

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

No. **P 216-0115**

**PERMIT TO CONDUCT WELL OPERATIONS**

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

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

Ventura, California  
 July 08, 2016

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

Your proposal to **Rework** well "Ward" 3A, A.P.I. No. **037-22306**, Section **27**, T. **03N**, R. **16W**, **SB B. & M.**, **Aliso Canyon** field, **Any** area, **Sesnon-Frew** pool, **Los Angeles** County, dated **7/3/2016**, received **7/5/2016** has been examined in conjunction with records filed in this office. (Lat: **34.317598** Long: **-118.546736** 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 **8 5/8"** casing.
4. 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.
5. In all other respects, the provisions of Division Order #1109 and its amendments shall remain in effect.
6. This office shall be contacted by phone prior to making any program changes and no changes are made without Division approval.
7. **THIS DIVISION SHALL BE NOTIFIED TO:**
  - a. Witness a pressure test of the **8 5/8"** casing and tubing plug.

Continued on Next Page

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

Engineer Kris Gustafson  
 Office (805) 654-4761

KG/kg

Kenneth A. Harris Jr.  
 State Oil and Gas Supervisor

By *Patricia A. Abel* 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.

**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:

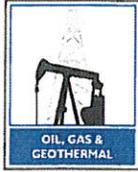
- a. Conduct daily gas monitoring at the surface of the non-operational well, including monitoring the area around the well perimeter and in the annular space between the plugged casing string and the outmost casing;
- b. Conduct noise log, temperature log and positive pressure test every six months;
- 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	<del>OGD114</del>	OGD121
	CALV WIMS	115V

P216-0115

## NOTICE OF INTENTION TO REWORK / REDRILL WELL

Detailed instructions can be found at: [www.conservation.ca.gov/dog/](http://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  well Ward 3A, API No. 037-22306,  
(Check one)

Sec. 27, 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: 7663 feet. The effective depth is: 7658 feet.

Present completion zone(s): Seson (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 - ETOC at 3004' as per attached wellbore mechanical.

5b - Packer set at 7231'. Plug set in No-Go at 7198' and SSD opened at 7164' on 5/25/16.

6b - Circulated 8.5 ppg kill fluid down tbg. through SSD at 7164' and back to surface to completely fill well on 6/10/2016.

7b - With casing valve closed, pressure-up on tubing to 1000 psi. for 1 hour (will test csg., packer and tubing plug all at same time).

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

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 7/3/16
Individual to contact for technical questions: Mike Giuliani	Telephone Number: (805) 290-2074	E-Mail Address: mike.giuliani@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.

## 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, re-drilling, 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/](http://www.conservation.ca.gov/dog/)

