	17.2	12.0	C
5306	17.1	226	24.1	10	17.0	11.8	A
5308	18.6	224	24.1	12	16.6	11.6	A
5310	19.0	249	24.2	10	16.4	11.5	A
5312	17.1	224	24.1	9	16.4	11.6	C
5314	19.1	248	24.0	10	16.5	11.6	C
5316			24.0	10	16.7	11.7	
5318	13.5	247	24.0	12	16.5	11.7	A
5320	11.8	235	24.0	13	16.1	11.6	A
5322	11.0	229	24.0	11	16.1	11.8	A
5324	14.6	242	24.0	10	16.2	12.0	C
5326	18.5	252	24.0	9	16.2	12.1	C
5328	11.1	238	24.0	10	15.4	12.1	A
5330	11.6	252	24.0	12	13.8	11.8	A
5332	14.6	214	24.0	12	13.8	11.8	A
5334	14.2	213	23.9	11	15.3	12.1	A
5336	16.4	255	23.8	11	15.6	12.1	A
5338	15.3	221	23.8	14	14.9	11.9	A
5340	14.4	222	23.7	16	14.6	11.8	A
5342	12.4	237	23.6	15	14.4	11.8	A
5344	12.8	225	23.6	14	13.7	11.8	E
5346	11.5	227	23.5	13	13.2	11.7	A
5348	12.1	226	23.4	14	13.2	11.7	A
5350	13.3	233	23.5	14	13.5	11.7	A
5352	13.3	230	23.5	14	14.2	11.8	A
5354	12.2	225	23.4	14	14.3	11.8	A
5356	12.4	219	23.4	13	13.8	11.8	A
5358	11.1	219	23.4	14	13.4	11.8	A
5360	13.6	216	23.5	15	13.2	11.8	A
5362	14.9	210	23.6	13	13.1	11.8	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5364	16.4	210	23.6	13	13.2	11.8	A
5366	15.9	217	23.5	14	13.1	11.8	A
5368	13.9	195	23.5	14	13.1	11.7	A
5370	11.9	189	23.5	14	13.2	11.7	A
5372	16.4	198	23.4	14	13.5	11.7	E
5374	15.9	210	23.3	16	14.6	11.8	A
5376			23.4	15	15.9	11.9	
5378	19.9	235	23.4	13	16.7	12.0	A
5380	18.6	234	23.4	13	17.0	12.2	A
5382			23.5	13	17.5	12.4	
5384	25.7	225	23.5	13	17.5	12.3	C
5386	20.3	237	23.5	14	17.4	12.2	A
5388	18.4	229	23.6	15	17.4	12.2	A
5390	25.7	218	23.7	12	17.4	12.3	A
5392	23.2	210	23.7	9	17.1	12.2	A
5394	19.5	214	23.7	8	16.5	11.9	E
5396	18.8	236	23.7	10	16.3	11.9	E
5398			23.7	12	16.2	11.9	
5400	17.9	229	23.8	13	16.2	11.8	A
5402	17.2	227	23.8	12	16.8	11.9	A
5404	21.3	220	23.8	12	17.2	11.9	C
5406	19.5	221	23.8	11	17.2	11.9	A
5408	19.9	224	23.8	11	17.1	11.8	A
5410	18.9	229	23.9	11	16.6	11.7	A
5412	24.2	246	24.0	11	15.7	11.7	A
5414	27.0	247	23.9	13	14.9	11.6	A
5416	11.9	220	23.9	11	15.6	11.7	C
5418	9.5	207	23.8	9	17.3	11.9	A
5420	15.5	237	23.7	9	17.8	11.8	A
5422	9.0	232	23.6	10	17.5	11.7	A
5424	13.9	235	23.6	10	17.7	11.7	A
5426	14.3	241	23.6	11	17.9	11.6	A
5428	14.1	294	23.6	11	17.7	11.5	D
5430	13.6	254	23.6	12	17.7	11.5	C
5432	18.2	273	23.7	13	17.8	11.5	C
5434			23.9	13	17.9	11.4	
5436	15.3	268	23.9	13	17.9	11.4	C
5438	16.2	244	24.0	13	17.5	11.4	A
5440	18.0	252	24.0	13	17.2	11.3	A
5442	20.3	237	24.0	13	17.2	11.3	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5450	18.6	238	23.6	10	14.5	10.8	A
5452	20.5	204	23.5	11	14.5	10.8	C
5454	19.8	221	23.4	9	14.5	10.8	E
5456	16.5	242	23.5	9	14.5	10.8	A
5458	16.4	238	23.5	10	14.5	10.6	A
5460	17.9	246	23.6	10	14.5	10.6	A
5462	14.3	216	23.7	10	14.5	10.8	E
5464	12.9	219	23.9	9	14.5	11.1	F
5466	13.7	229	24.0	9	14.5	11.2	E
5468	7.9	267	24.0	10	14.5	10.9	A
5470	7.5	265	24.0	10	14.5	10.8	A
5472	27.2	200	24.0	11	14.5	10.8	D
5474			24.0	9	14.5	11.1	
5476			24.0	9	14.5	11.7	
5478			24.0	6	14.5	12.2	
5480	23.9	192	24.0	4	14.5	12.1	D
5482			24.0	5	14.5	12.0	
5484	23.4	189	24.0	9	14.5	12.1	B
5486	22.6	188	24.0	10	14.5	12.2	D
5488	19.6	183	24.0	8	14.5	12.3	B
5490			24.0	6	14.5	12.3	
5492			24.0	8	14.5	12.3	
5494	22.6	180	24.0	7	14.5	12.3	D
5496	16.4	206	24.0	4	14.5	12.2	D
5498	17.4	238	24.0	8	14.5	11.6	D
5500	12.4	243	24.1	9	14.5	11.0	D
5502	19.8	220	24.1	9	14.5	10.7	D
5504	20.0	218	24.1	9	14.5	10.8	F
5506	20.3	218	24.2	9	14.5	10.7	D
5508	21.6	238	24.1	11	14.5	10.6	F
5510	16.4	253	24.0	12	14.5	11.0	B
5512	22.0	266	24.0	12	14.5	11.8	D
5514	18.2	250	24.0	12	14.5	12.3	D
5516	18.4	250	23.9	13	14.5	12.3	D
5518	10.7	232	23.8	11	14.5	12.3	D
5520			23.8	7	14.5	12.3	
5522	17.5	215	23.8	5	14.5	12.3	D
5524	16.4	234	23.8	5	14.5	12.3	B
5526	17.0	234	23.9	7	14.5	12.3	B
5528	15.3	232	24.0	9	14.5	12.3	D

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5530	14.8	188	24.0	7	14.5	12.3	D
5532	13.5	233	24.0	7	14.5	12.3	D
5534	16.9	230	24.0	10	14.5	12.3	D
5536	16.9	232	24.0	10	14.5	12.3	D
5538			24.0	10	14.5	12.3	
5540	16.6	234	24.0	7	14.5	12.2	D
5542			23.9	6	14.5	11.4	
5544	12.1	211	23.9	9	14.5	10.6	B
5546	12.4	211	24.0	9	14.5	10.4	A
5548	10.7	212	24.0	8	14.5	10.3	A
5550	9.5	214	24.0	8	14.5	10.2	A
5552	10.9	227	24.1	8	14.5	10.1	A
5554	10.9	241	24.1	10	14.5	10.1	A
5556			24.0	10	14.5	10.1	
5558	14.4	243	24.0	10	14.5	10.1	A
5560	12.2	218	24.0	10	14.5	10.1	A
5562	13.2	207	24.0	10	14.5	10.1	A
5564	15.4	241	23.9	10	14.5	10.1	A
5566	16.6	177	23.8	9	14.5	10.1	D
5568	16.5	177	23.8	9	14.5	10.1	D
5570	15.6	178	23.8	9	14.5	10.1	D
5572	15.7	174	23.8	9	14.5	10.1	D
5574	19.1	227	23.8	10	14.5	10.1	E
5576	17.0	228	23.9	10	14.5	10.2	A
5578	18.8	248	24.0	9	14.5	10.2	A
5580	20.7	190	24.0	9	14.5	10.2	C
5582	16.9	236	24.0	9	14.5	10.3	A
5584	16.5	242	24.0	9	14.5	10.5	A
5586	16.2	243	24.0	7	14.5	11.0	A
5588	12.2	242	24.0	5	14.5	11.3	C
5590			24.0	5	14.5	11.9	
5592			24.0	4	14.5	12.0	
5594	2.9	114	24.0	3	14.5	11.4	B
5596	0.7	189	24.0	6	14.5	10.9	B
5598	17.1	223	24.0	6	14.5	11.0	C
5600	19.3	223	24.0	5	14.5	11.2	E
5602	20.6	238	24.0	5	14.5	11.2	E
5604	17.8	227	24.0	6	14.5	11.1	C
5606			24.0	6	14.5	11.0	
5608	15.9	208	24.1	7	14.5	11.0	E

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5610	8.6	281	24.2	7	14.5	11.1	C
5612	12.8	228	24.2	7	14.5	11.2	A
5614	14.9	209	24.2	8	14.5	11.2	E
5616	11.7	246	24.2	9	14.5	11.4	A
5618	13.1	211	24.2	9	14.5	11.5	E
5620	12.0	216	24.2	9	14.5	11.4	A
5622	14.1	210	24.2	9	14.5	11.6	A
5624	12.5	218	24.2	9	14.5	11.7	A
5626	11.0	227	24.2	9	14.5	11.7	A
5628	13.2	218	24.1	9	14.5	11.8	A
5630	14.0	219	24.1	9	14.5	11.8	A
5632	14.3	214	24.1	9	14.5	11.7	A
5634	13.7	218	24.1	9	14.5	11.8	A
5636	12.0	220	24.0	9	14.5	11.9	A
5638	11.5	216	24.0	9	14.5	11.8	A
5640	13.4	207	24.0	9	14.4	11.8	A
5642	13.2	207	24.0	10	14.4	11.8	A
5644	12.6	209	24.0	9	14.5	11.8	A
5646	16.3	208	23.9	8	14.5	11.8	A
5648	20.1	206	23.8	8	14.5	11.8	E
5650	17.6	220	23.9	10	14.5	11.8	A
5652	13.8	220	23.9	10	14.5	11.8	A
5654	13.2	207	24.0	9	14.4	11.8	E
5656	13.9	209	24.0	10	14.4	11.8	A
5658	16.6	209	24.0	11	14.5	11.8	A
5660	18.0	208	24.0	11	14.5	11.8	A
5662	17.4	208	23.9	11	14.5	11.7	A
5664	17.2	212	23.9	11	14.5	11.7	A
5666	16.4	213	23.9	10	14.5	11.7	C
5668	16.2	207	23.8	10	14.5	11.7	A
5670	15.6	210	23.8	11	14.5	11.7	A
5672	14.9	212	23.8	11	14.5	11.6	A
5674	14.9	214	23.7	11	14.5	11.5	A
5676	15.3	217	23.6	11	14.5	11.6	A
5678	16.6	221	23.6	11	14.5	11.5	A
5680	15.8	219	23.6	10	14.5	11.6	A
5682	11.0	197	23.6	8	14.5	11.7	C
5684	16.4	219	23.6	8	14.5	11.6	A
5686	17.5	219	23.6	9	14.5	11.4	C
5688	24.3	270	23.6	9	14.5	11.5	F

