Docket:	<u>I.19-06-016</u>
Exhibit Number	
Commissioner	Rechtschaffen
Admin. Law Judges	Poirier/Kenney
SED Project Mgr.	
SED Witness	



## SAFETY AND ENFORCEMENT DIVISION California Public Utilities Commission

## **REPLY TESTIMONY**

Order Instituting Investigation on the Commission's Own Motion into the Operations and Practices of Southern California Gas Company with Respect to the Aliso Canyon storage facility and the release of natural gas, and Order to Show Cause Why Southern California Gas Company Should Not Be Sanctioned for Allowing the Uncontrolled Release of Natural Gas from its Aliso Canyon Storage Facility

## SUPPORTING ATTACHMENTS

San Francisco, California March 20, 2020

## **INDEX LIST OF SUPPORTING ATTACHMENTS**

DESCRIPTION	BATES NUMBER
FN.06.I1906016 CPUC SED DR 47	SED_RT_0001 - SED_RT_0019
FN.14.1.SPE-1606-G-PA	SED_RT_0020 - SED_RT_0028
FN.14.2.NACE-SP0186-NN	SED_RT_0029 – SED_RT_0056
FN.16.AC_CPUC_25-28.SS-25.well.File	SED_RT_0057 – SED_RT_0060
FN.19.AC_CPUC_SED_DR_27_0000046.1989 .DOGGR.Ltr	SED_RT_0061 - SED_RT_0062
FN.20.AC_CPUC_0165094.Boots&Coots.Dail yReports	SED_RT_0063
FN.21.Page 2-14 from Aliso_Final_EIR_Volume_II-Appendices	SED_RT_0064
FN.22.DOGGR_Final-Text-of-Regulations- UGS	SED_RT_0065 - SED_RT_0088
FN.25.I1906016 CPUC SED DR 48	SED_RT_0089 - SED_RT_0111
FN28.Pages 564-565 from P-44 All	SED_RT_0112 - SED_RT_0113
FN.30.Boots&Coots.DailyReports	SED_RT_0114 - SED_RT_0160
FN.36.SoCalGas.Response.DR25.01.FREW.2.2 014.Model.SIMP	SED_RT_0161 - SED_RT_0166
FN.42.DR11.01 SCG Leak Well List Master	SED_RT_0167 - SED_RT_0168
FN.44.AC_CPUC_0014708.SIMP.10.2016.Stat us	SED_RT_0169 - SED_RT_0171
FN.47.Blade-29 Amended 032219.Leaks	SED_RT_0172 - SED_RT_0173
FN.52.1.SoCalGas.Response to DR01.01 SCG	SED_RT_0174 - SED_RT_0190
FN.53.SoCalGas.Response.to.CPUC.SED.27.Q .37	SED_RT_0191 - SED_RT_0204
FN.58.I1906016_SCG_SED_DR_47_0000297	SED_RT_0205 - SED_RT_0488
FN.64.I1906016_SCG_SED_DR_47_0000093	SED_RT_0489 - SED_RT_0493
FN.65.SoCalGas.Response.to.DR29.01	SED_RT_0494 - SED_RT_0498
FN.68.SS-25 SCG-7.Temp.Noise, p.149	SED_RT_0499
FN.70.1.AC_CPUC_0000492.1991.1107.SS-25.Leak	SED_RT_0500

DESCRIPTION	BATES NUMBER
FN.70.2.SS-25 SCG-6.1991	$SED_RT_0501 - SED_RT_0503$
NoiseTemp.pp.150-151	
FN.72.SS-25 SCG-4.2006.p.433	SED_RT_0504
FN.73.SS-25 SCG-3.p.252	SED_RT_0505
FN.76.I1906016_SCG_SED_DR_47_0000582	SED_RT_506
FN.80.1.Aliso_Canyon_DOGGR_0001897.Cali	SED_RT_507
per.Tool.FF-34	
FN.80.2.Aliso_Canyon_DOGGR_0001881.Cor	SED_RT_508
rosion1991.FF-34A	
FN.83.SoCalGas.Response.to.DR33.01	SED_RT_0509 - SED_RT_0526
FN.86.EUO_BRET LANE_012418_VOL	SED_RT_0527 - SED_RT_0529
1p.1&101-102	
FN.90.03-11-2019 LACDPH to SoCalGas	SED_RT_0530 - SED_RT_0531
FN.101.I1906016	SED_RT_0532 - SED_RT_0540
SoCalGas.Response.to.CPUC.DR.45	

#### SOUTHERN CALIFORNIA GAS COMPANY

#### (DATA REQUEST SED-SCG-47 DATED NOVEMBER 27, 2019

#### SOCALGAS RESPONSE DATED DECEMBER 13, 2019

SoCalGas provides the following Responses to the Safety and Enforcement Division (SED) data request dated November 27, 2019 in I.19-06-016. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas' responses do not include information collected or modeled by Blade Energy Partners' during its Root Cause Analysis Investigation. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas objects to the instructions submitted by SED and to the continuing and indefinite nature of this request on the grounds that they are overbroad and unduly burdensome. Special interrogatory instructions of this nature and continuing interrogatories are expressly prohibited by California Code of Civil Procedure Section 2030.060(d) and 030.060(g), respectively. SoCalGas will provide responsive documents in existence at the time of its response. Should SED seek to update its request, SoCalGas will respond to such a request as a new data request in the future.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding. Finally, at the time of this Response, there are no pending oral data requests from SED to SoCalGas.

# Each of the following questions ask about passages in the testimony of Dan Neville on behalf of SoCalGas in I.19-06-016.

## **QUESTION 1:**

Pages 3-4 Paragraph beginning at P.3 Line 19 states in part, "... through design and systematic evaluation, testing, and monitoring of the various pressure barriers. . ." With regards to this statement:

#### SOUTHERN CALIFORNIA GAS COMPANY

#### (DATA REQUEST SED-SCG-47 DATED NOVEMBER 27, 2019

#### SOCALGAS RESPONSE DATED DECEMBER 13, 2019

a. Please confirm that the following are the only instances of the above referenced evaluations on SS-25:

i. Pre gas storage operations cement bond log run across the cemented area of the well above the gas storage zone 8738 feet to 6950 feet.

ii. Pre gas storage operations pressure test to 3400 psi.

iii. Pre gas storage operations installation and testing of highpressure gas wellhead system.

b. Pg.4-lines 4-5, states in part, "Pressure test ports are available between each set of seals so that each seal can be pressure tested independently." With regards to this statement, provide all records of pressure tests using "pressure test ports" between each set of seals that were installed on SS-25.

## **RESPONSE 1:**

- a. SoCalGas objects to this request as overly broad and vague to the extent it fails to specify a time to which SoCalGas may tailor its response. Subject to and without waiving the foregoing objection, SoCalGas responds as follows:
  - i) The referenced cement bond log was run on May 26, 1973 during the workover performed to convert the well for gas storage operations. There are no other instances of a cement bond log run in the well.
  - ii) The referenced pressure test to 3400 psi occurred on May 29, 1973 during the workover performed to convert the well for gas storage operations. Additional instances of a pressure test occurred on September 9, 1976 and on February 19, 1979 during well workovers. The September 9, 1976 test was to a pressure of 2500 psi. The February 19, 1979 test was to a pressure of 1500 psi.
  - iii) The referenced installation and testing of the high-pressure gas wellhead system occurred on June 1, 1973 and June 2, 1973 during the workover to convert the well for gas storage operations. Records show that a component of the wellhead called the "Christmas tree" was pressure tested on June 6, 1973, on July 8, 1976, and on February 20, 1979. An additional instance of a pressure test of the wellhead occurred on June 22, 2005.

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#### (DATA REQUEST SED-SCG-47 DATED NOVEMBER 27, 2019

#### SOCALGAS RESPONSE DATED DECEMBER 13, 2019

a. Records show there were two instances of utilizing the pressure test ports to pressure test the wellhead seals, independently. The first pressure test occurred on June 2, 1973 during the workover to convert the well for gas storage. Please see September 5, 1973 document *Division of Oil & Gas – History of Oil or Gas Well* on June 2, 1973. The second instance of a pressure test occurred on June 22, 2005. Please refer to the following electronic documents previously provided to CPUC-SED that include the SS-25 well file documents and/or well related information with Bates ranges:

AC\_CPUC\_0000023 - AC\_CPUC\_0000759 AC\_CPUC\_0012338 to AC\_CPUC\_12389 AC\_CPUC\_0206158 - AC\_CPUC\_0208846

## **QUESTION 2:**

Page 4 Lines 6-13, states,

"As of October 22, 2015, active UGS wells at Aliso Canyon, including SS-25, were subject to a systematic well integrity monitoring and inspection program that included: (1) daily site inspections; (2) weekly pressure readings; (3) monthly well site inspections; (4) annual leakage surveys; (5) annual temperature surveys and, if needed, noise and/or tracer surveys; and (6) additional casing integrity inspections if tubing was removed in the course of a workover. Separate and apart from the scheduled inspections and tests, if a well exhibited abnormal conditions, additional testing was conducted, including unscheduled pressure readings, temperature surveys, noise surveys, gas sampling, and/or other investigative work."

With regards to this passage, please answer the following:

FOR WELL SS-25: Provide copies of all records, (including individual pages from the SS-25 well file, compiled into one searchable pdf document) showing all instances of each of the following for Well SS-25 pre-October 23, 2015. For every test and inspection identified, provide the date of the event, the name of the person who performed the inspection or test and their affiliation with

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SoCalGas, where the records are kept, all audits of these records performed by SoCalGas or its contractors (including the name(s) of the auditor(s)), and the form of the records (electronic or paper):

- a. Daily site inspections
- b. Weekly pressure readings
- c. Monthly well site inspections
- d. Annual leakage surveys
- e. Annual temperature surveys
- f. Noise surveys
- g. Tracer surveys
- h. Casing integrity inspections
- i. Additional unscheduled pressure readings
- j. Additional unscheduled temperature surveys
- k. Additional unscheduled noise surveys
- I. Additional unscheduled gas sampling
- m. Additional unscheduled other investigative work (explain what this is for each item identified)

## **RESPONSE 2:**

SoCalGas object to this request as overly broad and unduly burdensome, and to the extent it fails to specify a time to which SoCalGas may tailor its response. SoCalGas further objects to this request on the grounds it is duplicative to the extent SED already is in possession of these records and assumes facts (including that audits are conducted or required). Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas interprets this request to seek information prior to October 23, 2015.

a. As a general practice, SoCalGas did not maintain records of daily site inspections. If the daily site inspection generated a corrective work order, that record is maintained in Maximo.

b: Please see previously provided electronic documents with Bates range:

#### SOUTHERN CALIFORNIA GAS COMPANY

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#### SOCALGAS RESPONSE DATED DECEMBER 13, 2019