**Well  
Ward 3A**

API #: 04-037-22306-00  
Sec 27, T3N, R16W

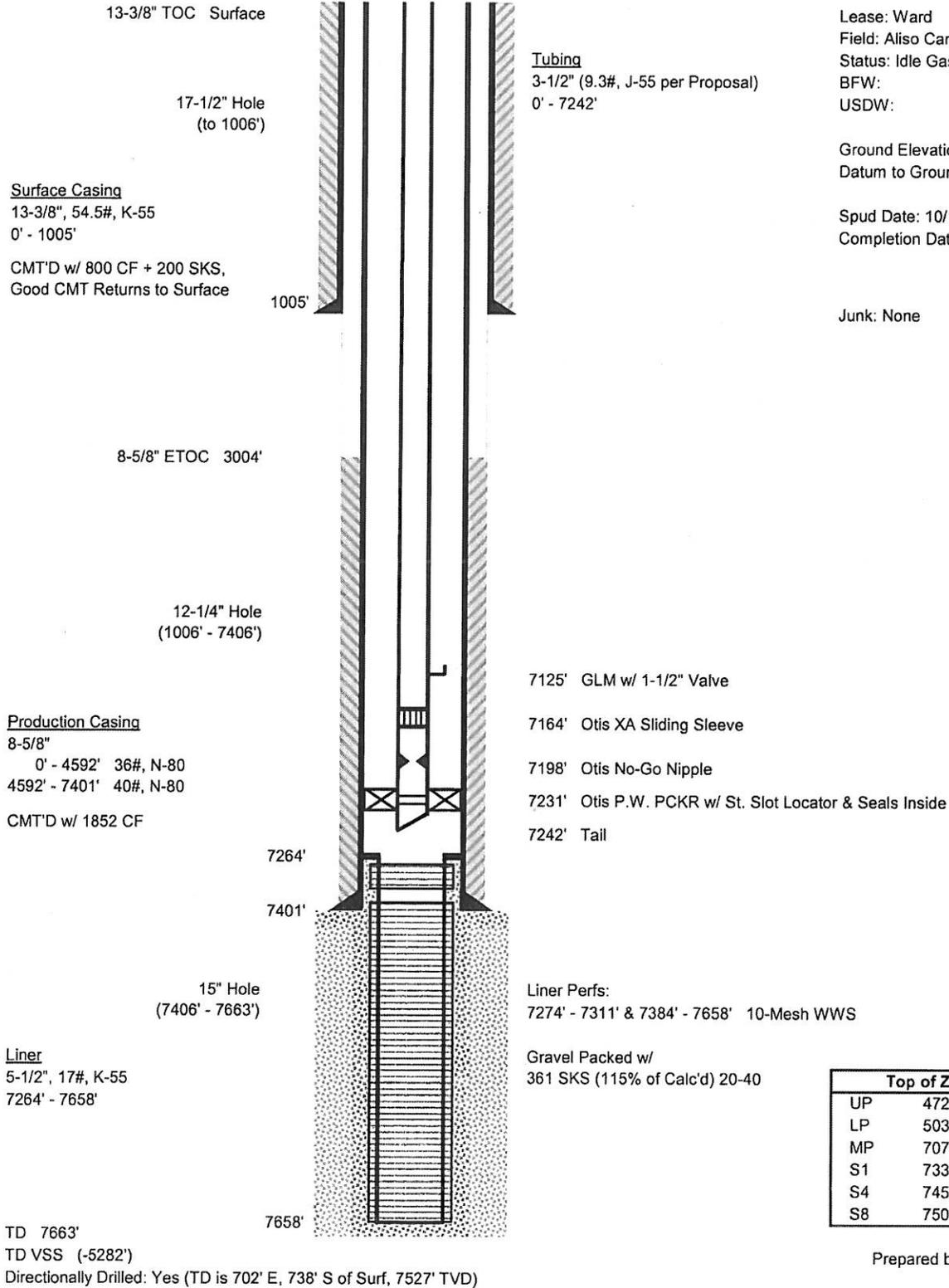
Operator: So. California Gas Co.

Lease: Ward  
Field: Aliso Canyon  
Status: Idle Gas Storage  
BFW:  
USDW:

Ground Elevation: 2226' asl  
Datum to Ground: 19' KB

Spud Date: 10/10/1981  
Completion Date: 11/30/1981

Junk: None



Prepared by: MAM (3/23/2016)

**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
Ward 3A	7231'/7106'	8-5/8", 36#, N-80	4592	6490	5517	3030	Yes
				7300	6205	4196	Yes
Standard Sesnon 9	8544'/8544'	7", 23#, N-80	3777	4360	3706	2669	Yes
				6340	5389	3415	Yes
				7240	6154	4135	Yes
				8160	6936	4776	Yes
				4360	3706	2695	Yes
Standard Sesnon 13	8880'/8880'	7", 23#, N-80	6340	5389	3522	Yes	
			7240	6154	4288	Yes	
			8160	6936	4925	Yes	
			4360	3706	1023	Yes	
			6340	5389	3754	Yes	
Standard Fee 6	8878'/8877'	7", 26#, N-80	7240	6154	4703	Yes	
			8160	6936	4924	Yes	
			4360	3706	3063	Yes	
			6340	5389	3964	Yes	
Porter 45	7320'/7318'	7", 26#, N-80	7240	6154	4235	Yes	
			8160	6936	4924	Yes	
			4360	3706	3063	Yes	
Porter 37	7434'/7434'	7", 23#, J-55	4360	3706	2561	Yes	
			6340	5389	3311	Yes	
			7240	6154	4019	Yes	
			8160	6936	4286	Yes	