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5690	15.3	233	23.6	8	14.5	11.9	A
5692	14.5	231	23.7	6	14.5	12.2	A
5694	14.8	246	23.8	7	14.5	11.9	A
5696	14.1	240	23.9	8	14.5	11.5	A
5698	11.9	224	24.0	9	14.5	11.3	A
5700	12.6	237	24.0	9	14.5	11.2	A
5702	17.3	210	24.0	11	14.5	11.2	A
5704	14.9	214	24.0	12	14.5	11.2	A
5706	16.9	207	24.0	10	14.5	11.2	E
5708	18.1	276	24.0	8	14.5	11.2	C
5710	13.5	218	24.0	9	14.5	11.3	A
5712	12.9	247	23.9	10	14.5	11.3	A
5714	15.1	234	23.9	11	14.5	11.4	E
5716	15.1	238	23.8	11	14.5	11.4	E
5718	12.7	234	23.8	10	14.5	11.3	A
5720	12.5	279	23.8	10	14.5	11.4	A
5722	14.0	222	23.8	9	14.5	11.5	A
5724	15.7	224	23.8	8	14.5	11.6	E
5726	11.4	278	23.9	7	14.5	11.6	C
5728	12.9	227	23.9	7	14.5	11.5	A
5730	17.2	271	23.9	7	14.5	11.6	A
5732	14.1	208	23.9	7	14.5	11.7	C
5734	12.8	228	23.8	7	14.5	11.7	A
5736	13.7	225	23.9	6	14.5	11.7	A
5738	18.0	249	24.0	7	14.4	11.4	E
5740	16.2	236	24.0	8	14.4	11.4	A
5742	17.7	230	24.1	8	14.4	11.7	A
5744	17.3	229	24.2	8	14.1	11.7	A
5746	14.9	215	24.2	9	13.8	11.6	A
5748	15.0	201	24.2	7	13.7	11.7	A
5750	17.1	233	24.2	8	13.7	11.7	A
5752	16.7	227	24.2	9	13.5	11.7	A
5754	13.7	224	24.1	9	13.2	11.7	A
5756	13.2	234	24.0	9	13.2	11.8	A
5758	15.1	229	24.0	9	13.1	11.8	E
5760	17.5	217	23.9	11	13.1	11.7	E
5762	16.8	215	23.8	12	13.1	11.7	A
5764	17.6	215	23.8	11	13.1	11.8	A
5766	17.1	212	23.8	8	13.1	11.8	A
5768	13.0	203	23.8	7	13.1	11.8	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5770			23.8	8	13.1	11.8	
5772			23.8	8	13.1	11.8	
5774	17.2	211	23.8	8	13.1	11.8	A
5776	14.4	211	23.8	7	13.1	11.8	A
5778	14.4	211	23.8	7	13.1	11.8	A
5780	15.0	209	23.8	7	13.1	11.8	A
5782	15.8	209	23.8	7	13.3	11.8	A
5784	13.7	217	23.8	8	13.4	11.8	E
5786	12.8	218	23.8	8	13.5	11.8	E
5788	14.5	219	23.8	8	13.5	11.8	E
5790	14.6	229	23.8	8	13.5	11.8	E
5792			23.8	8	13.5	11.9	
5794			23.8	8	13.5	11.9	
5796	17.8	236	23.8	8	13.5	11.8	E
5798	16.5	224	23.8	7	13.5	11.8	E
5800	13.6	223	23.8	8	13.5	11.8	A
5802	15.2	230	23.9	8	13.5	11.8	A
5804	16.6	225	23.8	8	13.5	11.8	A
5806	15.4	224	23.8	8	13.5	11.8	A
5808	15.7	215	23.8	8	13.4	11.8	E
5810	17.3	206	23.8	8	13.4	11.8	A
5812	16.7	218	23.8	8	13.3	11.8	A
5814	15.9	220	23.8	8	13.2	11.8	A
5816	14.6	224	23.8	8	13.2	11.8	A
5818			23.8	8	13.1	11.8	
5820	11.2	201	23.8	8	13.1	11.8	A
5822	13.1	201	23.8	8	13.1	11.8	A
5824	13.8	199	23.8	7	13.1	11.8	A
5826	14.0	205	23.8	7	13.1	11.8	A
5828	13.8	209	23.8	8	13.1	11.8	A
5830	15.9	202	23.8	7	13.1	11.8	A
5832	16.2	200	23.8	7	13.2	11.8	A
5834	12.9	217	23.8	8	13.3	11.8	A
5836	14.4	213	23.8	8	13.2	11.8	A
5838	16.3	205	23.8	8	13.1	11.8	A
5840	14.7	210	23.8	7	13.1	11.8	A
5842	14.1	204	23.8	7	13.1	11.8	A
5844	11.1	193	23.8	7	13.1	11.8	A
5846	15.9	203	23.8	7	13.1	11.8	A
5848	18.1	209	23.8	6	13.3	11.8	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5850	17.8	210	23.8	7	13.5	11.8	A
5852	13.1	197	23.8	7	13.5	11.8	C
5854	18.7	211	23.8	7	13.5	11.8	A
5856	16.8	209	23.8	8	13.4	11.8	A
5858	13.4	219	23.8	8	13.4	11.8	A
5860	17.1	211	23.8	8	13.5	11.8	A
5862	16.7	212	23.9	8	13.7	11.8	A
5864	17.4	220	23.9	8	13.7	11.8	C
5866	18.3	216	24.0	8	13.5	11.8	E
5868	17.2	223	24.0	9	13.5	11.8	A
5870	19.6	234	24.0	8	13.5	11.8	A
5872	17.5	231	24.0	8	13.5	11.8	E
5874	16.0	217	24.0	8	13.5	11.8	A
5876	15.9	220	24.0	8	13.4	11.8	A
5878	15.8	227	23.9	8	13.3	11.8	A
5880	14.6	221	23.9	8	13.1	11.8	A
5882	12.3	218	23.8	8	13.1	11.8	A
5884			23.8	8	13.1	11.8	
5886	14.7	221	23.8	8	13.1	11.8	A
5888	17.6	223	23.8	8	13.1	11.8	A
5890	16.2	218	23.8	8	13.1	11.8	A
5892			23.8	8	13.1	11.8	
5894	19.2	212	23.8	8	13.1	11.8	A
5896	19.2	215	23.8	8	13.4	11.8	A
5898	18.8	219	23.8	8	13.7	11.8	A
5900	20.4	222	23.9	8	13.8	11.8	A
5902	23.0	221	23.9	8	13.8	11.8	A
5904	21.3	215	23.9	8	13.7	11.8	A
5906	20.6	214	23.9	8	13.5	11.8	A
5908	19.1	230	23.9	8	13.4	11.8	C
5910	18.0	232	24.0	8	13.3	11.8	C
5912	16.6	212	24.0	8	13.2	11.8	C
5914	18.4	203	24.0	8	13.1	11.8	A
5916	19.5	207	24.0	8	13.1	11.8	E
5918	15.8	212	24.0	9	13.3	11.8	A
5920	14.4	214	24.0	9	13.5	11.8	A
5922	13.4	221	24.0	10	13.8	11.7	A
5924	15.4	224	24.0	11	14.1	11.7	E
5926	16.0	224	24.0	11	14.2	11.6	E
5928	14.5	229	23.9	10	14.3	11.6	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
5930	15.2	214	23.8	8	14.5	11.6	E
5932	17.2	222	23.9	8	14.5	11.6	E
5934	15.8	226	24.0	9	14.5	11.6	E
5936	14.0	218	24.0	8	14.5	11.6	E
5938	13.5	236	23.9	8	14.5	11.6	A
5940	13.9	233	23.8	8	14.5	11.6	E
5942	11.2	222	23.9	7	14.5	11.6	E
5944	11.9	215	23.9	8	14.5	11.7	E
5946	11.8	228	24.0	8	14.5	11.7	A
5948			24.0	7	14.5	11.7	
5950	18.1	192	24.0	7	14.5	11.6	D
5952			24.0	8	14.5	11.6	
5954	17.5	223	24.0	7	14.5	11.6	B
5956	20.6	222	24.0	8	14.5	11.6	F
5958	19.5	218	24.0	9	14.5	11.6	F
5960	18.8	221	24.0	10	14.5	11.6	D
5962			24.0	10	14.5	11.6	
5964	19.1	231	24.1	9	14.5	11.6	D
5966	17.9	218	24.2	10	14.4	11.7	F
5968	17.5	227	24.1	11	14.4	11.7	D
5970	15.6	225	24.0	11	14.4	11.8	A
5972	13.5	231	24.0	9	14.4	11.8	A
5974	12.1	225	24.0	9	14.5	11.8	A
5976	14.0	225	24.0	9	14.4	11.8	A
5978	14.9	227	24.0	10	14.3	11.8	A
5980	23.6	211	24.0	10	14.2	11.7	C
5982	19.2	212	23.9	11	14.3	11.7	A
5984	16.8	221	23.8	12	14.4	11.9	A
5986	13.4	207	23.9	12	14.5	12.1	C
5988			24.0	11	14.5	11.9	
5990	15.2	248	24.0	10	14.5	11.8	C
5992	15.0	229	24.0	9	14.5	11.8	A
5994	18.8	217	24.0	9	14.5	11.8	E
5996	16.7	225	24.0	11	14.5	11.8	A
5998	13.7	228	24.0	11	14.5	11.8	A
6000	12.4	225	24.1	12	14.5	11.8	A
6002	16.6	219	24.2	11	14.4	11.8	A
6004	14.5	223	24.2	10	13.9	11.8	A
6006	20.1	228	24.2	9	13.6	11.8	C
6008	18.3	216	24.2	10	13.8	11.8	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6010	17.4	219	24.2	11	14.1	11.8	A
6012	17.4	219	24.2	11	14.2	11.8	A
6014	16.3	221	24.1	11	14.2	11.8	A
6016	15.7	220	24.0	11	14.3	11.8	A
6018	16.7	220	24.0	10	14.3	11.8	A
6020	17.3	226	23.9	11	14.4	11.8	A
6022	16.8	222	23.9	11	14.5	11.8	A
6024	16.6	215	23.9	11	14.5	11.8	A
6026	15.1	204	23.8	10	14.5	11.8	A
6028	14.7	205	23.8	10	14.5	11.9	A
6030	16.4	216	23.8	12	14.5	11.9	A
6032	16.6	215	23.8	12	14.5	11.9	A
6034	16.9	218	23.9	11	14.5	11.9	A
6036	14.8	214	24.0	11	14.5	11.8	A
6038	13.4	212	24.0	11	14.5	11.9	A
6040	16.5	212	24.0	10	14.5	12.0	A
6042	17.9	208	24.0	10	14.5	12.1	E
6044	14.4	215	24.0	10	14.5	12.0	A
6046	15.2	216	24.0	11	14.5	12.0	A
6048	16.6	216	24.0	11	14.5	11.9	A
6050	15.0	211	24.0	10	14.5	11.7	A
6052	14.0	213	24.0	10	14.4	11.7	A
6054	15.8	214	24.0	13	14.3	11.9	A
6056	15.5	219	24.0	13	14.3	11.9	A
6058	14.8	216	24.0	10	14.3	11.8	A
6060	16.7	214	24.0	10	14.2	11.8	A
6062	15.3	218	24.0	10	14.3	12.1	A
6064	13.2	225	24.0	10	14.4	12.3	C
6066	16.3	224	24.0	11	14.3	12.1	A
6068	16.0	221	24.0	12	14.3	11.8	A
6070	15.7	217	24.0	12	14.3	11.8	A
6072	13.5	222	24.1	11	14.2	11.8	A
6074	12.7	219	24.2	10	14.0	11.8	A
6076	14.4	216	24.2	11	13.9	11.8	A
6078	15.0	214	24.3	11	13.8	11.8	A
6080	18.6	225	24.3	11	13.9	11.8	A
6082	18.4	221	24.2	9	13.8	11.8	A
6084	17.3	214	24.2	9	13.6	11.8	A
6086	15.8	207	24.2	9	13.5	11.8	A
6088	14.5	230	24.2	9	13.5	11.8	E