AC CPUC 0009479; AC CPUC 0009485; AC CPUC 0009492; AC CPUC 0009498; AC CPUC 0009504; AC CPUC 0009510; AC CPUC 0009516; AC CPUC 0009522; AC CPUC 0009528; AC CPUC 0009540; AC CPUC 0009546; AC CPUC 0009552; AC\_CPUC\_0009558; AC\_CPUC\_0009564; AC\_CPUC\_0009570; AC\_CPUC\_0009576; AC CPUC 0009582; AC CPUC 0009588; AC CPUC 0009594; AC CPUC 0009600; AC\_CPUC\_0009606; AC\_CPUC\_0009612; AC\_CPUC\_0009618; AC\_CPUC\_0009624; AC CPUC 0009630; AC CPUC 0009679; AC CPUC 0009680; AC CPUC 0009683; AC CPUC 0009687; AC CPUC 0009688; AC CPUC 0009691; AC CPUC 0009695; AC\_CPUC\_0009696; AC\_CPUC\_0009700; AC\_CPUC\_0009704; AC\_CPUC\_0009708; AC CPUC 0009712; AC CPUC 0009713; AC CPUC 0009716; AC CPUC 0009717; AC CPUC 0009720; AC CPUC 0009724; AC CPUC 0009728; AC CPUC 0009729; AC CPUC 0009732; AC CPUC 0009736; AC CPUC 0009737: AC CPUC 0009740: AC CPUC 0009744: AC CPUC 0009748: AC\_CPUC\_0009749; AC\_CPUC\_0009752; AC\_CPUC\_0009753; AC CPUC 0009756; AC CPUC 0009757; AC CPUC 0009762; AC CPUC 0009766; AC CPUC 0009767; AC CPUC\_0009769 ; AC\_CPUC\_0009771; AC\_CPUC\_0009772 : AC CPUC 0009775; AC CPUC 0009776; AC CPUC 0009779; AC CPUC 0009780; AC CPUC 0009783; AC CPUC 0009787; AC CPUC 0009788; AC CPUC 0009791 ; AC CPUC 0009793; AC CPUC 0009794 ; AC CPUC 0009798; AC CPUC 0009799; AC CPUC 0009802; AC CPUC 0009803; AC CPUC 0009806; AC CPUC 0009807; AC CPUC 0009810; AC CPUC 0009811; AC\_CPUC\_0009814; AC\_CPUC\_0009815; AC\_CPUC\_0009818; AC\_CPUC\_0009822; AC CPUC 0009823; AC CPUC 0009826; AC CPUC 0009830; AC CPUC 0009831; AC CPUC 0009835; AC CPUC 0009837; AC CPUC 0009838; AC CPUC 0009841; AC CPUC 0009844; AC CPUC 0009845; AC CPUC 0009848; AC CPUC 0009850; AC CPUC 0009852; AC CPUC 0009854; AC CPUC 0009856; AC CPUC 0009858; AC CPUC 0009860; AC CPUC 0009862; AC CPUC 0009864; AC CPUC 0009866; AC CPUC 0009868; AC CPUC 0009870; AC CPUC 0009872; AC CPUC 0009874; AC CPUC 0009876; AC CPUC 0009878; AC CPUC 0009880; AC CPUC 0009882; AC CPUC 0009884; AC CPUC 0009886; AC CPUC 0009888; AC CPUC 0009890; AC CPUC 0009892; AC CPUC 0009894; AC CPUC 0009896; AC CPUC 0009898; AC CPUC 0009900; AC CPUC 0009902; AC CPUC 0009904; AC CPUC 0009906; AC CPUC 0009908; AC CPUC 0009910; AC CPUC 0009912; AC CPUC 0009914; AC CPUC 0009916; AC CPUC 0009918; AC CPUC 0009920; AC CPUC 0009922; AC CPUC 0009924; AC CPUC 0009926; AC CPUC 0009928; AC CPUC 0009930;

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AC_CPUC_0009932; AC_CPUC_0009936; AC_CPUC_0009938; AC_CPUC_0009940; AC_CPUC_0009942; AC_CPUC_0009944; AC_CPUC_0009946; AC_CPUC_0009948;
AC_CPUC_0009950; AC_CPUC_0009952; AC_CPUC_0009954; AC_CPUC_0009956; AC_CPUC_0009958; AC_CPUC_0009960; AC_CPUC_0009962; AC_CPUC_0009964;
AC_CPUC_0009958; AC_CPUC_0009960; AC_CPUC_0009962; AC_CPUC_0009964; AC_CPUC_0009966; AC_CPUC_0009968; AC_CPUC_0009970; AC_CPUC_0009972;
AC CPUC 0009974; AC CPUC 0009976; AC CPUC 0009978; AC CPUC 0009980;
AC CPUC 0009982; AC CPUC 0009984; AC CPUC 0009986; AC CPUC 0009988;
AC CPUC 0009990; AC CPUC 0009992; AC CPUC 0009994; AC CPUC 0009996;
AC_CPUC_0009998; AC_CPUC_0010000; AC_CPUC_0010002; AC_CPUC_0010004;
AC_CPUC_0010006; AC_CPUC_0010008; AC_CPUC_0010010; AC_CPUC_0010012;
AC_CPUC_0010014; AC_CPUC_0010016; AC_CPUC_0010018; AC_CPUC_0010020;
AC_CPUC_0010022; AC_CPUC_0010026; AC_CPUC_0010028; AC_CPUC_0010030;
AC_CPUC_0010032; AC_CPUC_0010034; AC_CPUC_0010036; AC_CPUC_0010038;
AC_CPUC_0010040; AC_CPUC_0010042; AC_CPUC_0010044; AC_CPUC_0010045;
AC_CPUC_0010048; AC_CPUC_0010052; AC_CPUC_0010054; AC_CPUC_0010056;
AC_CPUC_0010058; AC_CPUC_0010060; AC_CPUC_0010074; AC_CPUC_0010078;
AC_CPUC_0010079; AC_CPUC_0010084; AC_CPUC_0010091; AC_CPUC_0010096;
AC_CPUC_0010097; AC_CPUC_0010108; AC_CPUC_0010109; AC_CPUC_0010114; AC_CPUC_0010115; AC_CPUC_0010126; AC_CPUC_0010127; AC_CPUC_0010131;
AC_CPUC_0010113, AC_CPUC_0010128, AC_CPUC_0010127, AC_CPUC_0010131, AC_CPUC 0010136; AC_CPUC 0010137; AC_CPUC 0010143; AC_CPUC 0010144;
AC_CPUC_0010157; AC_CPUC_0010167; AC_CPUC_0010143; AC_CPUC_0010144; AC_CPUC_0010157; AC_CPUC_0010167; AC_CPUC_0010176;
AC_CPUC_0010177; AC_CPUC_0010186; AC_CPUC_0010187; AC_CPUC_0010188;
AC CPUC 0010196; AC CPUC 0010197; AC CPUC 0010208; AC CPUC 0010209;
AC_CPUC_0010211; AC_CPUC_0010218; AC_CPUC_0010221; AC_CPUC_0010222;
AC CPUC 0010223; AC CPUC 0010228; AC CPUC 0010229; AC CPUC 0010232;
AC_CPUC_0010233; AC_CPUC_0010248; AC_CPUC_0010249; AC_CPUC_0010252;
AC_CPUC_0010261; AC_CPUC_0010262; AC_CPUC_0010270; AC_CPUC_0010271;
AC_CPUC_0010277; AC_CPUC_0010288; AC_CPUC_0010289; AC_CPUC_0010291;
AC_CPUC_0010296; AC_CPUC_0010297; AC_CPUC_0010300; AC_CPUC_0010301;
AC_CPUC_0010310; AC_CPUC_0010312; AC_CPUC_0010319; AC_CPUC_0010320;
AC_CPUC_0010323; AC_CPUC_0010329; AC_CPUC_0010342; AC_CPUC_0010343;
AC_CPUC_0010347; AC_CPUC_0010350; AC_CPUC_0010351; AC_CPUC_0010357;
AC_CPUC_0010370; AC_CPUC_0010371; AC_CPUC_0010377; AC_CPUC_0010384;
AC_CPUC_0010385; AC_CPUC_0010397; AC_CPUC_0010406; AC_CPUC_0010413;
AC_CPUC_0010414; AC_CPUC_0010415; AC_CPUC_0010423; AC_CPUC_0010424;

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#### SOCALGAS RESPONSE DATED DECEMBER 13, 2019

AC CPUC 0010429; AC CPUC 0010430; AC CPUC 0010437; AC CPUC 0010445; AC CPUC 0010448; AC CPUC 0010455; AC CPUC 0010456; AC CPUC 0010461; AC CPUC 0010470; AC CPUC 0010473; AC CPUC 0010483; AC CPUC 0010484; AC\_CPUC\_0010488; AC\_CPUC\_0010511; AC\_CPUC\_0010515; AC\_CPUC\_0010527; AC CPUC 0010528; AC CPUC 0010532; AC CPUC 0010537; AC CPUC 0010540; AC\_CPUC\_0010547; AC\_CPUC\_0010555; AC\_CPUC\_0010557; AC\_CPUC\_0010558; AC CPUC 0010561; AC CPUC 0010563; AC CPUC 0010572; AC CPUC 0010576; AC CPUC 0010586; AC CPUC 0010599; AC CPUC 0010613; AC CPUC 0010617; AC\_CPUC\_0010621; AC\_CPUC\_0010631; AC\_CPUC\_0010638; AC\_CPUC\_0010641; AC CPUC 0010648; AC CPUC 0010649; AC CPUC 0010655; AC CPUC 0010658; AC CPUC 0010659; AC CPUC 0010660; AC CPUC 0010680; AC CPUC 0010690; AC CPUC 0010691; AC CPUC 0010700; AC CPUC 0010705; AC CPUC 0010711; AC CPUC 0010715; AC CPUC 0010716; AC CPUC 0010719; AC CPUC 0010721; AC\_CPUC\_0010727; AC\_CPUC\_0010743; AC\_CPUC\_0010754; AC\_CPUC\_0010756; AC CPUC 0010764; AC CPUC 0010765; AC CPUC 0010769; AC CPUC 0010770; AC CPUC 0010778; AC CPUC 0010779; AC CPUC 0010786; AC CPUC 0010787; AC CPUC 0010793; AC CPUC 0010799; AC CPUC\_0010813; AC\_CPUC\_0010842; AC CPUC 0010848; AC CPUC 0010849; AC CPUC 0010857; AC CPUC 0010863; AC\_CPUC\_0010865; AC\_CPUC\_0010874; AC\_CPUC\_0010875; AC\_CPUC\_0010882; AC CPUC 0010887; AC CPUC 0010888; AC CPUC 0010897; AC CPUC 0010908; AC CPUC 0010919; AC CPUC 0010924; AC CPUC 0010926; AC CPUC 0010929; AC\_CPUC\_0010935; AC\_CPUC\_0010941; AC\_CPUC\_0010948; AC\_CPUC\_0010950; AC CPUC 0010957; AC CPUC 0010961; AC CPUC 0010965; AC CPUC 0010981; AC CPUC 0010989; AC CPUC 0010994; AC CPUC 0010996; AC CPUC 0011014; AC CPUC 0011019; AC CPUC 0011029; AC CPUC 0011033; AC CPUC 0011041; AC CPUC 0011050; AC CPUC 0011054; AC CPUC 0011062; AC CPUC 0011077; AC CPUC 0011090; AC CPUC 0011125; AC CPUC 0011140; AC CPUC 0011148; AC CPUC 0011150; AC CPUC 0011164; AC CPUC 0011169; AC CPUC 0011170; AC CPUC 0011173; AC CPUC 0011176; AC CPUC 0011179; AC CPUC 0011182; AC CPUC 0011185; AC CPUC 0011188; AC CPUC 0011191; AC CPUC 0011194; AC CPUC 0011197; AC CPUC 0011200; AC CPUC 0011203; AC CPUC 0011206; AC CPUC 0011209; AC CPUC 0011212; AC CPUC 0011215; AC CPUC 0011218; AC CPUC 0011221; AC CPUC 0011224; AC CPUC 0011227; AC CPUC 0011230; AC CPUC 0011233; AC CPUC 0011236; AC CPUC 0011239; AC CPUC 0011242; AC CPUC 0011245; AC CPUC 0011248; AC CPUC 0011251; AC CPUC 0011254;

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AC\_CPUC\_0011257; AC\_CPUC\_0011260; AC\_CPUC\_0011263; AC\_CPUC\_0011266; AC\_CPUC\_0011269; AC\_CPUC\_0011272; AC\_CPUC\_0011275; AC\_CPUC\_0011278; AC\_CPUC\_0011281; AC\_CPUC\_0011284; AC\_CPUC\_0011287; AC\_CPUC\_0011290; AC\_CPUC\_0011293; AC\_CPUC\_0011296; AC\_CPUC\_0011299; AC\_CPUC\_0011302; AC\_CPUC\_0011305; AC\_CPUC\_0011308; AC\_CPUC\_0011311; AC\_CPUC\_0011314; AC\_CPUC\_0011317; AC\_CPUC\_0011320; AC\_CPUC\_0011323; AC\_CPUC\_0011326; AC\_CPUC\_0011329; AC\_CPUC\_0011334; AC\_CPUC\_0011337; AC\_CPUC\_0011340; AC\_CPUC\_0011343; AC\_CPUC\_0011348; AC\_CPUC\_0011351; AC\_CPUC\_0011356; AC\_CPUC\_0011359; AC\_CPUC\_0011594; AC\_CPUC\_0011618.

c. Please see the enclosed electronic documents with the following Bates ranges: I1906016\_SCG\_SED\_DR\_47\_0000297 - I1906016\_SCG\_SED\_DR\_47\_0000580.

d: Please the enclosed electronic documents with the following Bates ranges: I1906016 SCG SED DR 47 0000093 -

11906016 SCG SED DR 47 0000296.

e-h: Please see the previously provided SS-25 well file documents and/or well related with Bates ranges:

AC\_CPUC\_0000023 - AC\_CPUC\_0000759

AC CPUC 0012338 to AC CPUC 12389

AC CPUC 0206158 - AC CPUC 0208846

i: SoCalGas objects to this request to the extent it assumes additional unscheduled pressure readings to investigate the integrity of the well were performed or required. Subject to and without waving the foregoing objection, SoCalGas responds as follows: Please see Response 2b.

j. SoCalGas objects to this request to the extent it assumes additional unscheduled temperature surveys to investigate the integrity of the well were performed or required. Subject to and without waving the foregoing objection, SoCalGas responds as follows:

Please see the previously provided SS-25 well file documents and/or well related information with Bates ranges:

AC\_CPUC\_0000023 - AC\_CPUC\_0000759 AC\_CPUC\_0012338 to AC\_CPUC\_12389

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#### AC\_CPUC\_0206158 - AC\_CPUC\_0208846

k: SoCalGas objects to this request to the extent it assumes additional unscheduled noise surveys to investigate the integrity of the well were performed or required. Subject to and without waving the foregoing objection, SoCalGas responds as follows:

Please see the previously provided SS-25 well file documents and/or well related information with Bates ranges:

AC\_CPUC\_0000023 - AC\_CPUC\_0000759

AC\_CPUC\_0012338 to AC\_CPUC\_12389

AC\_CPUC\_0206158 - AC\_CPUC\_0208846

I: SoCalGas objects to this request to the extent it assumes additional unscheduled gas sampling was performed or required. Subject to and without waving the foregoing objection, SoCalGas responds as follows. N/A m: SoCalGas objects to this request to the extent it assumes other investigative work was performed or required. Subject to and without waving the foregoing objection, SoCalGas responds as follows:

Please see the previously provided SS-25 well file documents and/or well related information with Bates ranges:

AC\_CPUC\_0000023 - AC\_CPUC\_0000759 AC\_CPUC\_0012338 to AC\_CPUC\_12389 AC\_CPUC\_0206158 - AC\_CPUC\_0208846

## QUESTION 3:

With regards to the passage on Page 4 Lines 6-13 quoted in question 2, please answer:

FOR WELL SS-25: For every instance of an abnormal condition identified in the records of inspections listed above, state how the problem was resolved and provide all records that document the resolution.

## SOUTHERN CALIFORNIA GAS COMPANY

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## **RESPONSE 3:**

SoCalGas objects to this request on the ground it is duplicative to the extent SED already is in possession of these records. SoCalGas further objects to this request on the grounds it is broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas additionally objects to this request to the extent it is not limited to a specific period of time to which SoCalGas may tailor its response.

Subject to and without waiving the foregoing objections, SoCalGas responds as follows:

Please see the previously provided SS-25 well file documents and/or well related information with Bates ranges:

AC\_CPUC\_0000023 - AC\_CPUC\_0000759 AC\_CPUC\_0012338 to AC\_CPUC\_12389 AC\_CPUC\_0206158 - AC\_CPUC\_0208846

SoCalGas identified certain temperature surveys run in the 1980's as having a temperature anomaly. These anomalies were investigated with noise surveys and a tracer survey in 1984 and were found not to be indicative of a well integrity issue. Please see attached 1984 temperature surveys, noise logs and RA tracer survey. Subsequent noise logs were run in 1991, 2006, and 2012 which also did not indicate any well integrity issue.

## **QUESTION 4:**

Pages 4-5, paragraph beginning p.4 line 26, which states,

"Once each week, SoCalGas field operators connected a pressure gauge to instrumentation tubing at the well site to check the pressure in each tubular space within the well: (1) the interior of the tubing (tubing pressure), (2) the annular space between the tubing and the production casing (casing pressure), and (3) the annular space between the production casing and the surface casing (surface casing pressure). In a well such as SS-25 that allows for casing flow, the tubing and casing are exposed to the

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storage zone pressure and, as a result, the tubing, casing, and storage zone pressures are nearly equal."

With this passage in mind, please answer:

Provide all pressure gauge reading records taken BEFORE October 24, 2015 (including the day of the well failure) by field operators using a pressure gauge connected to instrumentation tubing at the SS-25 well site to check the pressure in each of the tubular spaces within the well as described in this paragraph.

#### **RESPONSE 4:**

SoCalGas objects to this request on the ground it is duplicative to the extent SED already is in possession of these records. Subject to and without waiving the foregoing objection, SoCalGas responds as follows:

Please see Response 2b and the enclosed electronic document with the following Bates ranges: I1906016\_SCG\_SED\_DR\_47\_0000582.

#### QUESTION 5:

Page 5 lines 8-9, states,

*"Further investigation would typically consist of checking the wellhead seals, and/or running temperature/noise surveys, and/or gas sampling."* With this in mind, please answer:

- **a.** For Well SS-25, identify by date and type of investigation all "further investigations" that occurred over the life of the well.
- **b.** For each investigation identified, provide all records related to that investigation, including results and follow up work to resolve and problems identified.

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## RESPONSE 5:

**a.** Please see Response 3.

**b.** SoCalGas objects to this request on the ground it is duplicative to the extent SED already is in possession of these records. Subject to and without waiving the foregoing objection, SoCalGas responds as follows:

Please see Response 3. The weekly pressure records indicate that the surface pressure readings of SS25 were not anomalous and consequently there was no reason for SoCalGas to conduct further investigations.

## **QUESTION 6:**

Page 6 Lines 22-26, states,

"SoCalGas used the removal of the tubing during a workover as an opportunity to perform certain kinds of integrity tests on the well's production casing that are not possible when the tubing is in place, such as running an ultrasonic inspection tool ("USIT"), which uses ultrasonic sound waves to circumferentially measure the internal radius and thickness of the casing as well as cement quality."

With this in mind, please answer:

**a.** For Well SS-25, provide all records pre-October 23, 2015, that show removal of the tubing during a workover and performance of integrity tests on the well's production casing, including but not limited to ultrasonic inspection.

## RESPONSE 6:

SoCalGas objects to this request on the grounds it assumes facts. Subject to and without waiving the foregoing objection, SoCalGas responds as follows:

SoCalGas conducted three workovers on SS25 in which the tubing was removed. The

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initial workover was performed to convert the well to gas storage, followed by two workovers related to the deep-set sub-surface safety valve. Please see Division of Oil & Gas – History of Oil or Gas Well reports dated September 5, 1973, July 29, 1976, and February 21, 1979. Please see previously provided SS-25 well file documents and/or well related information with Bates ranges:

> AC\_CPUC\_0000023 - AC\_CPUC\_0000759 AC\_CPUC\_0012338 to AC\_CPUC\_12389 AC\_CPUC\_0206158 - AC\_CPUC\_0208846

#### **QUESTION 7:**

Page 6 Lines 28-30, states,

"Prior to October 23, 2015, SoCalGas successfully addressed and repaired infrequent casing leaks as they arose. SoCalGas' monitoring, inspection, and testing program successfully identified and stopped leaks." With this in mind, please answer the following:

- a. For Well SS-25, identify all instances of casing leaks identified by SoCalGas, and how each leak was repaired.
- b. Provide the records showing the date of each leak listed in response to question 7a.
- c. Provide the records related to the each leak listed in response to question 7a.

## **RESPONSE 7:**

a. SoCalGas had not identified any instances of casing leaks in SS25 prior to October 23, 2015.

b. Please see Response 7a.

c. Please see Response 7a.

## QUESTION 8:

Page 7 Lines 12-20, states,

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"As an additional safety measure, SoCalGas had in place a remote well kill system so that SoCalGas could kill the well in the event the well site was inaccessible. The system consisted of valves and piping connected to the wellhead, separate from the flow side of the wellhead, specifically to allow remote well kill. The piping ran to a remote area from the wellhead so that pumping equipment could be staged away from the immediate wellhead area, if necessary. Additionally, each well was connected to a kill network of piping so that an individual well could be killed from a nearby well. Company procedures dictated that the well kill valves on the wellhead remain in the open position at all times during operations, thus maintaining remote kill ability at all times."

With this passage in mind, please answer:

For Well SS-25, provide a drawing showing how the well was connected to the remote well kill system (network) as described in the passage quoted in this question.

## **RESPONSE 8:**

Please see the enclosed electronic document with the following Bates range: I1906016\_SCG\_SED\_DR\_47\_0000581.

## **QUESTION 9:**

With regards to the passage quoted in question 8, and as shown on page 7 Lines 1220, please answer the following:

- **a.** For Well SS-25, provide records showing an instance when this system was successfully used to kill the well before October 23, 2015.
- **b.** Include operating records that documented the well conditions before, during, and after the well kill event.

## RESPONSE 9:

a. The remote well kill system was not utilized to kill SS-25 prior to October 23, 2015.

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b. N/A

## **QUESTION 10:**

With regards to the passage quoted in question 8, and shown on page 7 Lines 12-20, please answer the following: For Well SS-25, was this system used on, or after, October 23, 2015?

- a. If the response is "no," explain why not.
- b. If the response is "yes," identify the dates when the system was used and for each instance identified, provide records showing plans for the well kill(s), problems encountered with the system, and how each problem identified was resolved.

## RESPONSE 10:

a. SoCalGas objects to this request to the extent it assumes the referenced well kill system should or was required to be used on, or after, October 23, 2015. SoCalGas further objects to this request as vague and ambiguous. Subject to and without waiving the foregoing objections, SoCalGas responds as follows:

Please refer to the Prepared Opening Testimony of Mr. Schwecke. The well kill system was not utilized to remotely kill SS-25 for the first well kill attempt performed by SoCalGas since there was direct access to the SS-25 wellhead. Well kill attempts 2 –7 were performed by Boots & Coots.

b. N/A

## **QUESTION 11:**

Page 7 lines 25-27 states in part, "Prior to moving the workover rig on the well, operators would remove any plugs that were set for mechanical isolation. . ."

With this in mind, please answer the following:

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- a. For Well SS-25 on or after October 23, 2015: Did this well have "any plugs that were set for mechanical isolation"?
- b. If the response is "no," explain why not.
- c. If the response is "yes," provide records that show installation of the plugs, how many were installed, and removal of the plug(s) after October 23, 2015 prior to the first well kill attempt.

## RESPONSE 11:

SoCalGas objects to this request to the extent it assumes mechanical isolation was possible or appropriate. Subject to and without waiving the foregoing objection, SoCalGas responds as follows:

a. No, SS-25 did not have plugs set for mechanical isolation on or after October 23, 2015.

b. Due to the nature of the leak, it was determined that mechanical isolation was not appropriate.

**c.** N/A

## **QUESTIONS 12:**

Page 7, lines 30-31 and page 8 line 1 states,

"Following the workover, SoCalGas prepared a "History of Oil or Gas Well" report that described the daily work conducted, including detailing changes in the downhole configuration."

Regarding this passage, please answer:

For Well SS-25, provide copies of all of the History of Oil or Gas Well reports created after October 23, 2015.

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## RESPONSE 12:

Please see the enclosed electronic documents with the following Bates ranges: I1906016\_SCG\_SED\_DR\_47\_0000001 - I1906016\_SCG\_SED\_DR\_47\_0000092.

## **QUESTION 13:**

Page 8, lines 1-3 state as follows:

"In addition to this report, following the workover, SoCalGas submitted required workover records, including casing inspection logs, to DOGGR."

With this in mind, please answer the following:

a. For Well SS-25. Provide copies of all workover records, including casing inspection logs, provided to DOGGR after October 23, 2015.

## **RESPONSE 13:**

Please see the DOGGR website via the following link:

https://secure.conservation.ca.gov/WellSearch/Details?api=03700776&District=&County =&Field=&Operator=&Lease=&APINum=03700776&address=&ActiveWell=true&Active Op=true&Location=&sec=&twn=&rge=&bm=&PgStart=0&PgLength=10&SortCol=6&Sor tDir=asc&Command=Search

## QUESTION 14:

Page 8, lines 4-16, state,

"UGS wells were additionally equipped with safety systems designed to shut-in wells in order to prevent or mitigate leaks in the wellhead or surface piping.

The surface safety system consisted of fail-close pneumatic operated valves located on the wellhead and designed to close by any of the following methods:

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- Low pressure pilot shuts in well if a break in the surface piping causes the wellhead pressure to drop below a threshold value;
- High pressure pilot shuts in well if pressure in the surface withdrawal line exceeds a threshold value;
- Sacrificial sand erosion probe shuts in well upon excessive erosive sand production;
- Fusible plug shuts in well if a fire occurs in the well cellar; and
- Remote shut down station allows for wells to be shut-in manually from a remote distance from the wellhead."