OPERATOR So Cal Gas  
 LSE & NO Ward 3A  
 MAP 254

( ) ( ) ( ) ( ) ( ) ( )

INTENTION	<i>Drill New Street</i>					
NOTICE DATED	<i>1-15-81</i>					
P-REPORT NUMBER	<i>281-14</i>					
CHECKED BY/DATE	<i>ms 3/1/82</i>					
MAP LETTER DATED	<i>3/6/82</i>					
SYMBOL	<i>*</i>					

REC'D NEED REC'D NEED REC'D NEED REC'D NEED REC'D NEED REC'D NEED

NOTICE	<i>1-19-81</i>						
HISTORY	<i>12-28-81</i>						
SUMMARY (CORRECTED)	<i>10-9-86</i>						
<i>DIGL</i> IES/ELECTRIC LOG	<i>1-12-82</i>						
DIRECTIONAL SURV	<i>12-28-81</i>						
CORE/SWS DESCRIP							
OTHER	<i>CDL/M Calculation photo BOP chart</i>						
RECORDS COMPLETE	<i>JR</i>						

ENGINEERING CHECK

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

CLERICAL CHECK

POSTED TO 121 _____	170 MAILED _____	FINAL LETTER _____
_____	_____	MAILED _____
_____	_____	RELEASED BOND _____
_____	_____	_____
_____	_____	_____

REMARKS: ACBM-S 5-4-82

WELL SUMMARY REPORT

Operator Southern California Gas Company		Well Ward #3A				
Field Aliso Canyon		County Los Angeles	Sec. 27	T. 3N	R. 16W	B.&M. S.B.
Location (Give surface location from property or section corner, street center line and/or California coordinates) 93' north and 129' west of Station #84					Elevation of ground above sea level 2226'	
Commenced drilling (date) 10-10-81	Total depth (1st hole) 7663' (2nd) (3rd)			Depth measurements taken from top of: <input type="checkbox"/> Derrick Floor <input type="checkbox"/> Rotary Table <input checked="" type="checkbox"/> Kelly Bushing Which is 19' feet above ground		
Completed drilling (date) 11-30-81	Present effective depth 7658'			GEOLOGICAL MARKERS		
Commenced producing (date)	Junk  None			DEPTH 7450'		
<input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas lift		Formation and age at total depth Sesnon Zone-Miocene				
Name of producing zone(s) Sesnon						

	Clean Oil (bbl per day)	Gravity Clean Oil	Percent 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 (API)	Top of Casing	Depth of Shoe	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Number of Sacks or Cubic Feet of Cement	Depth of Cementing (if through perforations)
13-3/8"	Surface	1005'	54.5#	K-55 Buttress	New	17-1/2"	1030	
8-5/8"	Surface	7401'	36# & 40#	N-80 Buttress	New	12-1/4"	1852	

PERFORATED CASING (Size, top, bottom, perforated intervals, size and spacing of perforation and method.)  
394' 5-1/2" 17# K-55 landed 7658', top 7264', 10-mesh wire wrapped 7658'-7384' and 7311'-7274'. Gravel flow packed in 15" hole with 361 sacks 20-40 gravel.

Was the well directionally drilled? If yes, show coordinates at total depth  
 Yes  No 7663' V.D. 7526' 730' south and 696' east

Electrical log depths  
7500' and 7663'

Other surveys  
Compensated density and neutron, cement bond and photon logs

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.

Name J. W. Gourley		Title Agent	
Address Box 3249, Terminal Annex		City Los Angeles, CA	Zip Code 90051
Telephone Number (213) 689-3925	Signature <i>N.W. Buss</i>	Date October 7, 1986	

P10

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 Ward #3A Sec. 27, T. 3N, R. 16W, SB. B. & M.  
A.P.I. No. 037-22306 Name P.S. Magruder, Jr. Title Agent  
Date December 7, 1981  
(Person Submitting report) (President, Secretary or Agent)

Signature .....

P.O. Box 3249 Terminal Annex, Los Angeles, CA 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

GWO #98783 was issued to drill new gas storage well to sesnon zone.