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6090	21.1	211	24.2	10	13.5	11.8	C
6092	19.8	215	24.2	10	13.5	11.8	A
6094	18.7	213	24.1	9	13.7	11.8	A
6096	13.2	196	24.0	9	13.9	11.9	A
6098	18.3	205	24.0	8	14.1	12.0	A
6100	19.9	207	24.0	8	14.1	11.9	A
6102	22.1	210	24.0	8	14.0	11.8	A
6104	13.0	217	24.0	8	14.1	11.8	A
6106	18.0	217	24.0	9	14.2	11.8	C
6108	17.3	219	24.0	9	14.2	11.8	A
6110	15.7	217	24.0	9	14.2	11.8	A
6112	16.0	198	24.0	9	14.2	11.8	A
6114	19.0	213	24.0	9	14.2	11.8	A
6116	17.5	222	24.0	9	14.2	11.8	A
6118	14.8	214	24.0	8	14.2	11.8	A
6120	15.4	203	24.1	8	14.2	11.8	A
6122	16.2	205	24.2	9	14.2	11.8	A
6124	15.8	206	24.2	9	14.2	11.9	A
6126	14.8	220	24.2	10	14.2	12.0	A
6128			24.2	9	14.2	11.9	
6130	15.3	214	24.2	9	14.2	11.8	A
6132	15.0	214	24.2	9	14.1	11.8	A
6134	15.1	213	24.2	9	14.0	11.8	A
6136	16.6	224	24.2	8	14.0	11.8	E
6138	15.4	236	24.2	9	14.0	11.8	E
6140	13.6	236	24.2	9	14.0	11.8	A
6142	13.8	225	24.2	9	14.0	11.8	A
6144	13.1	217	24.2	10	13.9	11.8	A
6146	14.9	218	24.2	11	13.9	11.8	E
6148	14.7	215	24.2	11	14.0	11.8	A
6150	16.5	206	24.2	11	13.9	11.8	A
6152	15.7	212	24.2	11	13.9	11.8	A
6154	14.3	220	24.2	11	13.9	11.8	F
6156	17.0	168	24.1	10	13.7	11.8	F
6158	16.4	174	24.2	10	13.5	11.8	F
6160	16.4	170	24.2	10	13.5	11.8	D
6162	15.5	175	24.2	11	13.4	11.9	D
6164	10.1	176	24.2	11	13.2	11.8	D
6166	13.3	189	24.2	11	13.1	11.8	D
6168	12.5	243	24.2	10	13.1	11.8	D

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST=A
6170	4.9	211	24.2	10	13.1	11.8	D
6172	4.1	169	24.2	11	13.1	11.8	B
6174	14.1	211	24.2	10	13.1	11.8	A
6176	13.9	211	24.2	10	13.1	11.8	A
6178	16.2	210	24.2	10	13.1	11.8	A
6180	16.3	208	24.2	9	13.1	11.8	A
6182	9.5	153	24.2	10	13.1	11.8	F
6184	13.7	161	24.2	10	13.1	11.8	D
6186	14.2	161	24.2	10	13.1	11.8	B
6188	17.6	221	24.2	10	13.1	11.8	D
6190	12.8	227	24.2	11	13.1	11.8	D
6192	14.0	182	24.2	11	13.1	11.8	B
6194	13.9	207	24.2	10	13.1	11.8	B
6196	14.8	206	24.2	10	13.1	11.8	D
6198	15.3	205	24.2	10	13.1	11.8	A
6200	14.7	207	24.2	11	13.1	11.8	A
6202	16.4	206	24.2	11	13.1	11.8	A
6204	16.7	206	24.2	11	13.1	11.8	A
6206	13.3	207	24.2	11	13.1	11.8	A
6208	5.4	213	24.2	10	13.1	11.8	E
6210	3.0	173	24.2	10	13.2	11.8	C
6212	3.4	174	24.2	11	13.2	11.8	C
6214	12.0	189	24.2	11	13.2	11.8	C
6216	13.8	221	24.3	11	13.2	11.8	A
6218	13.3	222	24.4	11	13.1	11.8	B
6220	11.1	198	24.4	11	13.1	11.8	F
6222	9.6	193	24.3	10	13.1	11.8	D
6224			24.2	10	13.1	11.8	
6226			24.2	9	13.1	11.8	
6228	13.8	207	24.2	9	13.1	11.8	F
6230	12.2	238	24.3	10	13.1	11.8	D
6232			24.4	9	13.1	11.8	
6234	12.4	247	24.4	9	13.1	11.8	D
6236	5.9	191	24.4	10	13.1	11.8	D
6238	9.7	238	24.3	9	13.1	11.8	D
6240	14.3	225	24.3	8	13.1	11.8	D
6242	17.9	226	24.3	8	13.1	11.8	B
6244	12.9	231	24.3	9	13.1	11.8	B
6246	10.5	238	24.4	10	13.1	11.8	F
6248			24.4	9	13.1	11.8	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6250	3.4	331	24.3	9	13.1	11.8	D
6252	9.5	253	24.3	9	13.0	11.8	B
6254	10.2	247	24.4	9	13.0	11.8	F
6256			24.4	9	13.0	11.8	
6258			24.3	9	13.1	11.8	
6260	23.0	195	24.2	9	13.1	11.8	A
6262	23.0	197	24.2	8	13.1	11.8	A
6264	22.8	201	24.2	8	13.1	11.8	A
6266	17.3	203	24.2	8	12.9	11.8	A
6268	14.3	204	24.2	8	12.7	11.8	A
6270	22.9	179	24.2	6	12.7	11.8	C
6272			24.2	6	12.7	11.8	
6274	21.2	177	24.3	6	12.7	11.8	C
6276	29.3	191	24.3	6	12.7	11.8	C
6278	14.8	187	24.3	6	12.7	11.8	B
6280	15.6	181	24.2	6	12.8	11.8	B
6282	13.9	175	24.2	6	12.8	11.8	B
6284			24.2	6	12.7	11.8	
6286			24.2	6	12.8	11.8	
6288			24.2	6	12.9	11.8	
6290			24.2	8	12.9	11.8	
6292			24.2	9	13.1	11.8	
6294			24.2	9	13.1	11.8	
6296	17.5	169	24.2	9	13.1	11.8	D
6298	13.9	203	24.3	9	13.2	11.8	A
6300	15.3	203	24.4	8	13.3	11.8	A
6302	14.6	201	24.4	7	13.2	11.8	A
6304	15.2	206	24.4	7	13.1	11.8	A
6306	17.3	214	24.4	9	13.1	11.8	A
6308			24.4	10	13.1	11.8	
6310	21.4	225	24.4	9	13.1	11.8	C
6312	16.2	218	24.4	9	13.1	11.8	A
6314	15.7	217	24.4	8	13.1	11.8	A
6316	13.5	214	24.4	8	13.1	11.8	A
6318	13.8	207	24.4	8	13.1	11.8	A
6320	15.8	202	24.4	9	13.1	11.8	A
6322	16.9	200	24.4	9	13.1	11.8	A
6324	14.7	205	24.4	9	13.1	11.8	A
6326	14.7	211	24.4	8	13.1	11.8	B
6328	16.4	208	24.4	8	13.1	11.8	F