With this passage in mind, please answer the following:

For Well SS-25: Confirm that this well was equipped with safety systems designed to shut-in the well in order to prevent or mitigate leaks in the wellhead or surface piping.

- **a.** If the response is "no," explain why not.
- **b.** If the response is "yes," provide records of all instances where the well was shut in using this safety system and identify the method (shown in lines 8-16) for each instance the well was shut in.

## **RESPONSE 14:**

SoCalGas objects to this request to the extent it fails to provide a time period to which SoCalGas may tailor its response. Subject to and without waiving the foregoing objection, SoCalGas responds as follows:

a. N/A

b. SoCalGas further objects to this request to the extent it assumes SS-25 was shut-in

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using the referenced safety systems. Subject to and without waiving the foregoing objection, SoCalGas responds as follows:

SoCalGas interprets this request to seek information prior to October 23, 2015.

Yes. SS25 was equipped with the safety systems identified above. As a general practice, SoCalGas did not keep a record of instances when surface safety systems shut-in a well.

F. W. SCHREMP J. F. CHITTUM T. S. ARCZYNSKI CALIFORNIA RESEARCH CORP. LA HABRA, CALIF. STANDARD OIL CO. OF CALIF. LA HABRA, CALIF.

#### ABSTRACT

This paper describes a laboratory study of causes of external casing corrosion and the test work that led to the use of oxygen scavengers to prevent this attack. External casing failures are classified as water-line, casing-casing, collar and body failures. A corrosion mechanism based on principles of differential oxygen availability is developed that is consistent with facts known about each kind of failure. The field use of oxygen scavengers is depicted as a direct result of the laboratory study.

A part of the paper is devoted to reporting on the field use of hydrazine to control external casing corrosion. Results of field measurements made over a period of several years are presented as evidence of the effectiveness of the hydrazine treatment. The first conclusion reached is that the use of hydrazine materially reduces the cathodic protection requirements for treated wells. This result is interpreted to mean that a reduction is taking place in the amount of corrosion on the casing. Results indicate also that hydrazine shows its greatest usefulness within the first 12 to 18 months after a well is completed when pitting corrosion is likely to be most active.

#### INTRODUCTION

According to surveys sponsored by the National Association of Corrosion Engineers,<sup>1</sup> the cost of repairing casing leaks caused by external corrosion may exceed \$4 million per year. In addition, well damage and lost production resulting from casing

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leaks probably costs the petroleum industry an additional \$5 to \$6 million per year.

Concern about the cost of external casing corrosion led to an extensive laboratory study of factors causing this external corrosion and to the development of a new approach to its prevention. This paper presents a discussion of various causes of external casing corrosion, details of laboratory studies and the results of the field use of an oxygen scavenger in well cementing fluids to prevent the external corrosion of oil-string casing.

Measurements on test wells over a period of several years show that cathodic-protection current requirements are greatly reduced when hydrazine is used in cementing mud. Reduction of current requirements can be interpreted to mean that removal of oxygen by hydrazine has greatly suppressed corrosion cells on the external surface of the casing and thereby, has reduced corrosion.

To date, hydrazine has been used by the Standard Oil Co. of California in more than 200 well completions.

#### KINDS OF CASING FAILURES

A survey of a large number of casing leaks disclosed four types of external casing failures --- waterline, casing-casing, collar and body failures. These types are identified largely by their location on the casing. Water-line failures are found just below the surface of water or mud in the casing annulus. Casing-casing failures occur on the oil string just below the shoe of the surface string. Collar failures are found in the threaded ends of casing joints where they are screwed into casing collars. Body failures may occur at any point on the body of a casing joint. Examples of each kind of failure have some of the general characteristics that are shown in Fig. 1.

Water-line failures usually result in the circumferential severance of an oil-string casing. The corrosive action causing a water-line failure usually is sharply defined and is limited to a short length of the casing. Casing-casing failures usually are accompanied by pitting corrosion distributed around the oil-string casing for distances up to 100-ft below the shoe of the surface string. Casing-casing failures may also sever the casing. Collar failures seem to start on the first thread at the bottom of recesses between collar and casing joint. Corrosion proceeds across the threads by what appears to be a normal pitting mechanism. Both casing and collar are severely attacked. Body failures are the result of highly localized pitting at any point on a casing wall. Besides the pit that perforates a casing, a large number of other pits usually are found along one side of the casing joint. The pits occasionally are filled with corrosion products consisting largely of oxides and sulfides.<sup>2</sup> Frequently, the mill scale is largely intact on the rest of the casing.

Examination of a casing failure does not always reveal the cause of the failure. Frequently, the necessary details are destroyed when the failure occurs. For example, formation water flowing through a perforation at high velocity may enlarge the hole and destroy any remaining evidence of the cause of the failure. One way to obtain undistorted information about a failure is to study the nature of other pits on the casing in the vicinity of the failure. A study of such pits frequently suggests that they are characteristic of an attack resulting from the differential availability of molecular oxygen.

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<sup>&</sup>lt;sup>1</sup>References given at end of paper.

#### CONDITIONS LEADING TO EACH TYPE OF CASING CORROSION

#### WATER-LINE ATTACK

Water-line attack is found in wells with open casing annuli. Air diffuses into the casing annulus and makes oxygen available for the cathode reaction,

$$\frac{1}{2}0_2 + H_20 + 2e^- = 20H^-$$

This reaction occurs at the fluid-air interface. Just below the interface the fluid is deficient in oxygen, but the metal lattice is exposed so metallic iron takes part in the anode reaction,

 $Fe = Fe^{++} + 2e^{-}$ . (2) Occurrence of these reactions at the fluid-air interface will result in corrosive attack on the casing just below the fluid-air interface. Prolonged reaction at a constant interface level will result in a severed casing, as shown in Fig. 1(A).

Other chemical reactions also take place during the process of casing corrosion. These reactions, as shown by Eqs. 3 and 4, also help maintain the potential of the corrosion cell.

 $Fe^{++} + 20H^{-} = Fe(OH)_{2}$ . (3)  $3Fe(OH)_{2} + \frac{1}{2}O_{2} = Fe_{3}O_{4} + 3H_{2}O_{3}$ 

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tion near the fluid-air interface causes the attack to continue and be concentrated near this interface, as shown in Fig. 2(A). This corrosion mechanism is identical to that first given by Evans<sup>3,4</sup> in formulating his principle of "differential aeration" as the cause of pitting.

#### CASING-CASING CORROSION

Casing-casing corrosion occurs when oil and surface casing strings are in contact with two different muds. Such an occurrence is possible when the surface string is imperfectly cemented. The difference in mud composition may be either in oxygen content or pH, or both. If the oil string is in contact with a mud of lower pH than the surface string, or with mud having a lower oxygen concentration than the surface string, the oil string will behave as an anode.

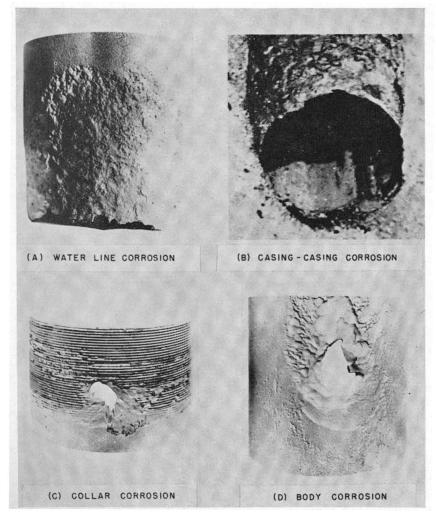


FIG. 1-EXAMPLES OF THE VARIOUS TYPES OF CASING CORROSION.

The reaction of Eq. 2 will be concentrated on the oil string near the shoe of the surface string, and iron will be removed most rapidly from the casing surface at any susceptible points on the metallic lattice. The cathode reaction of Eq. 1 will occur on the surface string. The complete corrosion cell with current lines in solution is illustrated in Fig. 2(B).

#### COLLAR FAILURE

Collar failure may be caused solely by improper joint make-up. The original leak in this case would be enlarged by erosion-corrosion while formation water flows through it. Improper joint make-up includes joints not torqued sufficiently to make a tight joint, and galled threads resulting from damaged threads, or failure to use lubricant.

Failure due to corrosion also may occur in the recess between the threaded portion of the casing joint and the end of the collar. The mechanism of such a failure is illustrated in Fig. 2(C). Differential availability of oxygen in the recess may set up the condition in which the anode reaction (Eq. 2) can take place on the exposed thread. The cathode reaction of Eq. 1 could occur on the millscale-coated casing adjacent to the recess. The potential of this cell could be maintained by the reactions of Eqs. 3 and 4. Current in this cell can be expected to produce rapid attack on the exposed threads.

#### BODY CORROSION

Body corrosion apparently occurs when differential conditions produce a corrosion cell along the body of a casing joint. The tendency for pitting to occur along one side of a casing joint suggests the possibility of mill-scale damage being the cause of increased corrosion susceptibility. Usually, the rest of the varnish and mill-scale coating on the surface of the joint is undamaged. Mill-scale damage of this kind along one side of a casing string can occur as the casing is run into a well. The removal of mill scale exposes the metallic lattice directly to the cementing mud. Under these conditions, the anode reaction of Eq. 2 takes place on the exposed iron. The small anode and large cathode areas cause highly localized corrosive attack.

Localized corrosive attack also may be created when formation waters free from oxygen seep into the mud and make contact with the casing at small areas. The points of contact with the formation water will be anodic to the rest of the

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casing. Furthermore, colonies of bacteria in a pit on a casing may localize corrosive action.<sup>5</sup> The metal surface covered by corrosion products from which bacteria have removed oxygen may be anodic to the surrounding casing surface. Both of these conditions will cause pitting corrosion. Two kinds of body corrosion are illustrated in Fig. 2(D).

#### CAUSES OF CASING CORROSION

The various kinds of casing corrosion were studied in the laboratory by devising experiments to simulate each kind of corrosion. Both potential and current measurements were made as a function of time in an effort to follow the effects of the various conditions that were changed during the study.

#### WATER-LINE CORROSION

A laboratory study was carried out to determine the magnitude of the potentials that could be built up to cause water-line corrosion. A water sample was collected from a casing annulus and adjusted to anaerobic conditions comparable to those in the casing annulus. Potentials (referred to saturated calomel electrode) of a small iron electrode were measured at different levels below the surface of the water sample. In the test apparatus, an iron electrode was sealed with insulating material into a hole through the wall of an iron tube so that the potentials of this electrode could be measured separately as the tube was moved up and down in the water. Atmospheres of air, nitrogen and oil-air were used successively above the water during the study. Fig. 3 shows that there was a 90-mv difference in the first 5 to 10 mm below the surface of the water sample as a result of differential oxygen concentration. Nitrogen atmosphere and the oil layer prevented the formation of the oxygen concentration cell.

A study of the current obtainable from a water-line corrosion cell and the nature of the anode was carried

CONCENTRATION CONSUMED 1/2 02 + H2 0+2 . -= 20H FLOW ION BEING t\_2. CASING SALT WATER ് CONCENTRATION PRIMARY REACTIONS CORRODIN T DEPOSIT + 20H - Fe(OH)2 - Fe 0 - 3H2 RUST DEPOSIT 3 Fe (OH) + 2 02 - Fe 04-CORRODING AREA SALT WATER SECONDARY REACTION COLLAR (A) WATER LINE CORROSION (C) COLLAR CORROSION SCALE SURFACE CASING MILL OIL STRING CASING 10+H0+20 z BREAK FORMATION CONCENTRATION MUD **FNT** CEMENTING CASING FORMATION ് Fe --- Fe<sup>++</sup>+2e FORMATION HIGHER Fe++ 20H -+ Fe 0 + H\_O (B) CASING - CASING CORROSION (D) BODY CORROSION

FIG. 2-MECHANISMS OF THE VARIOUS TYPES OF CASING CORROSION.

out in apparatus shown in Fig. 4. Six steel rods <sup>1</sup>/<sub>4</sub>-in. in diameter and 3-feet long were centered in <sup>3</sup>/<sub>4</sub>-in. glass tubes with rubber stoppers. The first of three steel rods—A, B and C—were each cut in two pieces and reconnected by means of short pieces of plastic rod. Wires were attached to the top and bottom ends of the

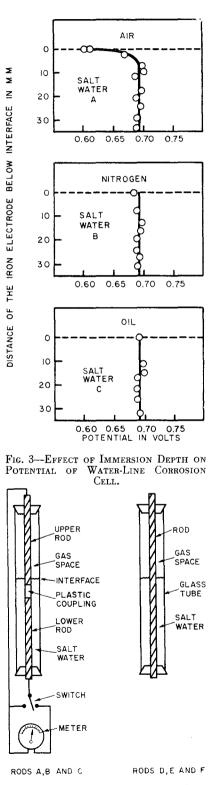


FIG. 4 — ARRANGEMENT OF TEST RODS USED TO MEASURE THE CURRENT CA-PACITY OF WATER-LINE CORROSION CELLS.