1981

- |       |   |
|-------|---|
| 10-10 | 1st Day. Spudded in at 11:59 A.M. Drilled 17-1/2" hole from 0'-219'.  |
| 10-11 | 2nd Day. Drilled 17-1/2" hole with bit #1 from 219'-568'.   |
| 10-12 | 3rd Day. Drilled 17-1/2" hole with bit #2 from 568'-724'.   |
| 10-13 | 4th Day. Drilled 17-1/2" hole from 724'-858' with bit #2. Drilled 17-1/2" hole from 858'-974' with bit #3.  |
| 10-14 | 5th Day. Drilled 17-1/2" hole 974'-1006'. Ran 13-3/8" 54.5# K-55 Buttress casing and cemented at 1005' with 800 cu. ft. of Class "G" cement mixed with 8% Gel and 3% calcium chloride followed with 200 sacks of Neat Class "G" cement mixed with 3% calcium chloride. Float shoe @ 1005' and stop collar at 908', 2 centralizers @ 986' and 925' and 3 scratchers at 986', 925' and 889'. Good circulation with cement returns to surface. |
| 10-15 | 6th Day. Welded on casing head and pressure tested weld to 1500 psi. Also installed protective bowl in casing head. Installed BOPE.   |
| 10-16 | 7th Day. Installed BOPE and pressure tested complete shut off rams, pipe rams, Hydril, choke and kill lines of Class III 5000 psi BOPE to 2750 psi with Haliburton pumping unit. Drilled out cement in 13-3/8" casing and then drilled 12-1/4" hole from 1006'-1070' with bit #4.   |
| 10-17 | 8th Day. Drilled 12-1/4" hole from 1072'-1227' with bit #4. Drilled 12-1/4" hole from 1227'-1444' with bit #5.  |
| 10-18 | 9th Day. Drilled 12-1/4" hole from 1444'-1482' with bit #5. Drilled 12-1/4" hole from 1482'-1648' with bit #6.  |

10-19 10th Day. Drilled 12-1/4" hole from 1648'-1903' with bit #7.

10-20 11th Day. Drilled 12-1/4" hole from 1903'-2164' with bit #8.

10-21 12th Day. Drilled 12-1/4" hole from 2164'-2421' with bit #8.

10-22 13th Day. Drilled 12-1/4" hole from 2421'-2648' with bit #8.

10-23 14th Day. Drilled 12-1/4" hole from 2648'-2928' with bit #9.

10-24 15th Day. Drilled 12-1/4" hole from 2928'-3240' with bit #9.

10-25 16th Day. Drilled 12-1/4" hole from 3240'-3400' with bit #9.

10-26 17th Day. Drilled 12-1/4" hole from 3400'-3997' with bit #10.

10-27 18th Day. Directionally drilled 12-1/4" hole from 3997'-4155' with Dyna drill using bit #11.

10-28 19th Day. Dyna drilled 12-1/4" hole from 4155'-4212' with bit #11.

10-29 20th Day. Directionally drilled 12-1/4" hole from 4212'-4608' with bit #13.

10-30 21st Day. Directionally drilled 12-1/4" hole from 4608'-4779' with bit #13 and from 4779'-4965' with bit #14.

10-31 22nd Day. Directionally drilled 12-1/4" hole from 4965'-5037' with bit #14.

11-01 23rd Day. Directionally drilled 12-1/4" hole from 5037'-5140' with bit #15.

11-02 24th Day. Directionally drilled 12-1/4" hole from 5140'-5342' with bit #16.

11-03 25th Day. Directionally drilled 12-1/4" hole from 5342'-5499' with bit #17.

11-04 26th Day. Directionally drilled 12-1/4" hole from 5499'-5851' with bit #17.

11-05 27th Day. Directionally drilled 12-1/4" hole from 5851'-6086' with bit #17.

11-06 28th Day. Directionally drilled 12-1/4" hole from 6086'-6257' with bit #17.

11-07 29th Day. Directionally drilled 12-1/4" hole from 6257'-6327' with bit #17.