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6330	17.0	202	24.4	8	13.1	11.8	F
6332	18.5	209	24.4	8	13.1	11.8	D
6334			24.4	7	13.1	11.8	
6336			24.4	7	13.1	11.8	
6338	16.8	195	24.5	8	13.1	11.8	B
6340	14.0	202	24.6	8	13.1	11.8	A
6342	13.4	200	24.6	8	13.1	11.8	A
6344	14.2	194	24.6	7	13.1	11.8	A
6346	15.9	210	24.6	8	13.1	11.8	C
6348	13.1	197	24.5	8	13.1	11.8	A
6350	12.0	193	24.5	8	13.1	11.8	A
6352	10.7	190	24.6	8	13.1	11.8	A
6354	9.8	203	24.6	8	13.1	11.8	A
6356	12.6	221	24.6	9	13.1	11.8	E
6358	13.7	211	24.6	9	13.1	11.8	A
6360	15.4	201	24.6	9	13.1	11.8	A
6362	14.7	202	24.6	9	13.1	11.8	A
6364	13.5	208	24.6	9	13.2	11.8	A
6366	12.5	209	24.6	9	13.3	11.8	A
6368	7.4	225	24.6	10	13.4	11.8	A
6370	13.2	196	24.6	10	13.5	11.8	A
6372	13.2	202	24.6	11	13.5	11.9	A
6374	12.9	196	24.6	11	13.4	12.0	A
6376	12.4	188	24.6	11	13.3	11.8	A
6378	15.7	202	24.6	11	13.1	11.8	E
6380	13.6	209	24.6	11	13.1	11.8	E
6382	8.8	211	24.6	10	13.1	11.8	E
6384	10.9	205	24.6	10	13.1	11.8	E
6386	11.7	206	24.6	10	13.1	11.8	E
6388	12.6	179	24.6	10	13.1	11.8	C
6390	12.6	180	24.6	10	13.2	11.8	C
6392	15.7	191	24.6	10	13.2	11.8	A
6394	15.6	196	24.6	10	13.2	11.8	A
6396	14.8	201	24.6	10	13.2	11.8	A
6398	14.9	193	24.6	11	13.2	11.8	A
6400	20.8	201	24.6	12	13.1	11.8	E
6402			24.6	11	13.1	11.8	
6404			24.7	10	13.1	11.8	
6406			24.8	10	13.1	11.8	
6408			24.8	11	13.1	11.8	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6410			24.8	11	13.1	11.8	
6412			24.8	11	13.1	11.8	
6414			24.8	10	13.1	11.8	
6416			24.8	10	13.1	11.8	
6418			24.8	10	13.1	11.8	
6420			24.8	11	13.1	11.8	
6422			24.8	11	13.1	11.8	
6424	12.8	195	24.8	11	13.1	11.8	D
6426	6.2	211	24.8	11	13.1	11.8	D
6428	9.1	222	24.8	11	13.1	11.8	B
6430	9.4	203	24.8	10	13.1	11.8	B
6432	13.2	183	24.8	10	13.1	11.8	F
6434			24.8	10	13.1	11.8	
6436			24.8	10	13.1	11.8	
6438			24.8	10	13.1	11.8	
6440			24.8	11	13.1	11.8	
6442			24.8	11	13.1	11.8	
6444	8.3	255	24.8	10	13.1	11.8	A
6446	14.7	267	24.8	10	13.1	11.8	C
6448	11.5	185	24.8	11	13.1	11.8	A
6450	8.8	201	24.8	10	13.1	11.8	A
6452	10.4	211	24.8	10	13.1	11.8	A
6454	15.4	248	24.8	11	13.1	11.8	A
6456	13.5	249	24.8	11	13.1	11.8	A
6458	13.9	240	24.8	11	13.1	11.8	A
6460	13.9	234	24.8	11	13.1	11.8	C
6462	16.6	249	24.8	11	13.1	11.8	C
6464	10.5	283	24.8	11	13.1	11.8	D
6466	7.1	249	24.8	11	13.1	11.8	B
6468	6.6	253	24.8	9	13.1	11.8	B
6470	10.4	206	24.9	8	13.1	11.8	B
6472	13.4	190	24.9	9	13.1	11.8	B
6474	13.5	255	25.0	10	13.0	11.8	D
6476	2.7	290	25.0	10	12.8	11.8	D
6478	2.6	248	25.0	11	12.7	11.8	D
6480			25.0	11	12.7	11.8	
6482	11.5	177	25.0	10	12.7	11.8	D
6484	0.3	44	25.0	10	12.7	11.8	C
6486	11.1	37	25.0	10	12.7	11.8	C
6488	2.6	179	25.0	10	12.7	11.8	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6490			25.0	9	12.7	11.8	
6492			25.0	9	12.7	11.8	
6494	5.5	146	25.0	9	12.7	11.8	A
6496	5.7	142	25.0	8	12.8	11.8	A
6498			25.0	7	13.0	12.0	
6500	6.6	186	25.0	8	12.8	12.0	C
6502	4.3	195	25.0	10	12.4	11.8	C
6504	25.5	205	25.0	10	12.3	11.8	D
6506	32.0	212	25.0	10	12.3	11.7	D
6508	19.0	310	25.0	9	12.3	11.7	D
6510	15.0	223	25.0	9	12.3	11.8	B
6512	35.5	219	25.0	9	12.4	11.8	D
6514	34.8	211	25.0	10	12.5	11.8	B
6516	35.6	215	25.0	10	12.7	11.8	D
6518			25.0	10	12.7	11.8	
6520			25.0	9	12.7	11.8	
6522	6.2	229	25.0	9	12.7	11.8	D
6524			25.0	9	12.7	11.8	
6526	27.4	195	25.0	9	12.8	11.8	A
6528	28.8	194	25.0	10	13.0	11.8	A
6530	23.2	190	25.0	11	13.3	11.8	A
6532	23.0	188	24.9	11	13.5	11.8	A
6534			24.8	11	13.7	11.7	
6536	18.6	201	24.7	12	14.0	11.8	A
6538	17.8	201	24.6	11	14.3	11.9	A
6540	25.8	198	24.6	10	14.3	11.9	C
6542			24.6	10	14.3	11.8	
6544	4.5	216	24.6	10	14.3	11.8	C
6546	11.5	242	24.6	10	14.4	11.8	A
6548	15.9	235	24.6	9	14.5	11.8	A
6550	12.5	251	24.6	9	14.5	11.7	A
6552	12.4	233	24.6	9	14.4	11.7	A
6554	7.0	222	24.7	9	14.3	11.9	A
6556	13.0	231	24.7	9	14.3	11.9	A
6558			24.6	9	14.3	11.5	
6560	17.3	180	24.6	9	14.4	11.3	C
6562	3.4	172	24.6	9	14.4	11.3	C
6564	19.2	200	24.6	9	14.4	11.3	A
6566	17.4	214	24.6	9	14.3	11.2	E
6568	11.3	195	24.5	9	14.4	11.2	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6570	16.5	172	24.5	9	14.5	11.2	C
6572	21.4	184	24.5	9	14.5	11.2	A
6574	20.8	198	24.5	10	14.5	11.2	C
6576	17.9	210	24.4	10	14.5	11.2	A
6578	17.9	208	24.4	10	14.5	11.2	A
6580	20.9	174	24.4	11	14.5	11.3	C
6582	21.9	187	24.4	11	14.4	11.4	A
6584	21.7	194	24.4	11	14.4	11.3	D
6586	21.1	187	24.3	11	14.5	11.2	D
6588	21.1	176	24.2	12	14.5	11.2	D
6590			24.2	11	14.5	11.3	
6592	19.7	176	24.2	8	14.4	11.6	B
6594	28.7	200	24.2	5	14.4	12.1	D
6596	21.4	174	24.1	7	14.4	11.9	B
6598	21.0	181	24.0	10	14.5	11.4	B
6600	21.4	173	24.1	11	14.5	11.3	D
6602	21.8	194	24.1	11	14.5	11.2	D
6604			24.0	11	14.5	11.3	
6606			24.1	9	14.4	11.6	
6608			24.1	7	14.3	12.0	
6610			24.1	7	14.4	12.2	
6612			24.0	8	14.4	12.1	
6614			24.0	9	14.4	12.0	
6616			23.9	7	14.3	12.0	
6618			23.8	8	14.3	12.0	
6620			23.8	10	14.4	11.7	
6622			23.8	10	14.4	11.6	
6624			23.8	10	14.4	11.5	
6626	22.3	183	23.8	9	14.4	11.7	D
6628			23.7	8	14.4	11.8	
6630	20.3	178	23.6	8	14.3	11.8	B
6632	20.3	174	23.6	8	14.3	11.8	B
6634	21.7	180	23.6	7	14.5	11.8	D
6636			23.6	7	14.5	11.8	
6638			23.6	8	14.4	11.7	
6640			23.6	8	14.3	11.7	
6642			23.5	9	14.3	11.7	
6644	21.0	193	23.4	10	14.4	11.7	D
6646			23.4	11	14.3	11.6	
6648			23.4	12	14.3	11.6	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6650	6.4	183	23.4	11	14.3	11.7	D
6652	5.2	180	23.4	10	14.4	11.8	B
6654	6.4	172	23.4	9	14.3	12.0	D
6656	22.1	185	23.4	9	14.3	12.0	D
6658			23.4	9	14.3	12.2	
6660	20.3	181	23.4	13	14.4	12.3	B
6662	18.0	186	23.4	15	14.3	12.3	D
6664	18.1	213	23.3	13	14.3	12.3	D
6666	15.3	237	23.2	13	14.3	12.3	D
6668	15.7	232	23.2	15	14.3	12.3	D
6670			23.2	17	14.3	12.3	
6672			23.2	16	14.2	12.3	
6674	17.1	227	23.2	16	14.2	12.3	B
6676	16.7	229	23.2	17	14.2	12.3	B
6678			23.2	17	14.3	12.3	
6680	18.5	237	23.2	15	14.3	12.3	D
6682	15.7	225	23.2	15	14.3	12.3	D
6684	19.0	195	23.1	17	14.3	12.3	C
6686			23.1	14	14.2	12.3	
6688			23.2	13	14.2	12.3	
6690	17.1	218	23.2	12	14.2	12.3	E
6692			23.2	10	14.2	12.3	
6694	19.5	203	23.2	13	13.7	12.1	A
6696	19.0	206	23.1	14	13.0	11.9	A
6698	18.9	210	23.0	15	12.7	11.8	A
6700	14.1	204	23.0	16	12.7	11.8	A
6702	13.1	196	23.0	12	12.7	11.8	A
6704	14.6	201	22.9	9	12.7	11.8	A
6706	15.8	199	22.7	9	12.9	11.8	A
6708	15.9	205	22.7	12	13.0	11.8	A
6710	15.8	209	22.6	15	13.1	11.8	A
6712	17.5	208	22.6	15	13.1	11.8	A
6714	18.6	204	22.6	12	13.1	11.8	A
6716	17.5	203	22.5	12	13.2	11.8	A
6718	19.0	207	22.4	14	13.2	11.8	A
6720	19.1	208	22.3	15	13.5	11.8	A
6722	18.6	205	22.2	13	14.1	11.9	A
6724	18.3	205	22.2	10	14.4	11.9	A
6726	20.7	212	22.1	10	14.5	11.9	A
6728	21.6	205	22.1	11	14.5	11.9	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6730			22.0	13	14.5	11.9	
6732	17.7	199	22.1	17	14.5	11.9	A
6734	19.9	199	22.2	18	14.5	11.8	A
6736	19.0	193	22.2	17	14.5	11.8	A
6738	20.0	194	22.2	16	14.5	12.1	A
6740	16.8	214	22.2	17	14.4	12.2	A
6742			22.2	16	14.3	12.2	
6744	18.6	207	22.2	10	14.4	12.3	C
6746	19.9	179	22.1	8	14.5	12.3	C
6748			22.0	9	14.4	12.3	
6750	11.9	178	22.0	12	14.3	12.3	A
6752	11.3	186	22.0	11	14.3	12.3	A
6754	10.9	189	22.0	9	14.4	12.3	A
6756	12.5	191	22.0	11	14.3	12.2	A
6758	10.0	199	22.0	11	14.2	12.0	A
6760	13.6	205	22.0	11	14.2	11.9	E
6762	11.7	198	22.0	12	14.2	12.1	A
6764	14.3	194	22.0	10	14.2	12.0	A
6766	16.6	197	22.0	9	14.2	12.0	A
6768	18.3	200	22.0	9	13.9	12.0	A
6770	17.7	205	22.0	11	13.0	11.8	A
6772			22.0	10	12.9	11.9	
6774			22.0	12	12.9	11.9	
6776	24.0	200	22.0	16	12.4	11.8	C
6778	14.1	220	21.9	13	12.3	11.8	A
6780	11.0	209	21.8	9	12.3	11.8	E
6782	13.8	202	21.8	8	12.3	11.8	E
6784	15.1	198	21.8	9	12.4	11.8	E
6786			21.8	9	12.6	11.8	
6788	12.5	161	21.8	13	12.7	11.8	D
6790			21.8	16	12.7	11.8	
6792			21.8	14	12.6	11.8	
6794			21.8	15	12.5	11.8	
6796	15.9	201	21.8	15	12.5	11.8	D
6798	10.9	186	21.8	14	12.5	11.7	B
6800	9.5	182	21.8	14	12.5	11.7	D
6802	10.6	184	21.8	16	12.5	11.8	D
6804	16.2	169	21.8	10	12.4	11.8	B
6806	26.7	174	21.8	8	12.7	11.8	D
6808			21.8	14	12.7	11.8	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6810	20.5	194	21.8	15	12.3	11.8	B
6812	22.5	198	21.8	14	12.2	11.7	B
6814	34.6	215	21.8	14	12.0	11.7	F
6816	24.1	204	21.8	14	12.0	11.7	D
6818	21.7	186	21.8	13	12.0	11.7	B
6820	21.1	177	21.8	14	12.0	11.7	D
6822			21.8	14	12.0	11.7	
6824			21.8	13	12.0	11.7	
6826	19.7	206	21.8	12	11.9	11.6	A
6828	19.2	198	21.8	14	11.9	11.6	A
6830	13.8	194	21.8	14	12.1	11.7	A
6832	15.1	192	21.8	13	12.4	11.7	A
6834	21.7	212	21.8	13	12.3	11.7	A
6836	18.3	211	21.8	13	12.0	11.6	A
6838	19.2	198	21.8	8	11.9	11.6	A
6840	20.2	187	21.8	360	11.7	11.5	A
6842	13.6	180	21.8	360	11.6	11.5	A
6844	14.5	170	21.8	4	11.6	11.6	A
6846	13.6	182	21.8	6	11.6	11.7	A
6848	14.9	192	21.7	7	11.6	11.7	A
6850	16.2	197	21.6	8	12.2	12.0	A
6852	16.1	200	21.6	6	12.5	12.3	A
6854	16.4	198	21.6	5	12.6	12.3	A
6856	17.5	198	21.6	5	13.0	12.3	B
6858	19.4	200	21.6	7	13.2	12.3	B
6860			21.6	9	13.1	12.3	
6862	20.6	193	21.6	8	13.2	12.3	B
6864	22.1	188	21.6	7	13.1	12.3	B
6866			21.6	7	12.9	12.3	
6868	31.5	204	21.7	8	12.7	12.3	D
6870	22.1	197	21.8	8	12.6	12.3	D
6872	22.5	198	21.8	8	12.6	12.3	D
6874			21.8	8	12.8	12.3	
6876	19.0	200	21.7	8	13.0	12.3	D
6878			21.7	8	13.1	12.3	
6880	15.9	237	21.8	8	13.1	12.3	D
6882			21.8	8	13.1	12.3	
6884	8.5	170	21.8	8	13.0	12.3	D
6886			21.8	8	12.6	12.3	
6888	17.2	202	21.7	10	12.1	12.3	B

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6890	17.6	191	21.6	11	13.0	12.3	D
6892	17.9	188	21.6	9	14.1	12.3	D
6894	21.7	72	21.6	10	14.5	12.3	B
6896	22.9	74	21.6	11	14.5	12.3	D
6898			21.6	8	14.5	12.3	
6900			21.6	6	14.4	12.3	
6902			21.7	7	14.4	12.3	
6904			21.8	9	14.5	12.3	
6906			21.8	9	14.4	12.3	
6908			21.7	8	14.4	12.3	
6910			21.6	6	14.4	12.3	
6912			21.6	8	14.4	12.3	
6914	28.2	133	21.6	8	14.2	12.3	D
6916	28.4	139	21.6	6	14.0	12.3	B
6918			21.6	5	13.5	12.3	
6920			21.6	3	13.2	12.3	
6922			21.6	1	13.3	12.3	
6924			21.6	2	13.9	12.3	
6926			21.6	2	14.4	12.3	
6928			21.6	0	13.9	12.3	
6930			21.5	1	13.3	12.2	
6932			21.5	5	13.6	12.2	
6934			21.4	8	13.7	12.3	
6936			21.4	7	13.7	12.3	
6938	8.0	177	21.4	4	13.8	12.3	D
6940	25.5	203	21.4	2	13.8	12.3	D
6942	21.8	191	21.3	2	13.6	12.3	D
6944	20.6	190	21.3	4	13.6	12.3	D
6946	22.3	210	21.4	7	13.8	12.3	D
6948	22.9	194	21.4	9	13.8	12.3	D
6950	22.8	193	21.4	9	13.7	12.3	D
6952			21.4	8	13.6	12.3	
6954	23.1	188	21.4	7	13.5	12.3	B
6956	22.7	189	21.4	8	13.1	12.3	D
6958	11.7	191	21.4	7	12.6	12.3	A
6960	13.8	202	21.5	10	12.1	12.3	A
6962	12.7	208	21.5	13	11.7	12.1	A
6964	13.5	200	21.5	12	11.9	12.1	A
6966	11.9	204	21.5	10	13.1	12.2	A
6968	17.4	194	21.6	8	13.2	12.2	E