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three re-assembled rods. Each pair of wires was connected outside the glass tube to complete the cell. On occasion, these wires were disconnected and reconnected to an ammeter to measure the current flowing between the two sections of each rod. The remaining three rods-D, E and F—were left intact. The glass tubes were mounted in a vertical position, and formation water was poured in each tube so that the lower half of each rod was submerged. Fluid in the tubes containing the plastic-separated rods was adjusted so that the top of the plastic coupling was 1/2-in. below the water-air interface.

Rod A was allowed to stand for 60 days in formation water with the water surface open to the air. Rod B was allowed to stand for 10 days, and then a small amount of oil was poured on top of the water for the remaining 50 days of the test. Rod C was treated similarly to Rod B except that the oil contained 1 per cent of an oil-soluble corrosion inhibitor. The three unbroken rods-D, E and F-also were permitted to stand partially submerged in the formation water for the 60-day test. During this period, air was maintained above the water line on Rod D, an oil-air interface was maintained above the water line on Rod E and nitrogen gas was maintained above the water on Rod F.

Results of current measurements are shown in Fig. 5 for each of the three separated rods. Fig. 6 shows the appearance of all six rods after the 60-day test. The current produced in such a corrosion cell will flow for as long a time as the differential oxygen concentration exists.

FIG. 5-EFFECT OF OIL LAYER ON WATER-LINE CORROSION-CELL CURRENT.

The anodic action is sharply localized on the iron below the liquid surface. Action of the water-line corrosion cell can be minimized by placing a refined oil layer on the water surface or by removal of oxygen from the gas space above the liquid surface.

#### CASING-CASING CORROSION

The potentials of casing-casing corrosion cells were next studied. Muds of different pH and different molecular oxygen concentrations were obtained, and the potentials of iron electrodes against a saturated calomel electrode were measured in these muds. Results of these measurements are shown in Fig. 7. Iron became more cathodic with increasing pH of the muds. Between pH 9.0 and pH 13.0, an iron potential was shown to be more anodic as the oxygen concentration in the mud was decreased.

The nature of the current density on an oil-string casing was studied using a model in which the oil string and the surface string were separate electrodes. The current was found to be quite concentrated along the length of oil string immediately below the shoe of the surface string. Decrease in current density below

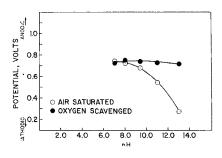


FIG. 7—EFFECT OF pH ON THE POTEN-TIAL OF IRON IN AIR-SATURATED AND OXYGEN-SCAVENCED DRILLING MUD AT 150°F.

this point was found to behave according to accepted principles of potential theory.

An additional study was carried out with the apparatus shown in Fig. 8. The cathode was made out of three short sections of iron pipe welded together concentrically, and the anode was made of a small iron coupon. Welded areas of the cathode were coated with plastic to eliminate galvanic couples at the weld joints. The area of the cathode was about 330 sq in. The area of the anode was 2 sq in. The cathode was placed in mud at a pH of 12.1, the anode in mud at a pH of 8.5. The two electrodes then were shorted together for

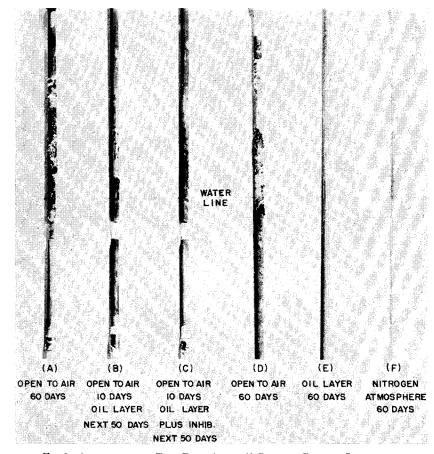


FIG 6---APPEARANCE OF TEST RODS AFTER 60 DAYS OF PARTIAL SUBMERSION IN FORMATION SALT WATER.

several days. The results of measurements are shown in Table 1.

The results of these tests show that corrosion cells with potentials of 0.2 to 0.6 v might be expected between two casings in contact with aerated muds of different pH. The current-producing capacity of such cells is substantial. During tests on casing models, the current from an oil string that is anodic was shown to be concentrated at the surface area where casing-casing corrosion has been found to be severe in the field. It further was found that the potential of a casing becomes more anodic as the oxygen concentration decreases.

#### COLLAR CORROSION

The potential of a collar-corrosion cell was measured in mud utilizing the recess between a joint of 91/4-in. casing and a casing collar. A ring made from 0.005-in. diameter iron wire was placed in the bottom of the recess, and its potential was measured with respect to another iron-wire ring outside of the recess. The arrangement of wires in this apparatus is shown in Fig. 9(A). The iron wires were protected from contact with either the casing or the collar by means of heavy cotton cloth. The measured potentials of the two iron wires are compared in Table 2. The current-carrying capacity of the collar corrosion cell is given also in Table 2.

Test results indicated that a potential of about 0.2 v might be exTABLE 1-WEIGHT LOSS OF ANODE IN SHORTED CASING-CASING CORROSION CELLS IN 12-DAY TEST

	Cathode	Anode	
Sol.	Init. Poten. pH (v)(—)	Init. Poten. Sol. pH (v)(~~)	Weight Loss (gm) Cal. Meas.
Mud	12.1 0.170	Mud 8.5 0.760	0.090 0.117

pected from the collar corrosion cell. The current-producing capacity of such a cell is substantial and can be expected to produce current so long as the differential oxygen concentration exists. Observations also indicated that the anode was located so that the corrosion would be concentrated on the first exposed thread of the joint.

#### BODY CORROSION

A corrosion cell consisting of bare iron and mill scale was studied first. Electrodes of mill scale and millscale-coated iron were prepared in an electric furnace at 1,800°F. The potentials of the bare-iron and millscale electrodes were measured againt a saturated calomel electrode in muds of various pH's. Results of these measurements are shown in Table 3.

Other electrodes of mill-scalecoated iron were assembled with sand-blasted iron electrodes in sealed jars, as shown in Fig. 9(B). The muds placed in these jars were given various treatments to introduce or remove molecular oxygen. Electrical currents produced by these cells were measured with a zero-resistance milliameter and are given in Table 4.

The results of tests on mill-scale

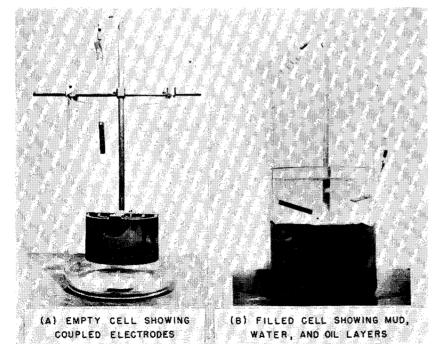


FIG. 8—CORROSION CELL FOR STUDY OF ELECTROLYTIC CAPACITY OF IRON IN DIFFERENT FLUIDS

electrodes showed that potentials of 0.2 to 0.3 v can be produced by a bare iron-mill scale corrosion cell. The current-producing capacity of this cell is sufficient to last indefinitely when molecular oxygen is available, and for weeks even if molecular oxygen is not available. Ultimately, as was observed at the end of several years, the current flow stops when sources of oxygen are depleted.

The effect of formation water on body corrosion was studied next. This study was undertaken because of the severity of corrosion in some oil fields where high-pressure formation fluids were believed to aggravate external casing corrosion. In laboratory tests, penetration of highpressure formation water into cementing mud was found to follow vertical paths in the mud and was thought possibly to account for pitting along one side of a casing joint.

Iron electrode potentials measured in typical formation waters of pH's 6.5 to 8.0 are shown in Table 5. These potentials are compared with potentials of the same iron electrodes in high-pH aerated muds. The corrosion capacity expressed as coupon weight loss for the anode of a cell made from these electrodes also is given. The tests again showed that potentials of the corrosion cells made by the formation water-mud con-

TABLE RENTS	MEASUR	ROSION RED IN RE	CESS BET	WEEN C	
		Potentia Wires (	l of Iron	Current ( at End of Between Shorted T	3-Min. Wires
Sol.	pН	Recessed		10-ohm I	
Mud Mud	12.0 10.5	0.622 0.680	0.352 0.650	2.0 0.6	
TABLE IRON	ELECTRO		OF MI	LINE DR	
		!I-Scale	Sand-B		Poten.
Time (mos.)		on Elec. n. (v) (-)	Iron I Poten. (		Difř. (v)
Start		0.272	0.54		0.268
1		0.284 0.310	0.51 0.50		0.229
2 3 4		0.329	0.48	3	0.154
4		0.338	0.47	0	0.132
TABLE SCALE DRI	AND	RENT MEA IRON ELE AUD PURG	CTRODES	IN AL	KALINE
			Current (r	nilliamps	1
Time (mos.)		Short Electro			horted* ctrodes
Start		0.05			0.030
1		0.04			0.090

0.001

0.065

\*Instantaneous reading

0.105

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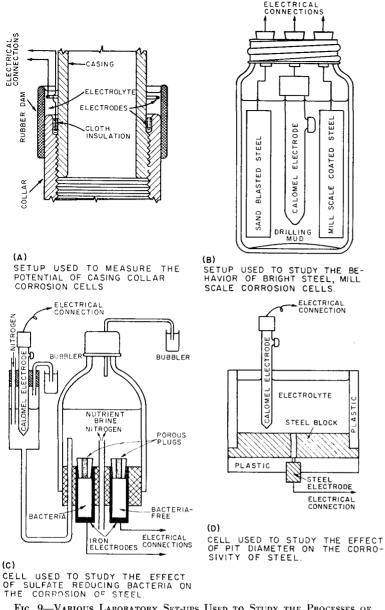


FIG. 9—VARIOUS LABORATORY SET-UPS USED TO STUDY THE PROCESSES OF EXTERNAL CASING CORROSION.

tacts on the casing are reduced to a low value when molecular oxygen is removed from the mud.

The effect of sulfate-reducing bacteria was investigated as a promoter of body corrosion. The study was carried out because iron sulfides frequently are found in pits on oilstring casing.<sup>2</sup> Conventional cementing mud was considered too alkaline to support appreciable growth of sulfate reducers or to allow metal contamination with these bacteria. Therefore, artificial iron pits were used which were not precontaminated with sulfate-reducing bacteria, and solutions were used which might be present in a pit filled with nearly neutral iron oxide and sulfide corrosion products. The object of the study was to discover if sulfate-reducing bacteria could grow in a casing pit and could make the iron more anodic on this area. A general mechanism for corrosion by sulfatereducing bacteria was not tested.

Electrode potentials were measured for iron covered with colonies of sulfate-reducing bacteria. The apparatus used to carry out the study is shown in Fig. 9(C). Pieces of iron were sand-blasted and placed in the apparatus under anaerobic conditions. Nutrient solutions were prepared containing sulfate-reducing bacteria. The cultures then were incu-

TABLE 6-POTENTIALS OF IRON ELECTRODES IN
BRINE SHOWING DIFFERENCES PRODUCED BY
GROWTH OF SULFATE-REDUCING BACTERIA

Hq		Potential of Iron (v) ()		
Time (days)	of Brine	Bact. Growing	No Baci. Growing	
Start	7.0	0.769	0.769	
1	7.0	0.771	0.749	
2	7.0	0.768	0.743	
3	7.0	0.766	0.736	
Start	8.0	0.762	0.736	
1	8.0	0.774	0.768	
2	8.0	0.770	0.757	
3	8.0	0.765	0.748	

bated at 90°F inside the test apparatus. Potentials of the iron electrodes referred to saturated calomel electrodes were measured as a function of time and ahe shown in Table 6. These potentials are compared also with potentials of iron in aerated brine but without bacteria. The increased current density that is possible at an iron anode promoted by a local colony of sulfate-reducing bacteria was estimated to be appreciable. Current densities, however, were not measured because of the difficulty in determining the area of the bacterial activity.