- 11-08 30th Day. Directionally drilled 12-1/4" hole from 6327'-6425' with bit #18.
- 11-09 31st Day. Directionally drilled 12-1/4" hole from 6425'-6619' with bit #18.
- 11-10 32nd Day. Directionally drilled 12-1/4" hole from 6619'-6928' with bit #18.
- 11-11 33rd Day. Directionally drilled 12-1/4" hole from 6928'-7237' with bit #19.
- 11-12 34th Day. Directionally drilled 12-1/4" hole from 7237'-7500' with bit #19 and #20.
- 11-13 35th Day. Pulled out of hole and ran Welex induction and caliper logs. Cleaned hole again and rigged up for 8-5/8" casing.
- 11-14 36th Day. Ran 8-5/8" 40# N-80 Buttress 7401'-4592' and 8-5/8" 36# N-80 Buttress 3492'-0'. Cemented at 7401' with 1200 cu. ft. of Class "G" Pozmix, 402 cu. ft. neat "G" and 250 cu. ft. of "self stress" cement.
- 11-15 37th Day. Installed wellheads and BOPE. Layed down 8" drill collars and casing tools.
- 11-16 38th Day. Rigged up lay down truck and layed down 5" drill pipe. Unloaded 3-1/2", drill pipe and collars. Changed pipe rams in BOPE to 3-1/2".
- 11-17 39th Day. Drilled out cement in 8-5/8" casing from 7286'-7390'. Rigged up and ran cement bond and neutron logs. Ran back in hole installing rubber protectors every other joint of 3-1/2" drill pipe.
- 11-18 40th Day. Drilled out cement and shoe and then directionally drilled 7-5/8" hole from 7500'-7625' with bit #22. Reamed from 7454'-7625'.
- 11-19 41st Day. Directionally drilled 7-5/8" hole from 7625'-7663' with bit #23. Circulated for log, ran Welex dual induction log. Reamed hole from 7609'-7663' to clear bridge at 7500'. Rigged up for Welex compensated density and neutron logs.
- 11-20 42nd Day. Ran Welex density and neutron logs. Cleaned mud tanks and changed over to HEC polymer completion fluid. Opened 7-5/8" hole to 15" from 7406'-7420'.
- 11-21 43rd Day. Opened 15" hole from 7420'-7558'.

- 11-22 44th Day. Opened 7-5/8" hole to 15" from 7558'-7599' with hole opener #4. Pulled out of hole to change hole opener after circulating bottoms up. Ran in hole with bit #24 and reamed 7-5/8" hole from 7599'-7663'.
- 11-23 45th Day. Opened 7-5/8" hole to 15" from 7599'-7652' with hole opener #5, and from 7652'-7663' with hole opener #6. Reamed 15" hole from 7401'-7652' with hole opener #6.
- 11-24 46th Day. Opened 7-5/8" hole from 7652' to 7663'. Ran Dresser Atlas caliper log after circulating bottoms up. Cleaned mud tanks and changed over to clean polymer drilling fluid.
- 11-25 47th Day. Ran 394' of 5-1/2" 17# K-55 10 mesh wire wrapped liner and landed at 7658', Top 7264'.
- 11-26 48th Day. Back scuttled and pulled out of hole to change gravel packing tools. Ran in hole and washed liner from 7654'-7276'. Pulled out of hole with washing tools. Layed down washing tools and 14 joints of tubing. Returned in hole to displace additional gravel. Total gravel in place 361 sacks or 15% over calculated volume.
- 11-27 49th Day. Ran Otis permatrievue packer on Welex wireline. Set packer at 7226'. Ran in hole to lay down pipe taking off pipe rubbers. Rigged up lay down machine and layed down 3-1/2" drill pipe.
- 11-28 50th Day. Unloaded 3-1/2" tubing. Ran 3-1/2" tubing and stabbed in packer at 7226'. Pressure tested packer and seals to 1500 psi.
- 11-29 51st Day. Hydrottested tubing to 5000 psi. Ran Otis production tube with 6 seals and sliding sleeve in tubing. Rigged down hydrottest equipment and landed tubing on packer with 20,000#. Removed BOPE and installed xmas tree. Tested xmas tree to 4500 psi. Hooked up kill line to change over.
- 11-30 52nd Day. Circulated polymer mud out of well with lease salt water. Rig released at 8:00 A.M., 11-30-81.