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
6970	11.7	196	21.6	8	12.0	12.1	A
6972	11.1	194	21.5	7	11.6	12.1	A
6974	10.5	199	21.4	6	11.7	12.2	A
6976	14.6	202	21.4	4	12.0	12.3	A
6978	14.8	186	21.3	1	11.9	12.2	A
6980	13.1	189	21.2	2	12.2	12.2	A
6982	12.0	200	21.0	5	13.0	12.3	A
6984	16.5	212	20.9	5	13.5	12.3	C
6986	17.4	218	20.9	4	13.9	12.3	A
6988	14.8	230	21.1	3	14.1	12.3	C
6990	15.6	192	21.2	2	14.2	12.3	A
6992	16.4	239	21.2	2	14.1	12.3	C
6994	16.4	219	21.3	8	14.0	12.2	A
6996	16.4	220	21.4	16	13.2	12.0	A
6998	17.2	231	21.4	20	12.5	11.8	A
7000	16.0	215	21.4	17	12.5	11.8	A
7002	17.4	210	21.4	12	12.9	11.9	A
7004	17.2	207	21.3	15	13.6	12.1	A
7006	17.2	219	21.2	11	14.1	12.3	A
7008	14.8	210	21.0	4	14.1	12.3	A
7010			20.9	4	14.1	12.3	
7012	18.7	178	20.9	4	14.0	12.3	C
7014	21.0	195	21.0	6	13.6	12.3	A
7016	20.4	202	21.0	8	13.4	12.3	A
7018	21.8	212	21.0	10	13.4	12.3	C
7020	27.5	221	21.0	11	13.3	12.3	D
7022	32.6	212	21.0	9	13.4	12.3	B
7024	33.9	209	21.0	8	13.1	12.2	F
7026	33.8	224	21.0	7	12.7	12.2	D
7028	38.0	218	21.0	5	12.8	12.3	D
7030	23.8	131	21.0	4	12.8	12.3	B
7032	23.6	127	20.9	1	12.6	12.3	B
7034	24.0	125	21.0	1	12.8	12.3	B
7036	17.3	177	21.0	2	13.1	12.3	D
7038	21.7	178	20.9	2	13.0	12.3	B
7040	20.6	181	20.9	3	12.9	12.3	A
7042	22.0	181	21.0	4	13.0	12.3	C
7044	19.0	201	21.0	3	13.0	12.3	C
7046	16.4	199	21.0	5	13.1	12.3	A
7048	17.1	203	21.1	6	13.1	12.3	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
7050	9.9	214	21.1	7	13.1	12.3	C
7052	15.9	212	21.0	9	13.5	12.3	C
7054	18.6	214	21.1	9	13.7	12.3	A
7056	18.6	216	21.1	10	13.6	12.3	A
7058			21.2	8	13.6	12.3	
7060	18.1	194	21.2	5	13.7	12.3	C
7062	17.3	200	21.2	5	13.5	12.3	A
7064	17.6	199	21.2	4	13.3	12.3	A
7066	18.0	196	21.2	1	13.4	12.3	A
7068	18.3	195	21.2	0	13.5	12.3	A
7070	17.5	207	21.2	2	13.6	12.3	C
7072	18.1	185	21.2	2	13.8	12.3	A
7074	15.6	191	21.2	1	14.0	12.3	A
7076	15.3	198	21.2	4	13.5	12.3	A
7078	16.6	202	21.2	6	13.4	12.3	A
7080			21.2	5	13.8	12.3	
7082	16.2	201	21.2	5	13.7	12.3	C
7084	17.7	214	21.2	5	13.7	12.3	A
7086	16.5	200	21.2	4	13.4	12.3	A
7088	17.4	201	21.2	3	13.2	12.3	A
7090	16.1	180	21.2	5	13.1	12.3	A
7092	15.7	186	21.1	6	13.0	12.3	A
7094	19.2	212	21.0	7	13.0	12.3	A
7096	20.9	212	21.0	8	13.1	12.3	A
7098	11.9	214	21.0	7	13.1	12.3	A
7100	16.9	198	21.0	6	13.0	12.3	C
7102	20.8	201	21.0	3	12.9	12.3	C
7104			21.1	1	12.8	12.3	
7106	19.6	283	21.2	1	12.8	12.3	B
7108	19.6	279	21.2	2	12.9	12.3	B
7110	23.8	208	21.2	4	12.8	12.3	A
7112	24.1	211	21.2	4	12.6	12.3	A
7114	20.5	210	21.2	4	12.5	12.3	A
7116	21.8	211	21.2	6	12.5	12.3	A
7118	16.5	207	21.2	9	12.5	12.3	A
7120	14.8	211	21.2	10	12.6	12.3	A
7122	15.5	212	21.2	9	12.6	12.3	A
7124	18.2	213	21.2	10	12.6	12.3	A
7126	20.2	217	21.2	10	12.7	12.3	A
7128	22.1	223	21.2	9	12.7	12.3	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
7130	23.1	221	21.3	9	12.9	12.3	A
7132	23.0	215	21.4	8	13.0	12.3	A
7134	20.8	231	21.4	8	13.0	12.3	E
7136	25.8	225	21.4	8	13.0	12.3	C
7138	26.8	219	21.4	7	12.9	12.3	C
7140			21.4	7	13.0	12.3	
7142	32.6	234	21.4	7	13.1	12.3	A
7144	29.4	231	21.4	6	13.1	12.2	A
7146	25.2	231	21.4	6	13.0	12.2	A
7148	25.1	227	21.4	5	13.0	12.3	A
7150	27.2	215	21.4	3	13.3	12.3	A
7152	21.1	222	21.4	3	13.3	12.3	A
7154	9.6	201	21.4	3	12.9	12.3	A
7156	10.9	208	21.4	5	13.1	12.3	A
7158	14.8	282	21.4	6	13.9	12.3	C
7160	14.6	274	21.3	5	14.1	12.3	C
7162	8.8	303	21.2	6	13.6	12.3	C
7164	7.9	250	21.3	7	13.2	12.3	A
7166	8.1	252	21.3	7	13.1	12.3	A
7168	10.2	323	21.2	6	13.1	12.3	C
7170	3.4	302	21.2	6	13.0	12.3	A
7172	2.0	292	21.2	7	13.0	12.3	A
7174	2.9	23	21.2	7	13.1	12.3	A
7176	1.4	296	21.2	7	12.8	12.3	A
7178	5.3	254	21.1	8	12.7	12.3	A
7180	7.6	247	21.1	8	12.8	12.3	A
7182	11.7	172	21.1	8	12.7	12.4	F
7184			21.0	9	12.8	12.5	
7186	8.8	204	21.0	10	12.8	12.4	D
7188	11.7	203	21.0	9	12.6	12.4	B
7190	11.7	205	21.1	8	12.7	12.4	A
7192	12.5	207	21.2	7	12.9	12.4	A
7194	20.8	233	21.2	7	13.1	12.5	A
7196	22.1	237	21.2	8	13.2	12.6	C
7198	22.8	215	21.2	8	12.9	12.5	A
7200	24.9	209	21.2	7	12.8	12.4	A
7202	14.1	261	21.2	8	12.7	12.4	A
7204	16.1	263	21.3	7	12.7	12.4	C
7206	19.1	223	21.4	4	13.0	12.5	A
7208	17.4	215	21.4	5	12.8	12.5	A

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
7210	16.2	211	21.4	8	12.5	12.4	A
7212	17.3	210	21.4	7	12.3	12.4	A
7214	22.6	208	21.4	10	12.4	12.4	A
7216	23.5	210	21.4	12	12.5	12.4	A
7218	22.5	208	21.4	12	12.8	12.4	A
7220	22.3	206	21.4	13	13.0	12.4	A
7222	20.6	206	21.3	13	13.1	12.4	A
7224	20.2	209	21.2	14	13.2	12.4	A
7226	19.4	217	21.2	14	13.1	12.4	C
7228	12.6	214	21.3	13	13.1	12.4	C
7230	29.7	222	21.3	13	13.2	12.4	D
7232	25.9	223	21.4	12	13.4	12.4	B
7234	26.9	223	21.5	13	14.0	12.4	B
7236	54.0	196	21.6	12	13.7	12.4	B
7238	50.8	194	21.6	11	14.6	12.4	B
7240	37.3	197	21.6	9	14.7	12.4	D
7242	36.7	195	21.5	7	13.1	12.3	F
7244	52.3	187	21.4	8	13.3	12.4	B
7246	51.0	192	21.5	8	13.6	12.5	D
7248			21.6	7	13.7	12.6	
7250			21.5	7	13.2	12.5	
7252			21.5	5	13.0	12.4	
7254			21.5	6	12.4	12.1	
7256			21.5	8	12.1	11.9	
7258			21.5	4	13.7	12.6	
7260			21.5	5	14.4	12.9	
7262			21.4	7	14.5	12.7	
7264			21.4	9	14.5	12.7	
7266			21.4	11	14.2	12.7	
7268			21.4	11	13.8	12.6	
7270	12.0	223	21.4	9	13.4	12.6	D
7272	11.2	227	21.5	10	13.2	12.5	D
7274	13.9	221	21.5	7	13.6	12.6	D
7276	15.9	197	21.4	4	13.4	12.6	D
7278	8.3	215	21.4	4	12.6	12.5	B
7280	11.3	204	21.4	4	12.9	12.5	B
7282	10.2	210	21.4	3	13.1	12.5	D
7284			21.4	3	12.0	12.1	
7286			21.4	5	11.0	11.8	
7288			21.4	5	11.0	11.8	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
7290			21.4	8	10.9	11.8	
7292	5.1	66	21.4	9	10.8	11.8	C
7294	7.7	18	21.4	6	11.2	12.0	C
7296	4.7	31	21.3	6	11.4	12.1	C
7298	7.6	181	21.1	7	11.7	12.2	E
7300	3.3	165	20.8	7	11.3	12.1	A
7302	2.5	221	20.6	9	8.3	11.5	A
7304	8.8	196	20.3	8	5.5	10.1	E
7306	4.7	26	20.2	9	4.5	7.5	C
7308	6.5	47	20.2	10	4.5	6.4	C

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
7234	22.0	208	21.3	8	11.6	11.8	A
7236	23.3	207	21.3	9	11.6	11.8	A
7238	22.6	207	21.3	11	11.7	11.8	A
7240	22.6	205	21.4	11	11.7	11.8	A
7242	20.0	206	21.4	12	11.7	11.8	A
7244	20.0	209	21.4	13	11.7	11.8	A
7246	17.1	224	21.4	14	11.7	11.8	C
7248	16.2	226	21.4	13	11.7	11.8	C
7250	27.2	223	21.4	11	11.7	11.8	B
7252	29.4	222	21.5	9	11.8	11.8	B
7254	35.9	223	21.6	7	11.8	11.8	D
7256	49.6	192	21.6	3	11.7	11.8	D
7258	46.8	195	21.6	2	11.8	11.8	D
7260	45.7	195	21.6	4	11.7	11.8	D
7262	45.3	192	21.6	4	11.7	11.8	B
7264			21.5	6	11.7	11.8	
7266	21.5	206	21.4	6	11.8	11.8	D
7268	15.9	212	21.4	6	11.7	11.8	D
7270			21.4	6	11.7	11.8	
7272	5.2	213	21.4	7	11.5	11.8	D
7274			21.3	11	11.3	11.8	
7276	13.6	228	21.2	11	11.6	11.8	D
7278	16.9	254	21.3	9	11.9	11.9	D
7280	9.6	235	21.3	5	11.9	11.8	D
7282	11.8	198	21.3	2	11.9	11.8	D
7284	11.0	187	21.4	2	11.7	11.9	D
7286			21.4	3	11.7	11.9	
7288	10.7	229	21.4	3	11.7	11.9	B
7290	12.4	225	21.4	5	11.7	11.8	A
7292			21.4	5	11.6	11.8	
7294	16.1	217	21.5	5	11.6	11.8	A
7296	11.7	205	21.6	6	11.6	11.8	A
7298	12.5	207	21.6	7	11.6	11.8	A
7300	12.6	228	21.6	10	11.6	11.8	C
7302	14.8	236	21.6	13	11.1	11.8	C
7304	10.0	233	21.6	13	10.8	11.8	C
7306	13.4	242	21.6	12	11.1	11.8	C
7308			21.4	12	10.9	11.8	