#### GROWTH OF CORROSION PIT

The effect of pit diameter on pitting activity was studied because of the frequent occurrence of localized external attack on casings. The study was confined to determining the influence of pit diameter on the potential that might develop at the bottom of a corrosion pit. The apparatus used in the experiments is shown in Fig. 9(D). To represent pits, a number of holes of different diameters were made in 1/2-in.-thick carbon steel blocks. An iron electrode was sealed across the bottom of each hole, and each of these electrodes was insulated from the steel block by means of a plastic plate. An aerated polyphosphate solution, sometimes used for wash water in oilwell cementing operations, was used in the test cell. The solution filled all of the holes and covered the top of the test block to a depth of 3/8 in. The potential of each iron electrode was measured against a saturated calomel electrode over a period of many days.

As shown in Fig. 10, the potential at the bottom of each hole became more cathodic with increase in hole diameter at the end of the test. The

	Cathode	1		Anode			
Init. Poten.		•	lr Po		Weight Loss (gm)		
Sol.	рH	(v) (-)	Sol.	pН	(v) (-)	Calc.	Meas.
Mud A	12.0	0.237	FW**	7.1	0.771	0.137	0.120
Mud B	12.3	0.372	FW	7.3	0.737	0.135	0.139
Mud A*	12.3	0.531	FW	7.2	0.717	0.125	0.132

\*\*FW = Formation Water.

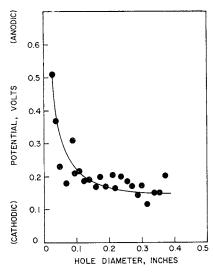


FIG. 10—EFFECT OF PIT DIAMETER ON THE ANODIC CHARACTER OF CORROSION PITS.

results of this test indicate that differential aeration pits tend to become sharper as they progress into the iron.

#### SECONDARY FACTORS IN CASING CORROSION

The causes of corrosion previously discussed describe the necessary and sufficient conditions for developing the highly localized character of casing corrosion. However, other factors also may be involved in the corrosion rate when the anodic areas are small. Three of these factors may have a significant effect on the life of some casings because they tend to accelerate the pitting processes by flow of gross positive current out from large areas of the casing.

An experiment was considered necessary to demonstrate this acceleration of pitting by outward flow of positive current from a casing surface. Therefore, a prototype casing coated with mill scale was built, with a small isolated area of metal left exposed. Positive currents of varying strengths from an external cathode were used to increase the average anode current density on the casing surface when it was immersed in mud. Current densities then were measured for positive currents leaving the exposed area. When the ratio of mill-scale-covered area to exposed area was 60:1, all applied external currents that created an average current density above 2.5 milliamp/sq ft resulted in a greater than-average discharge current density from the exposed area of the casing. When the ratio of mill-scale-covered area to exposed area was 1,000:1, a greaterthan-average discharge current density occurred when the average applied current density exceeded 1.2 milliamp/sq ft.

#### FLOW LINE CURRENT

A positive current of sufficient strength flowing into a well from attached flow lines, as shown before, tends to accelerate pitting corrosion at almost any place on the casing. The effect is similar to one where the cathode of the corrosion cell is made much larger because the surface flow lines become a part of the casing cathodic area. Current lines to some degree follow the classic potential theory lines through the ground when no highly localized anodic areas exist. If highly localized anodic areas do exist, however, the current density at these areas may be increased, and pitting may tend to be more severe.

#### INTERFERENCE CURRENTS

A positive current from a cathodic-protection anode may flow underground first to an unprotected casing and then return to a protected casing if the unprotected casing is in the electrical field of the protected well. Current flowing in this path is called interference current. Uniform return of the interference current from the unprotected casing may be expected if there are no localized anodic areas on the unprotected casing. If there are localized anode areas, interference current will accelerate pitting corrosion on the unprotected casing.

#### SELF-POTENTIAL CURRENTS

Self-potential currents flowing in wellbores have been suggested as a primary source of casing corrosion for several years.6 However, the experiment described herein suggests that self-potential currents are only secondary factors. The positive current flowing on a casing from a point opposite a shale bed and leaving the casing at a point opposite a sand formation containing brine usually is discharged uniformly over the casing surface. If anodic areas are highly localized, then a positive self-potential current of sufficient magnitude would tend to leave the anodic areas at greater-than-average current density. Self-potential in this case has the effect of increasing the potential of the local corrosion cells.

#### FLOWING FORMATION WATER

Body corrosion may be accelerated if formation water flows behind the casing from one formation to another. Flow of formation water will increase the chance of water contact with the casing surface. Current in the corrosion cells that is set up at the formation water-mud boundary is increased by the movement of the water. The current-producing capacity of this cell will be greater than in the static system, and the current will last a longer time. The accelerative corrosion effects of the flowing formation water are not produced, however, if oxygen is absent from the water and if oxygen is also removed from the mud surrounding the casing.

#### LABORATORY STUDY OF **OXYGEN SCAVENGERS**

The four kinds of casing corrosion discussed in this paper were seen to be largely the result of differential oxygen concentration attack. Therefore, oxygen scavengers were investigated in the laboratory as a means of controlling the external corrosion of oil-string casing.

Laboratory investigations showed that water-soluble reducing agents, such as ferrous chloride, ferrous hydroxide, powdered iron, stannous chloride and hydrazine, react with dissolved oxygen in alkaline drilling muds. These investigations also showed that the potential of iron in such treated mud shifts in the anodic direction as oxygen is consumed. Complete removal of the dissolved oxygen resulted in virtual cessation of corrosion.

Standard API tests of drilling-fluid properties showed that the use of ferrous chloride or stannous chloride adversely affected the physical properties of some test fluids and that mud reconditioning frequently would be necessary if these oxygen scavengers are used. Similar tests with hydrazine showed no adverse effects. Table 7 compares the physical properties of a typical alkaline-emulsion drilling fluid before and after the addition of 1.5 lb/bbl of 35 per cent hydrazine-water solution. Table 7 shows that the addition of 1.5 lb/bbl of hydrazine had no adverse effect on the drilling-fluid properties. The amount of hydrazine used in this test is estimated to be about 100 times the amount needed to consume the oxygen dissolved in typical airsaturated drilling fluid.

TABLE 7—EFFECT OF HYDRAZINE ON THE PHYS ICAL PROPERTIES OF A TYPICAL ALKALINE DRILLING FLUID				
Fluid Property	Before Treatment	After Treatment		
Weight, lb/cu ft Marsh Viscosity	78	78		
$\left(\frac{1,500 \text{ oc}}{1 \text{ gt}}\right)$ , sec.	45	45		
Gel Strength (10 min) Water Loss	0.0 & 1.5	0.0 & 1.5		
(30 min; 100 psi), ml	1.2	1.2		
Filter Cake (API), in.	1/32	1/32		
pH	12	12		
Temperature, °F	135	135		

709

Standard tests also were made to study the effect of hydrazine on the physical properties of set cement. Results of the tests are shown in Table 8.

Differences noted in the tensile and compressive strengths of treated and untreated cements are not considered to be significant. The spread of data for multiple tests was greater than the difference in the averages shown in Table 8. Apparently, hydrazine has no adverse effect on the physical properties of oilwell cement.

Electrochemical cells were set up to study the effect of hydrazine on the potential of J-55 steel electrodes in treated and untreated alkaline drilling-fluid samples. The objective of the study was to find out if the potential of iron could be shifted sufficiently far in the anodic direction to prevent corrosion attack on the test coupons. Potentials were measured for several months, and results of the tests are shown in Table 9.

Table 9 shows that the initial potential of sand-blasted J-55 steel in untreated drilling fluid was about 390 mv (538 to 146 mv) more anodic (negative) than the mill-scalecoated J-55 steel. This indicates that the bare steel was corroding because of the bare steel-mill scale couple existing in the oxygen-saturated mud. Such a couple can produce rapid pitting corrosion if the area of bare steel is small compared to the surrounding area of mill scale. The table shows also that the potentials of both the bare steel and mill-scalecoated steel are shifted in the anodic direction by the consumption of available oxygen. In the untreated mud, oxygen consumption is accomplished by the corrosion reaction shown by Eqs. 1 through 4. In the hydrazine-treated mud, oxygen

TABLE 8-EFFECT OF HYDRAZINE ON THE PHYS-				
ICAL PROPERTIES OF CLASS E OILWELL				
CEMENT*				

Strength Property	Untre	eated	Hydro Treo	
	1-Day	7-Day	1-Day	7-Day
Avg. Tensile (psi)	316	425	290	465
Avg. Compress. (psi)	3506	7361	2627	6031
*40-per cent slur	ry cured	l at 160	)°F.	

#### TABLE 9—EFFECT OF HYDRAZINE ON THE PO-TENTIALS\* OF SAND-BLASTED AND MILL-SCALE-COATED J-55 STEEL IN AN ALKALINE-EMULSION DRILLING FLUID

	Potential (- mv)**				
Hydrazine	Ini	Initial		Final	
(lb/bbl)	SB	M-S	SB	M-S	
0	538	146	525	513	
0.2	577	363	619	620	
1.0	575	462	643	652	
*Potentials scale; a scale			saturated vert to Cu	calomel , CuSO₁	

\*\*SB = Sand Blasted, M-S = Mill-Scale.

reacts with the hydrazine and is converted to water.

 $N_2H_1 + O_2 = N_2 + 2H_2O$ . (5) Potential shifts in the anodic direction indicate a reduction in the general corrosion tendency, while the disappearance of potential differences between the bare steel and the mill-scale indicates the disappearance of the tendency for pitting corrosion.

This reaction shows that hydrazine can have no deleterious effect on the drilling mud because its reaction products are only water and nitrogen gas. Hydrazine is an alkaline material and will have a slight tendency to raise the pH of some treated muds.

The next section of the paper describes results of field tests with hydrazine injected into the mud used in cementing several wells.

#### HYDRAZINE FIELD TESTS

Hydrazine was injected into the drilling fluid left behind each casing in four test wells in two Southern California oil fields. Three untreated wells also were selected in the same field for comparison purposes. Treated and untreated test wells in each field were selected because of the similarity in depth, casing size, method of completion and kind of mud used to drill and complete each well. Information about the test wells is given in Table 10.

Hydrazine effectiveness can be estimated from the difference in the cathodic currents needed to protect treated and untreated wells. Consumption of available oxygen reduces corrosion and reduces the amount of cathodic current needed to protect a well. Comparison of current requirements for treated and untreated wells, therefore, should be an indirect measure of hydrazine effectiveness. Cathodic current requirements during these tests were

TABLE 1	0-PERTINENT THE TES	INFORMA T WELLS	TION ABOUT
	Well Depth	Hydrazine	Kind of Drilling
Well No		Treated	Mud
Field A			
A-1	10,100	No	High pH Oil Emul. High pH
A-2 Field B	10,658	Yes	Oil Emul.
			High pH
B-1	14,260	No	Oil Emul. High pH
B-2	13,950	No	Oil Emul. High pH
B-3	13,350	Yes	Oil Emul. High pH
B-4	14,195	Yes	Oil Emul.
B-4*	13,947	Yes	High pH Oil Emul. High pH
B-5	13,955	Yes	Oil Emul.
*Well I	B-4 was re-drille	ed and reco	mpleted.

measured by the "null" potential method that was first proposed by Pearson<sup>7</sup> in 1942.

A series of direct currents of increasing strengths was applied to each test casing, and the potential of each casing was measured between the wellhead and a remote reference electrode (Cu, CuSO<sub>4</sub> half cell) for each current immediately after the current was interrupted. Cathodic current requirements then were estimated from the intersection of the straight-line portions of the potential vs log-current curves plotted from this null-potential data. Representative curves are shown in Fig. 11.

Fig. 11 shows that a current of 36 amps would be needed to protect untreated Well B-1. Fig. 11 also shows that hydrazine-treated Well B-5 required only a current of 17 amps for protection. Current requirements were determined for both wells approximately three years after each was completed. The lower current required to protect Well B-5 is attributed to oxygen scavenging by the hydrazine used to treat the well.

Current requirements were determined for each test well at various times over a four-year period. Results of the determinations are presented in Table 11 and plotted as current-vs-time curves in Figs. 12 and 13.