**REPORT  
of  
SUB-SURFACE  
DIRECTIONAL  
SURVEY**

SOUTHERN CALIFORNIA GAS COMPANY  
\_\_\_\_\_

COMPANY

WARD 3A  
\_\_\_\_\_

WELL NAME

ALISO CANYON  
\_\_\_\_\_

LOCATION

JOB NUMBER

P0981-D1042

TYPE OF SURVEY

SINGLE - SHOT

DATE

11-2-81

SURVEY BY

LONG BEACH

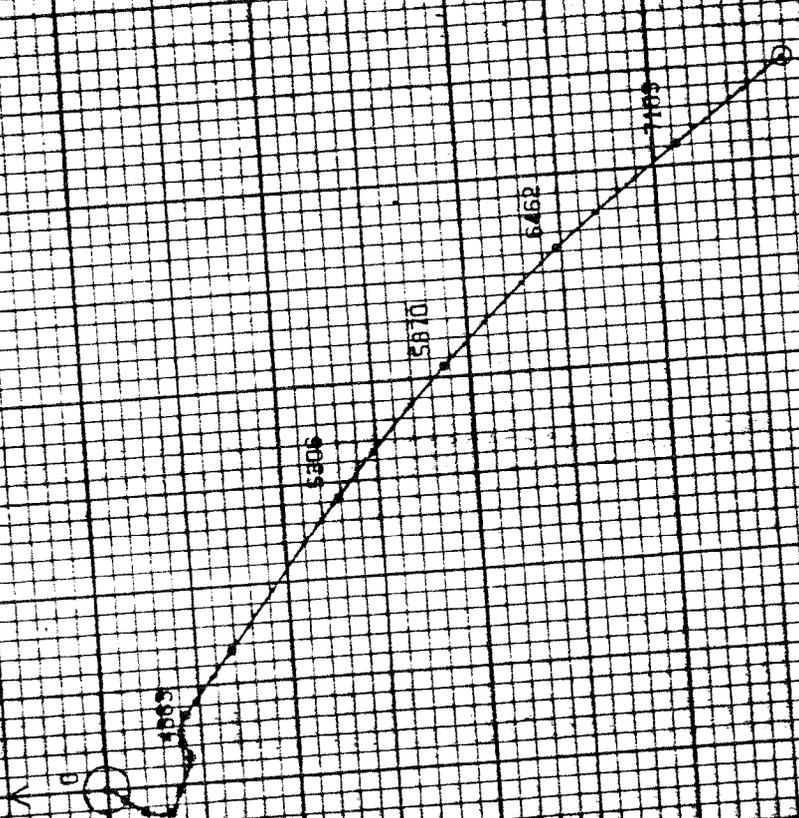
OFFICE

HORIZONTAL PROJECTION

SCALE 1 IN. = 200 FEET  
DEPTH INDICATOR NO.

SOUTHERN CALIFORNIA GAS COMPANY  
WELL: WARD 3A  
LOCATION: ALISO CANYON

EASTMAN WHIPSTOCK, INC.



FINAL STATION: 7527.14 LWD  
DEPTH: 7668 MD - 7527.14 LWD  
SOUTH: 7981.49 EAST: 1032.44  
CLOSURE: 1019.90 S 43.36 28 E

part

S/S K.W.

SOUTHERN CALIFORNIA GAS COMPANY

WELL: WARD 3A

LOCATION: ALISO CANYON

FILE: B2-286

DATE: 11-2-81

ELEV:

DECL: 16E

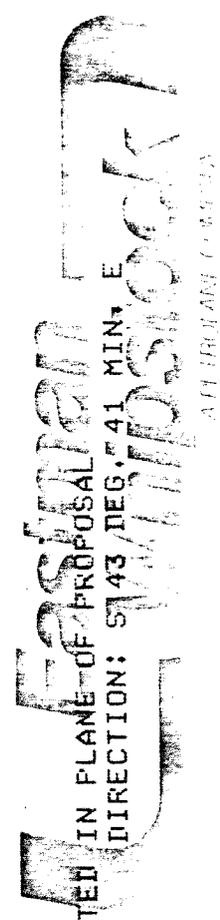
TYPE: SINGLE-SHOT

SEC. BEARING: S43 41 37E

JOB: F0981-D1042

VENDOR: EASTMAN WHIFSTOCK

SURVEYOR: KEN WALKER



RECORD OF SURVEY

RADIUS OF CURVATURE METHOD

pc

LL: WARD 3A

CATION: ALISO CANYON

TIME 12:11:44

DATE 23-NOV-81

TRUE

ASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O O R D I N A T E S FEET	C L O S U R E DISTANCE FEET	D I R E C T I O N D M	DOGLEG SEVERITY DG/100F
0.	0 0	0 0	0.	0.00	0.00	0.00	0.00	0 0	0.00
251.	1 30	S 26	251.	250.97	1.14	2.95 S	1.44 W	S 26	0.60
464.	2 15	S 31	213.	463.86	3.27	9.08 S	4.76 W	S 27	0.36
682.	3 15	S 41	218.	681.60	5.14	17.53 S	10.90 W	S 31	0.51
848.	2 45	S 36	166.	847.37	6.32	24.32 S	16.31 W	S 33	0.34
1006.	2 30	S 31	158.	1005.21	7.93	30.36 S	20.31 W	S 33	0.71
1227.	2 30	S 29	221.	1226.00	10.64	38.71 S	25.13 W	S 32	0.74
1444.	2 15	S 11	217.	1442.81	14.61	47.12 S	28.19 W	S 30	0.36
1648.	2 30	S 16	204.	1646.64	19.18	55.33 S	30.16 W	S 28	0.16
1929.	2 0	S 30	281.	1927.42	27.79	65.99 S	28.85 W	S 23	0.65
22137.	2 30	S 75	208.	2151.25	35.65	70.83 S	22.54 W	S 17	0.86
2427.	2 15	S 69	290.	2425.01	146.82	74.54 S	17.12 W	S 8	0.12
2586.	3 0	S 72	159.	2583.84	52.72	76.97 S	11.26 W	S 3	0.48
2866.	2 45	S 54	280.	2863.49	65.92	83.36 S	8.20 E	S 5	0.33
33085.	2 45	S 74	219.	3082.24	78.12	87.96 S	17.60 E	S 11	0.44
3323.	1 45	N 90	238.	3320.05	83.03	89.20 S	26.82 E	S 16	0.49
33515.	1 30	N 80	192.	3511.97	86.43	88.72 S	32.24 E	S 19	0.20
33997.	1 0	N 30	482.	3993.86	87.96	82.88 S	40.58 E	S 26	0.24
4020.	0 45	N 60	23.	4016.85	87.96	82.64 S	40.83 E	S 26	2.23
4050.	1 45	N 60	30.	4046.84	88.11	82.31 S	41.39 E	S 26	3.73
4081.	2 0	N 65	31.	4077.83	88.39	81.84 S	42.29 E	S 27	0.96
4112.	2 30	N 76	31.	4108.80	88.89	81.43 S	43.44 E	S 28	2.12
4143.	3 15	N 81	31.	4139.77	89.72	81.12 S	44.96 E	S 29	2.55
4205.	4 45	S 89	62.	4201.61	92.48	80.82 S	49.27 E	S 31	2.66
4236.	6 30	S 86	31.	4232.46	94.67	80.96 S	52.30 E	S 32	5.72
4267.	8 15	S 83	31.	4263.20	97.68	81.34 S	56.27 E	S 34	5.78
4298.	9 15	S 72	31.	4293.84	101.59	82.36 S	60.86 E	S 36	6.27
4363.	10 0	S 54	65.	4357.93	111.81	87.27 S	70.51 E	S 38	4.75
4455.	12 0	S 52	92.	4448.23	129.13	97.83 S	84.52 E	S 40	2.21
4580.	15 0	S 50	125.	4569.76	158.07	116.19 S	107.20 E	S 42	2.43