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DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
7074	12.8	219	21.1	1	11.9	11.8	A
7076	17.5	239	21.0	3	11.9	11.8	A
7078	20.7	199	21.0	5	11.9	11.8	C
7080			21.0	7	11.8	11.8	
7082	16.9	233	21.0	8	11.8	11.8	A
7084	17.4	228	21.0	8	11.9	11.8	C
7086	14.5	218	20.9	6	11.8	11.8	C
7088	16.2	218	20.9	4	11.8	11.8	C
7090	13.4	194	21.0	3	11.7	11.8	C
7092	15.2	222	21.0	4	11.6	11.8	C
7094	14.4	201	21.0	4	11.6	11.8	A
7096	15.6	200	21.0	2	11.6	11.8	A
7098	17.4	201	21.1	360	11.6	11.8	A
7100	18.1	197	21.2	360	11.6	11.8	C
7102	18.4	221	21.2	1	11.6	11.8	C
7104	15.9	207	21.2	4	11.6	11.8	A
7106	16.5	206	21.2	7	11.6	11.8	A
7108	16.3	211	21.2	8	11.6	11.8	C
7110	18.2	199	21.2	9	11.6	11.8	A
7112	20.9	202	21.2	10	11.6	11.8	A
7114	21.5	205	21.2	12	11.6	11.8	A
7116	19.3	206	21.2	12	11.6	11.8	C
7118	20.9	202	21.2	11	11.7	11.8	A
7120	17.3	209	21.2	9	11.6	11.8	A
7122	19.2	205	21.2	6	11.6	11.8	A
7124	21.8	213	21.2	6	11.7	11.8	A
7126	4.3	314	21.3	6	11.7	11.8	B
7128	7.3	301	21.3	4	11.8	11.8	B
7130	24.7	209	21.2	3	11.9	11.8	A
7132	23.4	213	21.2	1	11.9	11.8	A
7134	18.3	203	21.2	0	11.9	11.8	A
7136	20.6	205	21.2	2	11.8	11.8	A
7138	16.6	199	21.2	3	11.7	11.8	A
7140	13.7	209	21.2	6	11.7	11.8	A
7142	15.0	214	21.1	8	11.7	11.8	A
7144	17.8	214	21.0	9	11.7	11.8	A
7146	19.8	216	21.0	10	11.6	11.8	A
7148	22.2	223	21.0	11	11.6	11.8	A
7150	26.7	233	21.0	10	11.6	11.8	A
7152	28.6	227	21.0	6	11.6	11.8	A

Schlumberger

DEPTH	FORMATION DIP	FORMATION DIP AZI.	BOREHOLE DEV.	BOREHOLE DEV. AZI.	BOREHOLE DIAM 1-3	BOREHOLE DIAM 2-4	QUAL. INDEX BEST =A
7154	11.6	281	21.0	5	11.6	11.8	B
7156	14.3	267	21.0	4	11.6	11.8	B
7158	25.1	213	21.1	2	11.7	11.8	C
7160	32.1	232	21.2	2	11.6	11.8	C
7162	33.5	231	21.2	3	11.6	11.8	A
7164			21.2	4	11.6	11.8	
7166			21.2	5	11.6	11.8	
7168	27.2	228	21.2	6	11.6	11.8	A
7170	29.4	222	21.2	6	11.6	11.8	A
7172			21.2	9	11.6	11.8	
7174	7.3	228	21.2	11	11.6	11.8	A
7176	8.2	244	21.2	13	11.6	11.8	A
7178	16.0	322	21.2	14	11.7	11.8	A
7180			21.2	13	11.7	11.8	
7182	8.7	276	21.2	13	11.7	11.8	A
7184	11.5	252	21.3	11	11.6	11.8	C
7186	8.4	336	21.4	9	11.6	11.8	C
7188	2.6	303	21.4	8	11.7	11.8	A
7190	2.1	254	21.4	6	11.8	11.8	A
7192	3.1	43	21.4	3	11.9	11.8	A
7194	5.7	228	21.4	3	11.9	11.8	A
7196	2.2	256	21.3	3	11.9	11.8	A
7198	5.3	252	21.2	3	11.9	11.8	A
7200	8.3	247	21.2	3	11.9	11.8	A
7202			21.2	3	12.0	11.8	
7204			21.2	5	11.9	11.8	
7206	7.4	212	21.2	6	11.8	11.8	A
7208	10.2	205	21.2	7	11.6	11.8	A
7210	11.2	209	21.2	8	11.7	11.8	A
7212	10.3	235	21.1	9	11.7	11.8	A
7214	15.1	214	21.1	10	11.7	11.8	D
7216	20.2	210	21.1	8	11.6	11.8	F
7218	21.3	209	21.2	6	11.6	11.8	F
7220	14.0	212	21.2	5	11.6	11.8	D
7222	16.7	220	21.2	4	11.6	11.8	D
7224			21.2	4	11.6	11.8	
7226	16.5	216	21.3	4	11.7	11.8	B
7228	12.2	209	21.4	4	11.6	11.8	D
7230	15.7	213	21.4	6	11.6	11.8	B
7232	19.1	213	21.4	7	11.6	11.8	B

Schlumberger

037-21892
Sec. 34-3N-16W

SOUTHERN CALIFORNIA GAS MISSION ADRIAN - 1B SUMMARY

DEPTH	DIP	DIP AZM	DEV	DEV AZM	DIAM 1-3	DIAM 2-4	QUAL
TOP 1028.0	48.0	26.	4.4	269.	18.0	16.6	*
BOTTOM 7308.0	6.5	47.	20.2	10.	4.5	6.4	C
TOP 7074.0	12.8	219.	21.1	1.	11.9	11.8	A
BOTTOM 7308.0	16.3	190.	21.4	12.	10.9	11.8	*

Schlumberger

Pw

Core Descriptions - Mission Adrian #1-B, Aliso Canyon

Cristensen Diamond core head with plastic inner bbl 7 5/8" core head. Core 3" diameter.

Core #1

Cored 7 5/8" hole from 7,353' to 7,379' (26'). Recovered 22' fine to medium grained soft sand.

7,375' - 7,379' (4') . No recovery.

Core #2

Cored 7 5/8" hole from 7,379' to 7,403' (24'). Recovered 23' fine to medium grained poorly sorted.

7,402' - 7,403' (1') No recovery.

Core #3

Cored 7 5/8" hole from 7,403' to 7,428' (25'). Recovered 23' silty fine grained sand.

7,426' - 7,428' (2'). No recovery.

Core #4

Cored 7 5/8" hole from 7,428' to 7,454' (26'). Recovered 26' silty fine to medium grained sand.

Core #5

Cored 7 5/8" hole from 7,454' to 7,464' (10'). Silty poorly sorted Brown sand.

Cored 7 5/8" hole from 7,464' to 7,467' (3'). Silty poorly sorted Brown sand and Quartz cobble.

Cored 7 5/8" hole from 7,467' to 7,470' (3'). Quartz cobble.

Core #6

Core 7 5/8" hole from 7,470' to 7,475' (5'). Quartz cobble.

Cored 7 5/8" hole from 7,475' to 7,477' (2'). Quartz cobble and Brown sand.

Cored 7 5/8" hole from 7,477' to 7,485' (7'). No recovery.

Core #7

Cored 7 5/8" hole from 7,485' to 7,486' (1'). Quartz cobble.

Cored 7 5/8" hole from 7,486' to 7,494' (8'). Fine grained Brown sand.

Cored 7 5/8" hole from 7,494' to 7,496' (2'). No recovery.

Core #8

Cored 7 5/8" hole from 7,496' to 7,507' (11'). Fine grained silty Brown sand.

Cored 7 5/8" hole from 7,507' to 7,508' (1'). Quartz cobble.

Cored 7 5/8" hole from 7,508' to 7,510' (2'). No recovery.

Core #9

Cored 7 5/8" hole from 7,587' to 7,589' (2'). Medium to coarse grained poorly sorted cemented sand.

Cored 7 5/8" hole from 7,589' to 7,600' (11'). Hard gray shale.

Cored 7 5/8" hole from 7,600' to 7,604' (4'). No recovery.

Core #10

Cored 7 5/8" hole from 7,604' to 7,624' (20'). Hard gray shale.

Cored 7 5/8" hole from 7,624' to 7,626' (2'). No recovery.

Core #11

Cored 7 5/8" hole from 7,626' to 7,656' (30'). Medium to coarse grained cemented sand. Some core samples bleeding oil.

All cores taken with Cristensen 7 5/8" Diamond core head with plastic inner sleeve - core diameter 3".

Cored a total of 226'. Recovered a total of 202' or 89% of interval cored.

GCA/jf

SOUTHERN CALIF. GAS CO.
WELL NO: MA-1B
ALISO CANYOU FIELD, CA.

SEC BEAR: N00 40E
ELEV: 1747'
JOB NO: D0722

FILE: F132-12 JULY 79
DECL: 16 E BALSIGER
EASTMAN SINGLE SHOT

VERTICAL SECTION CALCULATED IN PLANE OF PROPOSAL
DIRECTION: N 0 DEG. 40 MIN. E

RECORD OF SURVEY

ANGLE AVERAGING METHOD

Pw

SOUTHERN CALIF. GAS CO.
WELL NO: MA-1B
ALISO CANYOU FIELD, CA.