In Fig. 12 the assumption is made that the initial current requirements for Wells A-1 and A-2 are approximately 25 amps. This value was chosen because it is typical of current requirements measured for wells in the area.

Fig. 12 shows a marked reduction in current required during the first year for both the untreated and treated wells. The current-requirement reduction in the untreated well is attributed to partial oxygen consumption by corrosion. The much greater and more rapid reduction in current requirements in the treated well is attributed to the action of the hydrazine. It also will be noted that after the first year the current required to protect the treated well was

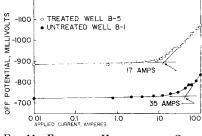


FIG. 11-EFFECT OF HYDRAZINE ON CATH-ODIC-PROTECTION CURRENT REQUIREMENTS.

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	THE TEST WELLS Time from	Cathodic
	Completion	Current
Well No.	(years)	(amps)
Field A		
A-1	1.5 4.6	15½ 16
A-2	0.95 4.1	7½ 10
Field B		
B-1	2.0 3.0 4.8	35 36 20
B-2	0.98 2.3 4.0	28 271⁄2 23
B-3	0.46 0.79 3.5	25 23 15
B-4	0.26 0.59	32 28
Re-drill	1.8	15
B-5	0.19 0.60 2.9	20 18 17

TABLE 12 -	HYDRAZIN	E R	EQUIREMEN	NTS	FOR
VARIOUS	VOLUMES	OF	DRILLING	MUE	>

Drilling Mud	Approx: Well	35% Hydrazine	
(bbl)	Depth (ft)	Gal	Lb
Up to 100	Up to 4000	6	48
100-200	4000- 6000	12	96
200-300	6000- 8000	18	144
300-500	8000-12000	30	240

nearly 45 per cent less than for the untreated well. Undoubtedly less corrosion took place on the outside of the casing in the treated well than on the casing of the untreated well during the first three to four years after completion.

Fig. 13 shows the effectiveness of hydrazine in another oil field. In each instance, the current required to protect a treated well rapidly decreased during the first year after completion and either continued a downward trend or leveled off during the next one to two years. There is no indication of an increase in current, which presumably could indicate depletion of the hydrazine and an influx of oxygen. Fig. 13 also shows that current requirements for the two untreated wells (B-1 and B-2) decreased with time, but at a much slower rate than in the treated wells. Hydrazine apparently makes its greatest contribution to the prevention of external casing failure during the first 12 to 18 months after a well is completed. This is a particularly important period because it is during this period that differential oxygen concentration

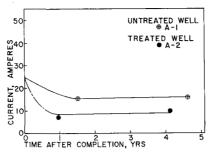


FIG. 12—EFFECT OF HYDRAZINE ON THE CORROSIVITY OF TEST WELLS IN FIELD A.

cells can cause the greatest amount of damage through pitting corrosion attack.

The favorable results from the laboratory and field tests showed that the use of hydrazine in the cementing mud was an effective, inexpensive and easily applied method for controlling external casing corrosion. The material has been used in over 200 wells of Standard Oil Co. of California.

#### CONCLUSIONS

1. External casing corrosion can be classified into four major types: water-line, casing-casing, collar and body. A mechanism for each type of external corrosion can be developed from principles of differential aeration.

2. Casing leaks are caused by highly localized corrosion attack.

3. The use of oxygen scavengers to control the corrosion attack is based on corrosion mechanisms developed from the principles of differential aeration. Laboratory tests show that hydrazine is a convenient and effective oxygen scavenger for use in oil wells.

4. Field tests of hydrazine show that the use of hydrazine in cementing mud materially reduces cathodicprotection current requirements for treated wells. This reduction in current requirements is interpreted to indicate substantial consumption of oxygen around the oil-string casing and consequent reduction in external corrosion.

5. Hydrazine appears to have par-

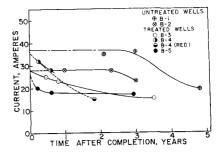


FIG. 13—EFFECT OF HYDRAZINE ON THE CORROSIVITY OF TEST WELLS IN FIELD B.

ticular usefulness for removing oxygen during the first 12 to 18 months after well treatment. Hence, a significant amount of corrosion can be prevented early in the life of a well when differential oxygen concentration cells are most active and able to cause pitting corrosion at a high rate.

6. Test results do not show any significant reduction in hydrazine effectiveness even after use in wells for three to four years. It is possible that a major part of the effectiveness may last the life of the treated well.

#### ACKNOWLEDGMENT

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## **Standard Practice**

## Application of Cathodic Protection for External Surfaces of Steel Well Casings

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#### Foreword

Oil and gas wells represent a large capital investment. It is imperative that corrosion of well casings be controlled to prevent loss of oil and gas, environmental damage, and personnel hazards, and in order to ensure economical depletion of oil and gas reserves.

This NACE International standard practice identifies procedures to determine the need for cathodic protection (CP) and the current requirements to achieve CP of well casings associated with oil and gas production and gas storage. It also outlines practices for the design and installation of CP systems and for their operation and maintenance. The purpose of this standard is to ensure more effective prevention of corrosion of well casings by making available reliable information about CP as it relates to well casings. This standard is intended for use by corrosion engineers in oil and gas production, especially those concerned with the CP of steel well casings.

This standard was originally prepared in 1986 by Unit Committee T-1E on Cathodic Protection and Task Group (TG) T-1J-2, a component of Unit Committee T-1J on Storage Wells. It was reaffirmed in 1994 by Unit Committee T-1E, and in 2001 and 2007 by Specific Technology Group (STG) 35 on Pipelines, Tanks, and Well Casings. The STG membership consists of representatives from oil and gas producing and storage companies, equipment manufacturers, consulting firms, and CP service companies. Included in the membership are persons involved in design, consulting, research, construction, maintenance, and manufacturing and supply of materials, all of whom are concerned with the establishment and maintenance of cathodic protection systems used with well casings. This standard is issued by NACE under the auspices of STG 35.

In NACE standards, the terms *shall, must, should,* and *may* are used in accordance with the definitions of these terms in the *NACE Publications Style Manual*, 4th ed., Paragraph 7.4.1.9. *Shall* and *must* are used to state mandatory requirements. The term *should* is used to state something considered good and is recommended but is not mandatory. The term *may* is used to state something considered optional.

## **NACE International**

## **Standard Practice**

## Application of Cathodic Protection for External Surfaces of Steel Well Casings

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## SED\_RT\_0031

#### Section 1: General

1.1 This standard presents acknowledged procedures for the control of external corrosion of steel well casings by applying CP. This standard is intended to be a guide for establishing minimum requirements for corrosion control when CP is practical and cost-effective.

1.2 This standard does not designate practices for specific situations. The complexity of some casing spacing, subsurface proximity to other casings, and environmental conditions preclude standardizing the application of CP. Deviation from this standard may be warranted in specific situations, provided those in responsible charge can demonstrate that the objectives expressed in this standard have been achieved.

1.3 This standard does not include corrosion control methods based on chemical control of the environment.

1.4 This standard applies only to well casing exteriors and not to internal corrosion, or to corrosion of other surface or downhole equipment.

1.5 The provisions of this standard should be applied under the direction of competent persons knowledgeable in the physical sciences, principles of engineering, and mathematics. They may have acquired knowledge by professional education and related practical experience and should be qualified to practice corrosion control for well casings by the use of CP. Such persons may be registered professional engineers recognized as being qualified as corrosion specialists in the appropriate fields of corrosion control by NACE International. Their professional activities should include suitable experience in well casing corrosion control practices.

#### Section 2: Definitions<sup>(1)</sup>

Alternating Current (AC): Current whose direction changes with time.

Ampere: Unit of current that is one coulomb per second.

**Anode**: The electrode of an electrochemical cell at which oxidation occurs. Electrons flow away from the anode in the external circuit. Corrosion usually occurs and metal ions enter the solution at the anode.

**Backfill**: Material placed in a hole to fill the space around the anodes, vent pipe, and buried components of a cathodic protection system.

**Casing Potential Profile**: Voltage (IR) drop and current direction versus casing depth is plotted. Amount of current is determined from the IR drop and casing resistance. (See nonmandatory Appendix A.)

**Casing-to-Electrolyte:** See Structure-to-Electrolyte Potential.

Casing-to-Reference Electrode: See Structure-to-Electrolyte Potential.

**Cathode**: The electrode of an electrochemical cell at which reduction is the principal reaction. Electrons flow toward the cathode in the external circuit.

**Cathodic Protection**: A technique to reduce the corrosion of a metal surface by making that surface the cathode of an electrochemical cell.

**Cement:** Cement slurry fills the space between the casing and the sides of the wellbore to a predetermined height above the bottom of the well.

**Continuity Bond**: A connection, usually metallic, that provides electrical continuity between structures that can conduct electricity.

**Corrosion**: The deterioration of a material, usually a metal, that results from a reaction with its environment.

**Counterpoise**: A conductor or system of conductors arranged beneath a power line, located on, above, or most frequently, below the surface of the earth and connected to the footings of the towers or poles supporting the power line.

Coupling (or Collar): Well casing joint connector.

**Current Density**: The current to or from a unit area of an electrode surface.

<sup>&</sup>lt;sup>(1)</sup> Definitions in this section are those presented in the *NACE Glossary of Corrosion-Related Terms* and those that reflect the common usage among practicing corrosion control personnel. In many cases, in the interest of brevity and practicality, the strict scientific definitions are abbreviated or paraphrased.

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**Deep Groundbed**: One or more anodes installed vertically at a nominal depth of 15 m (50 ft) or more below the earth's surface in a drilled hole for the purpose of supplying cathodic protection.

**Dielectric Coating:** A coating that does not conduct electricity.

**Direct Current (DC)**: Current whose direction does not change with time.

**Drainage:** Conduction of electric current from an underground or submerged metallic structure by means of a metallic conductor.

**E-log-I**: A test that indicates the cathodic protection current required by a slope change on the cathodic polarization diagram. (Refer to nonmandatory Appendix B.)

**Electrical Isolation**: The condition of being electrically separated from other metallic structures or the environment.

**Electric Log**: A survey taken in the open borehole of a well to determine the lateral formation resistivity.

**Electrolyte**: A chemical substance containing ions that migrate in an electric field. For the purposes of this standard, electrolyte refers to the soil or liquid adjacent to and in contact with a buried or submerged metallic structure, including the moisture and other chemicals contained therein.

**Electroosmotic Effect:** The effects of the movements in an electric field of liquid with respect to colloidal particles immobilized in a porous diaphragm or a single capillary tube.

**Fault Current**: A current that flows from one conductor to ground or to another conductor due to an abnormal connection (including an arc) between the two. A fault current flowing to the ground may be called a ground fault current.

**Field**: A group of wells in close physical proximity, usually considered a unit when applying cathodic protection. It may be an oil or natural gas production field or a natural gas storage field.

**Foreign Structure**: Any metallic structure that is not intended as a part of a system under cathodic protection.

**Galvanic Anode**: A metal that provides sacrificial protection to another metal that is more noble when electrically coupled in an electrolyte. This type of anode is the electron source in one type of cathodic protection.

**Gamma Ray Neutron Log**: Gamma ray is a measurement of the natural radioactivity of a formation. Neutron log is used for delineation of porous formations. Data are used to identify the formations in the earth. **Groundbed**: One or more anodes installed below the earth's surface for the purpose of supplying cathodic protection.

**Impressed Current**: An electric current supplied by a device employing a power source that is external to the electrode system. (An example is direct current for cathodic protection.)

**Instant-Off Potential:** The polarized half-cell potential of an electrode taken immediately after the cathodic protection current is stopped, which closely approximates the potential without IR drop (i.e., the polarized potential) when the current was on.

**Interference Bond**: An intentional metallic connection, between metallic systems in contact with a common electrolyte, designed to control electrical current interchange between the systems.

**Intermediate Casing**: A string of casing set to protect a section of hole and to allow drilling to continue to a greater depth. Also called protection casing string.

**IR Drop**: The voltage across a resistance in accordance with Ohm's law.

Isolation: See Electrical Isolation.

Lithology: Rock formations traversed by well casing.

**Long-Line Current**: Current through the earth between an anodic and a cathodic area that returns along an underground metallic structure.

**Mutual Interference**: An electrical DC interference on a well originating from within the cathodic protection system of several wells and structures, such as several DC power sources for a group of wells.