ESTIMATED  
 WMS-30K  
 A T T H O R I Z E D C O M P A N Y

LL: WARD 3A

CATION: ALISO CANYON

TIME DATE

12:11:44 23-NOV-81

ASURED EPTH FEET	DRIFT ANGLE D M		DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	R E C T A N G U L A R C O R D I N A T E S FEET	C L O S U R E D I S T A N C E FEET	D I R E C T I O N D M	D O G L E G S E V E R I T Y D6/100FF
	D	M								
4700.	18	0	S 50	120.	4684.81	191.94	138.10 S	191.94	S 43	2.50
4937.	18	45	S 53	237.	4909.72	265.95	184.60 S	266.18	S 46	0.51
5121.	18	45	S 50	184.	5083.96	324.53	221.42 S	325.10	S 47	0.52
5306.	18	30	S 50	185.	5259.27	383.26	259.40 S	384.12	S 47	0.14
5496.	18	0	S 48	190.	5439.71	442.50	298.43 S	443.60	S 47	0.42
5701.	17	30	S 47	205.	5634.95	504.86	340.65 S	506.10	S 47	0.29
5870.	17	15	S 45	169.	5796.24	555.28	375.71 S	556.54	S 47	0.38
6077.	16	30	S 44	207.	5994.33	615.37	418.57 S	616.56	S 47	0.39
6273.	16	0	S 42	196.	6182.50	670.20	458.68 S	671.26	S 46	0.38
6462.	15	0	S 40	189.	6364.62	720.65	496.79 S	721.52	S 46	0.60
6667.	14	45	S 38	205.	6521.23	773.10	537.69 S	773.72	S 45	0.28
6886.	14	15	S 36	219.	6774.77	827.58	581.48 S	827.93	S 45	0.32
7103.	14	30	S 36	217.	6984.98	880.95	625.06 S	881.12	S 44	0.12
ATIONS AT MD. 7450' AND 7663' ARE PROJECTED.										
7450.	14	30	S 36	347.	7320.93	967.05	695.35 S	967.07	S 44	0.00
7663.	14	30	S 36	213.	7527.14	1019.91	738.50 S	1019.91	S 43	0.00

7450' AND 7663' ARE PROJECTED.  
 ALL OTHER DATA IS FROM  
 FIELD SURVEY

FINAL CLOSURE - DIRECTION: S 43 DEGS 36 MINS E  
 DISTANCE: 1019.91 FEET



JAN 10 1981

DIVISION OF OIL AND GAS  
Notice of Intention to Drill New Well

C.E.Q.A. INFORMATION			
EXEMPT <input type="checkbox"/>	NEG. DEC. <input type="checkbox"/>	E.I.R. <input type="checkbox"/>	DOCUMENT NOT REQUIRED BY LOCAL JURISDICTION <input checked="" type="checkbox"/>
CLASS _____	S.C.H. NO. _____	S.C.H. NO. _____	
See Reverse Side			

FOR DIVISION USE ONLY					
MAP	MAP BOOK	CARDS	BOND	FORMS	
				114	121
		✓	66	✓	✓

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to commence drilling well Ward #3A, API No. 037-22306 (Assigned by Division), Sec. 27, 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

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 \_\_\_\_\_ along section/property line and \_\_\_\_\_ feet \_\_\_\_\_ (Direction) (Cross out one) (Direction)

at right angles to said line from the \_\_\_\_\_ corner of section/property \_\_\_\_\_ or \_\_\_\_\_ (Cross out one)  
200' Northerly and 200' Westerly of 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:  
1200' feet S42°E and \_\_\_\_\_ feet \_\_\_\_\_ (Direction) (Direction)

Elevation of ground above sea level 2226 feet.

\* All depth measurements taken from top of Kelly Bushing that is 19 feet above ground. (Derrick Floor, Rotary Table, or Kelly Bushing)

*NOTE: Adjacent Ward 3 is observing well is shallow*

**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	surface	1,000'	1,000'	surface
8 5/8"	36#, 40#	N-80 Butt	surface	7625'	7625'	3500
5 1/2"	20#	K-55 LT&C	7490'	7820'	W.W. liner	gravel packed

(A complete drilling program is preferred and may be submitted in lieu of the above program.)

Intended zone(s) of completion Seson, 7825', 3600 psi Estimated total depth 7825'  
(Name, depth, and expected pressure)

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

Name of Operator <u>Southern California Gas Company</u>	Type of Organization (Corporation, Partnership, Individual, etc.) <u>Corporation</u>
Address <u>P.O. Box 3249 Terminal Annex</u>	City <u>Los Angeles</u>
Telephone Number <u>(213) 689-3561</u>	Name of Person Filing Notice <u>P. S. Magruder Jr.</u>
	Signature <i>[Signature]</i>
	Date <u>1/15/81</u>

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