SEC BEAR: N00 40E
ELEV: 1747'
JOB NO: D0722

FILE: F132-12 JULY 79
DECL: 16 E BALSIGER
EASTMAN SINGLE SHOT

COMPUTATION
TIME 00:03:09
DATE 00--00

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	SUBSEA TVD FEET	RECTANGULAR COORDINATES FEET		DOGLEG SEVERITY DG/100FT
0.	0 0	0 0	0.	0.00	0.00	-1747.00	0.00	0.00	0.00
175.	1 0	N 89 0 W	175.	174.99	0.01	-1572.01	0.03 N	1.53 W	0.57
353.	2 15	S 65 0 W	178.	352.92	-1.10	-1394.08	1.02 S	6.46 W	0.80
445.	2 0	S 71 0 W	92.	444.86	-2.41	-1302.14	2.30 S	9.63 W	0.36
536.	1 0	S 89 0 W	91.	535.83	-2.85	-1211.17	2.71 S	11.97 W	1.20
597.	1 0	N 89 0 W	61.	596.82	-2.87	-1150.18	2.71 S	13.04 W	0.06
688.	1 30	S 70 0 W	91.	687.80	-3.22	-1059.20	3.04 S	15.00 W	0.74
779.	1 15	S 72 0 W	91.	778.77	-3.95	-968.23	3.75 S	17.06 W	0.28
871.	2 15	S 42 0 W	92.	870.73	-5.51	-876.27	5.28 S	19.42 W	1.44
967.	3 30	S 71 0 W	96.	966.61	-8.21	-780.39	7.94 S	23.43 W	1.96
1082.	4 0	S 83 0 W	115.	1081.36	-9.99	-665.64	9.63 S	30.76 W	0.81
1210.	5 45	S 74 0 W	128.	1208.90	-12.28	-538.10	11.80 S	41.42 W	1.49
1272.	6 15	S 80 0 W	62.	1270.56	-13.81	-476.44	13.26 S	47.73 W	1.29
1316.	5 30	S 71 0 W	44.	1314.33	-14.99	-432.67	14.39 S	52.09 W	2.69
1347.	4 30	S 58 0 W	31.	1345.21	-16.18	-401.79	15.55 S	54.53 W	4.86
1377.	3 15	S 56 0 W	30.	1375.14	-17.31	-371.86	16.65 S	56.23 W	4.19
1407.	3 0	S 31 0 W	30.	1405.10	-18.51	-341.90	17.84 S	57.36 W	4.58
1439.	3 0	S 4 0 E	32.	1437.05	-20.14	-309.95	19.47 S	57.75 W	5.64
1470.	4 0	S 12 0 E	31.	1467.99	-22.01	-279.01	21.34 S	57.49 W	3.58
1502.	2 45	S 18 0 E	32.	1499.94	-23.82	-247.06	23.16 S	57.00 W	4.05
1534.	1 45	S 3 0 W	32.	1531.91	-25.07	-215.09	24.41 S	56.84 W	4.00
1564.	1 30	S 41 0 E	30.	1561.90	-25.87	-185.10	25.21 S	56.56 W	4.13
1596.	2 15	S 64 0 E	32.	1593.88	-26.50	-153.12	25.85 S	55.73 W	3.28
1667.	3 45	S 66 0 E	71.	1664.79	-28.03	-82.21	27.42 S	52.36 W	2.12
1723.	6 0	S 59 0 E	56.	1720.58	-30.18	-26.42	29.62 S	48.14 W	4.15
1816.	6 15	S 56 0 E	93.	1813.05	-35.41	66.05	34.95 S	39.77 W	0.44
1909.	6 15	S 54 0 E	93.	1905.50	-41.12	158.50	40.76 S	31.48 W	0.23
1999.	6 30	S 54 0 E	90.	1994.94	-46.90	247.94	46.63 S	23.39 W	0.28
2093.	6 30	S 55 0 E	94.	2088.34	-52.98	341.34	52.81 S	14.73 W	0.12
2183.	6 15	S 53 0 E	90.	2177.78	-58.76	430.78	58.68 S	6.64 W	0.37

SOUTHERN CALIF. GAS CO.
WELL NO: MA-1B
ALISO CANYOU FIELD, CA.

SEC BEAR: N00 40E
ELEV: 1747'
JOB NO: D0722

FILE: F132-12 JULY 79
DECL: 16 E BALSIGER
EASTMAN SINGLE SHOT

COMPUTATION
TIME 00:03:09
DATE 00--00

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	SUBSEA TVD FEET	RECTANGULAR COORDINATES FEET		DOGLEG SEVERITY DG/100FT
2275.	6 15	S 55 0 E	92.	2269.24	-64.55	522.24	64.57 S	1.46 E	0.24
2366.	5 0	S 53 0 E	91.	2359.80	-69.71	612.80	69.81 S	8.67 E	1.39
2416.	4 45	S 81 0 E	50.	2409.62	-71.32	662.62	71.47 S	12.59 E	4.74
2447.	6 0	N 88 0 E	31.	2440.48	-71.47	693.48	71.65 S	15.48 E	5.21
2478.	6 30	N 77 0 E	31.	2471.30	-70.99	724.30	71.21 S	18.83 E	4.18
2510.	6 15	N 69 0 E	32.	2503.10	-69.91	756.10	70.17 S	22.23 E	2.88
2538.	6 15	N 61 0 E	28.	2530.93	-68.59	783.93	68.88 S	24.99 E	3.11
2570.	6 0	N 53 0 E	32.	2562.75	-66.70	815.75	67.02 S	27.85 E	2.78
2601.	6 15	N 44 0 E	31.	2593.57	-64.48	846.57	64.83 S	30.33 E	3.20
2631.	7 30	N 34 0 E	30.	2623.36	-61.66	876.36	62.04 S	32.59 E	5.75
2662.	7 45	N 26 0 E	31.	2654.08	-58.07	907.08	58.48 S	34.65 E	3.51
2693.	7 45	N 14 0 E	31.	2684.80	-54.13	937.80	54.55 S	36.08 E	5.21
2726.	9 0	N 4 0 E	33.	2717.45	-49.37	970.45	49.80 S	36.83 E	5.80
2813.	9 45	N 20 0 E	87.	2803.29	-35.48	1056.29	35.94 S	39.78 E	3.11
2843.	9 15	N 21 0 E	30.	2832.87	-30.82	1085.87	31.30 S	41.51 E	1.76
2896.	9 0	N 11 0 E	53.	2885.20	-22.71	1138.20	23.22 S	43.83 E	3.03
2926.	8 45	N 0 0 E	30.	2914.84	-18.10	1167.84	18.62 S	44.27 E	5.71
2958.	10 0	N 0 0 E	32.	2946.42	-12.89	1199.42	13.40 S	44.27 E	3.91
2978.	11 0	N 11 0 W	20.	2966.08	-9.26	1219.08	9.78 S	43.92 E	11.18
3182.	13 15	N 4 0 E	204.	3165.53	33.47	1418.53	32.99 N	41.31 E	1.89
3272.	14 45	N 5 0 E	90.	3252.86	55.20	1505.86	54.70 N	43.01 E	1.69
3396.	16 45	N 4 0 E	124.	3372.20	88.78	1625.20	88.25 N	45.66 E	1.63
3524.	18 45	N 2 0 E	128.	3494.11	127.77	1747.11	127.22 N	47.70 E	1.63
3649.	20 45	N 1 0 E	125.	3611.76	170.00	1864.76	169.45 N	48.80 E	1.62
3772.	23 0	N 1 0 E	123.	3725.90	215.83	1978.90	215.27 N	49.60 E	1.83
3871.	22 15	N 2 0 E	99.	3817.28	253.91	2070.28	253.34 N	50.60 E	0.85
3962.	21 45	N 4 0 E	91.	3901.66	287.97	2154.66	287.38 N	52.38 E	0.99
4087.	21 15	N 4 0 E	125.	4017.96	333.71	2270.96	333.08 N	55.58 E	0.40
4212.	20 45	N 6 0 E	125.	4134.66	378.38	2387.66	377.71 N	59.48 E	0.70
4303.	22 0	N 8 0 E	91.	4219.40	411.34	2472.40	410.63 N	63.53 E	1.59

SOUTHERN CALIF. GAS CO.
WELL NO: MA-1B
ALISO CANYOU FIELD, CA.

SEC BEAR: N00 40E
ELEV: 1747'
JOB NO: D0722

FILE: F132-12 JULY 79
DECL: 16 E BALSIGER
EASTMAN SINGLE SHOT

COMPUTATION
TIME 00:03:09
DATE 00--00

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	SUBSEA TVD FEET	RECTANGULAR COORDINATES FEET		DOGLEG SEVERITY DG/100FT
4395.	24 30	N 8 0 E	92.	4303.92	447.36	2556.92	446.59 N	68.58 E	2.72
4520.	25 30	N 8 0 E	125.	4417.21	499.76	2670.21	498.91 N	75.93 E	0.80
4549.	26 0	N 7 0 E	29.	4443.33	512.26	2696.33	511.40 N	77.58 E	2.28
4643.	25 45	N 4 0 E	94.	4527.91	553.14	2780.91	552.23 N	81.51 E	1.42
4737.	25 45	N 5 0 E	94.	4612.58	593.89	2865.58	592.94 N	84.71 E	0.46
4830.	26 0	N 5 0 E	93.	4696.25	634.36	2949.25	633.37 N	88.25 E	0.27
4924.	25 45	N 6 0 E	94.	4780.83	675.23	3033.83	674.21 N	92.18 E	0.54
4979.	24 30	N 3 30 E	55.	4830.62	698.53	3083.62	697.48 N	94.12 E	2.98
5009.	24 0	N 1 30 E	30.	4857.98	710.84	3110.98	709.79 N	94.65 E	3.21
5039.	23 30	N 1 45 W	30.	4885.44	722.92	3138.44	721.87 N	94.63 E	4.67
5115.	23 15	N 6 0 W	76.	4955.20	752.98	3208.20	751.96 N	92.59 E	2.24
5209.	23 0	N 6 0 W	94.	5041.65	789.65	3294.65	788.67 N	88.73 E	0.27
5306.	22 45	N 5 30 W	97.	5131.02	827.12	3384.02	826.19 N	84.95 E	0.33
5395.	23 0	N 6 0 W	89.	5213.02	861.50	3466.02	860.61 N	81.49 E	0.36
5520.	23 0	N 5 0 W	125.	5328.08	910.06	3581.08	909.23 N	76.81 E	0.31
5612.	22 45	N 5 30 W	92.	5412.85	945.63	3665.85	944.84 N	73.53 E	0.34
5673.	23 0	N 5 30 W	61.	5469.05	969.21	3722.05	968.44 N	71.26 E	0.41
5795.	23 15	N 5 0 W	122.	5581.25	1016.86	3834.25	1016.15 N	66.88 E	0.26
5953.	23 0	N 5 0 W	158.	5726.55	1078.61	3979.55	1077.97 N	61.47 E	0.16
6081.	23 15	N 4 30 W	128.	5844.27	1128.66	4097.27	1128.07 N	57.31 E	0.25
6205.	23 15	N 5 30 W	124.	5958.20	1177.37	4211.20	1176.83 N	53.04 E	0.32
6329.	23 30	N 4 0 W	124.	6072.02	1226.35	4325.02	1225.86 N	48.97 E	0.52
6452.	24 0	N 4 30 W	123.	6184.60	1275.70	4437.60	1275.26 N	45.29 E	0.44
6515.	24 15	N 4 0 W	63.	6242.10	1301.36	4495.10	1300.94 N	43.39 E	0.51
6550.	24 15	N 4 0 W	35.	6274.01	1315.68	4527.01	1315.28 N	42.38 E	0.00
6643.	22 45	N 4 0 W	93.	6359.30	1352.64	4612.30	1352.27 N	39.80 E	1.61
6706.	22 0	N 4 0 W	63.	6417.56	1376.55	4670.56	1376.20 N	38.12 E	1.19
6765.	21 15	N 4 0 W	59.	6472.40	1398.22	4725.40	1397.89 N	36.61 E	1.27
6828.	21 0	N 4 0 W	63.	6531.17	1420.85	4784.17	1420.54 N	35.02 E	0.40
6925.	21 15	N 4 0 W	97.	6621.65	1455.69	4874.65	1455.41 N	32.58 E	0.26

SOUTHERN CALIF. GAS CO.
WELL NO: MA-1B
ALISO CANYOU FIELD, CA.

SEC BEAR: N00 40E
ELEV: 1747'
JOB NO: D0722

FILE: F132-12 JULY 79
DECL: 16 E BALSIGER
EASTMAN SINGLE SHOT

COMPUTATION
TIME 00:03:09
DATE 00--00

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	SUBSEA TVD FEET	RECTANGULAR COORDINATES FEET		DOGLEG SEVERITY DG/100FT
7017.	20 45	N 3 30 W	92.	6707.54	1488.56	4960.54	1488.31 N	30.43 E	0.58
7109.	20 30	N 4 0 W	92.	6793.64	1520.87	5046.64	1520.65 N	28.31 E	0.33
7232.	20 30	N 1 0 W	123.	6908.85	1563.88	5161.85	1563.68 N	26.43 E	0.85
7322.	21 0	N 1 0 W	90.	6993.02	1595.76	5246.02	1595.56 N	25.87 E	0.56
7716.	21 0	N 1 0 W	394.	7360.85	1736.89	5613.85	1736.74 N	23.41 E	0.00

STATION AT 7716' WAS PROJECTED

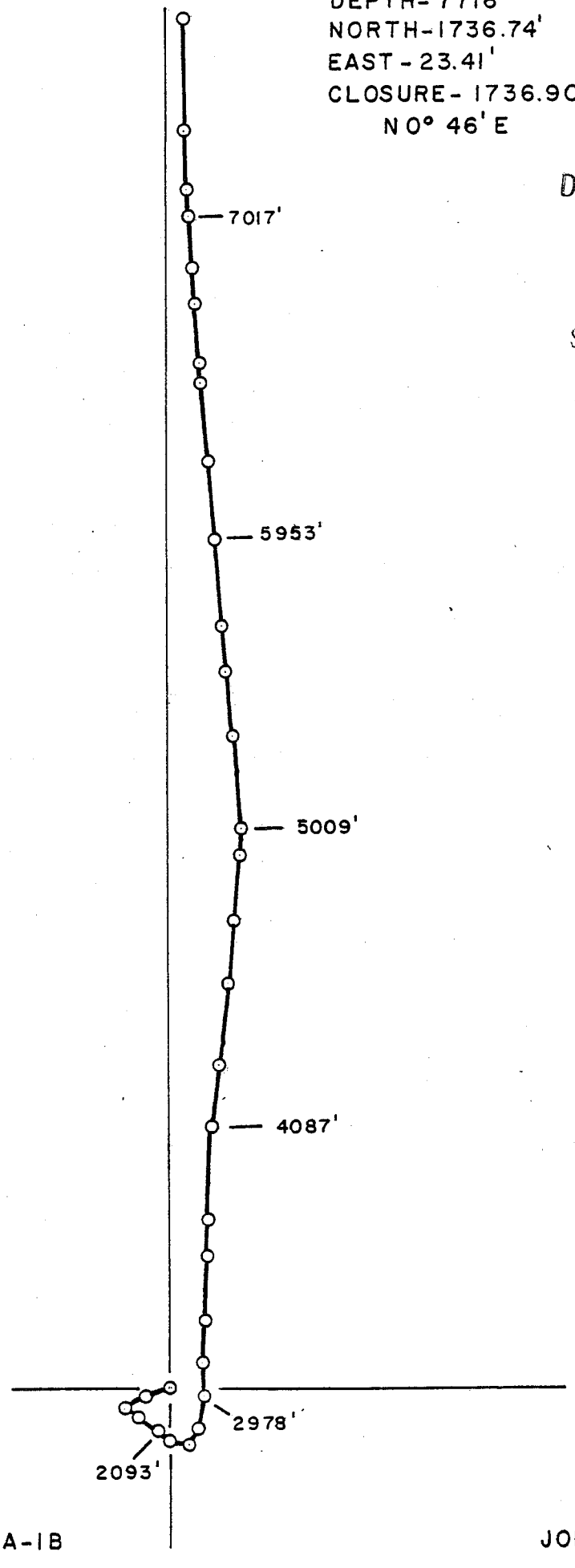
FINAL CLOSURE - DIRECTION: N 0 DEGS 46 MINS E
DISTANCE: 1736.90 FEET

DEPTH- 7716'
NORTH-1736.74'
EAST - 23.41'
CLOSURE- 1736.90'
N 0° 46' E

DIVISION OF OIL AND GAS
RECEIVED
FEB 22 1980
SANTA PAULA, CALIFORNIA

Decl. 16°E

1"=400'



WELL No. MA-1B

JOB No. D0722

Form 136

037-21892
Sec 34-3-16

MEMORANDUM OF TELEPHONE OR PERSONAL CONVERSATION

Santa Paula, Calif.

Sept. 12, 1979

Operator Southern California Gas Co. Well No. "SFZU" MA-1/B

Field Aliso Canyon Sec. 34 T. 3N R. 16W S.B.B&M

~~personal~~

A telephone conversation was held, concerning above well, with Mr. P.S. Magruder, Jr. Superintendent for above operator on September 12, 1979 at 9:30 A.M.

Details of the conversation were as follows:

SUBJECT: Blowout at gas storage well

DATE: Sept. 9, 1979, from 3:25 p.m. to 5:30 p.m.

PERSONS INJURED: None

PROPERTY DAMAGE: None

CONDITION OF WELL AT TIME OF BLOWOUT: 13 3/8" cem 1014'; 8 5/8" cem 7347'; cp 7203', 7204' & 7207', perf 7203' WSO. 15" hole opener on 4 1/2" d.p. to 7477'. Effective depth 7500'.

WORK IN PROGRESS AT TIME OF BLOWOUT: Opening hole

PROBABLE CAUSE: Performing operation with gas cut mud column. (JLH)

EQUIPMENT DAMAGE: Minor (Ram rubbers)

REMARKS: Driller was opening 7 5/8" hole to 15" at 7477' when a kick was recorded. The hydril bag and both rams were closed on the kelly, and the kelly cock was closed. Mud blew past the bag emptying the hole. Then gas blew, restricted by the partially closed bag, at diminishing rates until bag completely sealed off the annulus. To reduce the possibility of accidentally igniting the gas, a pump truck was used to pump the 80 lb. mud from a remote location to equalize pressure in the well.

Costs: Cost of rams, cement wagon, mud, lost time, lost gas, preventive conferences.

(Signed) John L. Hardoin

(Title) Deputy Supervisor

PW

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 279-209

DIVISION OF OIL AND GAS

Report on Operations

CORRECTED COPY

Mr. J. W. Tenfelder, Agent
Southern Calif. Gas Company
12801 Tampa Avenue
Northridge, CA 91324

Santa Paula, Calif.
Aug. 31, 1979

Your operations at well "SFZU" MA-1B, API No. 037-21892, Sec. 34, T. 3N R. 16W s.b., B.& M. Aliso Canyon Field, in Los Angeles County, were witnessed on 8/22/79. Ed Hickey, representative of the supervisor, was present from 1400 to 1500. There were also present Mr. Lloyd Green, drilling foreman

Present condition of well: additions to the casing record since Report No. T279-167: 8 5/8" cem 7347', perf. 7203', 7204', 7207' (cem off) perf. 7203' WSO. T.D. 7347'.

The operations were performed for the purpose of demonstrating a water shut-off on the 8 5/8" casing by means of a formation tester.

DECISION:

THE 8 5/8" SHUT-OFF AT 7203' IS APPROVED.

b

M. G. MEFFERD
State Oil and Gas Supervisor

By John L. Hardoin
Deputy Supervisor
John L. Hardoin

OG109 (6-77-GSRI-15M)

PCW

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 279-167

DIVISION OF OIL AND GAS

Report on Operations

CORRECTED COPY

Mr. J. W. Tenfelder, Agent
Southern Calif. Gas Company
12801 Tampa Avenue
Northridge, CA 91324

Santa Paula Calif.
July 9, 1979

Your operations at well "SFZH" MA-1B, API No. 037-21892, Sec. 34, T. 3N, R. 16W S.B., B.& M. Aliso Canyon Field, in Los Angeles County, were witnessed on 7/5/79. Mr. Ed Hickey, representative of the supervisor, was present from 0530 to 0730. There were also present Mr. Arch Awalt, foreman

Present condition of well: 13 3/8" cem. 1014'. T.D. 1015'.

The operations were performed for the purpose of testing the blowout prevention equipment and installation.

DECISION:

THE BLOWOUT PREVENTION EQUIPMENT AND INSTALLATION ARE APPROVED.

r

M. G. MEFFERD
State Oil and Gas Supervisor

By John L. Hardoin
Deputy Supervisor
John L. Hardoin

OG109 (6-77-GSRI-15M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 279-120

REPORT ON PROPOSED OPERATIONS

010 (field code)
03 (area code)
30 (pool code)

Mr. P. S. Magruder, Jr., Agent
Southern Calif. Gas Co.
P.O. Box 54790 Terminal Annex
Los Angeles, CA 90054

Santa Paula, California
April 13, 1979

Your _____ proposal to drill Gas Storage well "SFZU" MA-18,
A.P.I. No. 037-21892, Section 34, T. 3N, R. 16W, S.B.B. & M.,
Aliso Canyon field, Main area, Sesnon-Frew pool,
Los Angeles County, dated 3/29/79, received 4/11/79 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Sufficient cement shall be pumped back of the 13 3/8" casing to fill to the surface.
2. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
3. Unlined sumps, if they contain harmful waters, shall not be located over fresh water bearing aquifers.
4. Any sump used during these operations shall be thoroughly cleaned and filled with earth as soon as operations are completed.
5. Blowout prevention equipment of at least DOG Class III B 1M, shall be installed on the 13 3/8" casing and Class III B 2M on the 8 5/8" casing and maintained in operating condition at all times.
6. THIS DIVISION SHALL BE NOTIFIED TO WITNESS:
   a. A pressure test of the blowout prevention equipment before drilling below 1000'.
   b. A test of the 8 5/8" shut-off above the zone to be produced.

Blanket Bond
MD:b

A copy of this report must be posted at the well site prior to commencing operations.

M. G. MEFFERD, State Oil and Gas Supervisor

By John L. Hardoin
John L. Hardoin, Deputy Supervisor

OC111 (1-79-65RI-8M)

037-21892

D SION OF OIL AND G

Notice of Intention to Drill New Well

PW

C.E.Q.A. INFORMATION			
EXEMPT ☐ CLASS____	NEG. DEC. ☐ S.C.H. NO.____	E.I.R. ☐ S.C.H. NO.____	DOCUMENT NOT REQUIRED BY LOCAL JURISDICTION ☒
See Reverse Side			

FOR DIVISION USE ONLY					
MAP	MAP BOOK	CARDS	BOND	FORMS 114	FORMS 121
254	2-14-77	✓	BB	✓	✓

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to commence drilling well ~~Mission Adrian 1-B~~ "SFZU" MA-1B, API No.____ (Assigned by Division),

Sec. 34, T. 3N, R. 16W, S.B. B. & M., Aliso Canyon Field, Los Angeles County.

Legal description of mineral-right lease, consisting of____ acres, is as follows: (Attach map or plat to scale)

Previously Submitted

DIVISION OF OIL AND GAS
RECEIVED
APR 11 1979
SANTA PAULA, CALIFORNIA

Do mineral and surface leases coincide? Yes____ No____ If answer is no, attach legal description of both surface and mineral leases, and map or plat to scale.

Location of well____ feet____ (Direction) along section/property line and ____ feet____ (Direction) (Cross out one)

at right angles to said line from the____ corner of section/property ____ or (Cross out one)

4513.55' south and 1057.31' east from station 84

Is this a critical well according to the definition on the reverse side of this form? Yes ☐ No ☒

If well is to be directionally drilled, show proposed coordinates (from surface location) at total depth: 1663 feet north (Direction) and 18 feet east (Direction)

Elevation of ground above sea level 1725 feet.

All depth measurements taken from top of 17 Kelly Bushing (Derrick Floor, Rotary Table, or Kelly Bushing) that is 22 feet above ground.

PROPOSED CASING PROGRAM

SIZE OF CASING INCHES API	WEIGHT	GRADE AND TYPE	TOP	BOTTOM	CEMENTING DEPTHS	CALCULATED FILL BEHIND CASING
13-3/8"	54.5	K-55 Butt.	Surf.	1000'	1000'	Surface
8-5/8"	36 & 40	N-80 Butt.	Surf.	7140'	7140'	1000'
5-1/2"	20	K-55 LT&C	7020'	7340'	Gravel Pack Screen Liner	-

(A complete drilling program is preferred and may be submitted in lieu of the above program.)

Intended zone(s) of completion Sesnon, 7140', 2000 psi (Name, depth, and expected pressure) Estimated total depth 7340'

It is understood that if changes in this plan become necessary we are to notify you immediately.

Name of Operator	Type of Organization (Corporation, Partnership, Individual, etc.)	
So. California Gas Company	Corporation	
Address	**City**	**Zip Code**
P.O. Box 3249 Terminal Annex	Los Angeles, CA	90051
Telephone Number / **Name of Person Filing Notice**	**Signature**	**Date**
(213) 689-3561 / P. S. Magruder, Jr.	P. S. Magruder Jr.	3/29/79

This notice and indemnity or cash bond shall be filed, and approval given, before drilling begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

OG105 (7-78-GSRI-5M)