**Native State Potential:** The potential with zero groundbed current.

**Negative Return**: A point of connection between the cathodic protection negative cable and the protected structure.

**Ohm**: A resistance that passes one ampere of current when a one-volt potential is applied.

**Packaged Anode**: An anode that, when supplied, is already surrounded by a selected conductive backfill material.

**Photovoltaic**: Generation of an electromotive force when radiant energy falls on the boundary between two dissimilar materials.

Pipe-to-Soil Potential: See Structure-to-Electrolyte Potential.

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**Polarization**: The change from the open-circuit potential as a result of current across the electrode/electrolyte interface. In this standard, polarization is considered to be the change of potential of a metal surface resulting from current to or from an electrolyte.

Potential Profile Log: See Casing Potential Profile.

**Production Casing:** Casing that extends through the surface and intermediate casings, sometimes only to the tip of the zone but almost always through the producing or storing zone.

Rectifier: A device to convert AC power to DC power.

**Reference Electrode:** An electrode whose open-circuit potential is constant under similar conditions of measurement, which is used for measuring the relative potentials of other electrodes.

**Resistivity:** (1) The resistance per unit length of a substance with uniform cross section. (2) A measure of the ability of an electrolyte (e.g., soil) to resist the flow of electric charge (e.g., cathodic protection current). Resistivity data are used to design a groundbed for a cathodic protection system.

**Right-of-Way:** Right of passage, as over another's property.

Self-Interference: See Mutual Interference.

**Shunt:** A precise resistor with known resistance in an electrical circuit used to measure a voltage (IR) drop, which is used to calculate the amount of current in amperes.

**Soil Resistivity:** A measure of the ability of a soil or formation to conduct electricity expressed in units of ohm-centimeters or ohm-meters. Data are used to design a groundbed for a cathodic protection system.

**Structure-to-Electrolyte Potential:** The potential difference between the surface of a buried or submerged metallic structure and the electrolyte that is measured with reference to an electrode in contact with the electrolyte.

**Structure-to-Structure Potential:** The potential difference between metallic structures, or sections of the same structure, in a common electrolyte.

**Surface Casing:** A casing string extending from the surface to a depth great enough to keep surface waters and loose earth from entering the well.

**Surface Groundbed:** One or more anodes installed below the earth's surface for the purpose of supplying cathodic protection less than 15 m (50 ft) in depth for the anodes.

**Tafel Plot, Tafel Diagram, Tafel Line:** A plot of the relationship between the change in potential (E) and the logarithm of the current density (log *i*) of an electrode when it is polarized in both the anodic and cathodic directions from its open-circuit potential.

**Tafel Segment:** That portion of the Tafel plot that appears as a straight line when current is plotted on the logarithmic scale and potential change is plotted on the linear scale. The beginning of the Tafel segment is that point on the curve at which the current-potential relationship follows the straight line with increasing current increments and deviates from the straight line with decreasing current increments.

**Tafel Slope:** The slope of the straight-line portion of the E log *i* curve on a Tafel plot. (The straight-line portion usually occurs at more than 50 mV from the open-circuit potential.)

**Test Wire:** An insulated wire attached to a structure (usually buried) such as a pipeline and brought to a terminal convenient for making electrical tests to evaluate cathodic protection.

**Tubing:** A pipe inside the production casing through which oil is pumped, or liquid is removed from the natural gas storage zone.

Union (Isolating): See Electrical Isolation.

**Voltage:** An electromotive force, or a difference in electrode potentials expressed in volts.

**Well:** A steel-cased hole associated with the production and storage of oil or gas.

**Wellbore** *(also called bore hole)*: A hole drilled into the earth for the installation of a deep groundbed system.

**Wellhead:** Valves and other aboveground fittings electrically connected to the production, surface, and intermediate casings. May be called a "christmas tree" when referring to oil and natural gas production and storage wells.

**Well Casing:** See Production Casing, Intermediate Casing, and Surface Casing.

#### Section 3: Determination of Need for CP

#### 3.1 Introduction

3.1.1 The purpose of this section is to indicate those factors that should be considered in determining whether a well casing requires CP.

3.1.2 Metallic structures in contact with soil or submerged under water are subject to corrosion. Adequate procedures should be adopted to ensure that corrosion is not affecting safe and economical operation of well casings.

3.2 The decisions governing the need for CP of well casings shall be based on data obtained from corrosion surveys, operating records, prior tests with similar systems in similar environments, and on a study of design specifications and engineering, operating, and economic requirements.

3.2.1 The usual procedures for predicting the probability and rate of corrosion of a particular metallic casing system are as follows:

(a) The corrosion history of the well casing in question or of other systems of the same material in the same general area or in similar environments should be studied. The history should include cumulative leak frequency and downhole data obtained from workover (reconditioning) records.

(b) The environment surrounding a well casing should be studied. Once the nature of the environment has been determined, the probable corrosiveness can be estimated by referring to actual corrosion experience on similar well casings in similar environmental conditions. It should be remembered that formation water changes caused by production or injection methods may be contributing factors. One source of environmental data is the formation resistivity logs run on wells being investigated and on surrounding wells.

(c) The casing should be mechanically or electrically inspected for evidence of corrosion. The condition of the casing system should be carefully determined and recorded. (See nonmandatory Appendix C.)

(d) The casing should be inspected to determine whether there are any anodic areas. A well casing potential profile tool is commonly used for these investigations. (See nonmandatory Appendix A.)

(e) Maintenance records detailing leak locations and wall thickness surveys, which can be used as a guide for locating areas of maximum corrosion, should be reviewed.

(f) Statistical treatments of available leak data should be considered.

(g) The results of pressure testing should be reviewed; under certain conditions, this may help determine whether corrosion has occurred.

(h) When the well casing is pulled, it should be visually inspected.

(i) Close communication should be maintained with those responsible for the workover of a well.

3.2.2 Environmental and physical factors governing the need for CP are as follows:

3.2.2.1 The nature or constituents of the product being produced or stored.

3.2.2.2 Location of the well casing system in a sparsely or densely populated area and the frequency of visits by personnel.

3.2.2.3 Location of the well casing system as related to other facilities.

3.2.2.4 Influence of DC sources foreign to the system.

3.2.2.5 The introduction of secondary or tertiary recovery systems, which can sometimes increase corrosion rates on the backside of a well casing.

#### 3.2.3 Economic factors

3.2.3.1 Costs of maintaining the well casing in service for its expected life may include repairing corrosion leaks, reconditioning, or replacing all or portions of the system.

3.2.3.2 In addition to the direct costs that result from corrosion, contingent costs may be incurred. The more common types of contingent costs are:

- (a) Public liability claims.
- (b) Property damage claims.

(c) Damage to natural facilities, such as municipal or irrigation water supplies, forests, parks, and scenic areas.

(d) Cost of cleanup of product lost to surroundings.

(e) Cost of individual casing workover(s) as related to corrosion leak(s).

(f) Plant shutdown and start-up costs.

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(g) Loss of deliverability because of possible permanent formation damage caused by casing leak(s).

(h) Cost of lost product.

(i) Loss of revenue through interruption of service.

(j) Loss of contracts or good will through interruption of service.

(k) Loss of reclamation or salvage value of well casing.

(I) Loss of well casing, rendering well unusable for production or injection purposes.

3.2.3.3 The usual costs for protecting well casings are the costs of installing and operating CP. Other corrosion control costs may include:

(a) Inhibitors and bactericides used in drilling fluids.

(b) Corrosion-resistant materials.

(c) Cement for zones known to be corrosive.

(d) Electrical isolation to limit possible foreign current discharge from casings and to ensure that CP currents are applied to the well casing.

(e) Dielectric coating on the outer surface of casing.

#### Section 4: Criterion for CP and Current Requirements

#### 4.1 Introduction

4.1.1 The determination of design current requirements depends, in part, on prior experience with similar structures or environments in which the method has been used successfully. The first-time user is strongly urged to consult a person experienced in well casing CP before finalizing a design.

4.1.2 Certain methods have been developed through laboratory experiment, or have been derived empirically by evaluating data from successful CP systems. These methods are presented in Paragraph 4.3 and can be used to assist with the design process; they are not intended to be a comprehensive or limiting list.

4.2 Criterion for CP

4.2.1 The CP current applied to the well casing shall be considered adequate when measurements indicate that a net flow of current to the casing has eliminated all anodic areas.

4.3 Methods of Determining Design Current Requirements

4.3.1 A profile tool is a device used to measure a voltage (IR) drop across a portion of well casing in service by electrically isolating two sets of contacts from each other. The voltage readings are used to indicate the magnitude and direction of the current flow in the casing. Details of the test method and interpretation of the data are given in Appendix A.

4.3.2 Average current density  $(mA/m^2)$  may be used to calculate the quantity of CP current required to prevent external corrosion. The current density used should be dictated by the downhole completion practice and

formations (e.g., cementing practices, formation resistivities, water salinity, etc.) encountered in a given well. Current densities usually vary from 10 to 200  $\text{mA/m}^2$ .

4.3.3 Mathematical modeling may also be used to determine design current requirements. The effect of applied CP current downhole can be calculated from electrical measurements at the wellhead. The applied voltage and current distribution can be calculated as a function of well depth. Usually, a downhole potential criterion is established as the accepted indication of protection. Several calculation methods are available, and others are being developed.

4.3.3.1 One method of mathematical modeling uses a modified attenuation equation. The native state potential is measured and recorded. It also requires well casing data and current drain measurements made after polarization of the well.

4.3.3.2 Another method uses formation resistivity data to establish a potential attenuation curve for a casing to which CP has been applied.

4.3.3.3 A third method models the well casing by a computerized equivalent electrical circuit incorporating resistivity profiles, nonlinear polarization characteristics, and the well casing data.

4.3.4 E-log-I method

4.3.4.1 The principle behind the E-log-I method is that when current is impressed through the earth onto a metallic well casing, the potential between the well casing and reference electrode is shifted.

The potential shift for a given current level depends on the following factors:

- (a) The length of time the current is applied.
- (b) Current density, which is affected by factors such as well depth, casing sizes, and cement.
- (c) Properties of the electrolyte.

4.3.4.2 As increasing levels of current are impressed, polarization begins on the surface of the casing. The E-log-I data are plotted to enable selection of a current level at which polarization begins. (Details of the test method and interpretation of the data are given in Appendix B.)

4.4 Methods of Evaluating Effectiveness

4.4.1 A combination of procedures is always advised for evaluating the effectiveness of CP.

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#### Section 5: Design of CP Systems for Well Casings

5.1 Introduction

5.1.1 This section presents recommended procedures for designing CP systems that effectively control corrosion of well casings in contact with the earth. The design should satisfy the criterion in Section 4 and be reliable for the intended operating life of the system.

5.1.2 CP for pipelines is considered separately from well protection when applicable.

5.2 Objectives of CP System Design

5.2.1 Enable application of sufficient protective current to the well casings to meet the criterion for CP.

5.2.2 Minimize the stray current to foreign underground structures. (See Section 7.)

5.2.3 Design a groundbed with a lifetime that is commensurate with the required life of the protected structure.

5.2.4 Provide for periodic maintenance of the groundbed.

5.2.5 Provide a power source and groundbed with sufficient capacity to include connecting pipelines and other structures as required.

5.3 Considerations in the Design of CP Systems

5.3.1 CP applied to the well casings and the connecting pipelines and structures may be a source of mutual interference. (Refer to Section 7.)

5.3.2 Electrical grounding procedure requirements should be considered in the CP design.

5.3.3 In designing a CP system for well casings, the following should be considered:

5.3.3.1 Availability of AC power should be determined.

5.3.3.2 The proposed installation site should be investigated for any hazardous conditions.

5.3.3.3 The AC power source for the CP rectifier should be a suitable distance from the well structure to ensure a safe working area.

5.3.3.4 Materials and installation practices that conform to applicable codes (e.g., National Electrical Manufacturers Association [NEMA]<sup>(2)</sup> Standards, National Electrical Code [NEC],<sup>(3)</sup> and practices of NACE International) should be specified.

5.3.3.5 The CP system should be selected and designed for optimum economies of installation, maintenance, and operation.

5.3.3.6 Materials and installation practices that ensure safe and dependable operation throughout the intended service life of the CP system should be specified.

5.3.3.7 A system for optimum currents should be selected. Excessive current can be detrimental to buried or submerged metallic structures.

5.3.3.8 The current requirement data for pipelines connected to wells should be studied so that the groundbeds may be placed in the proper locations. This allows appropriate distribution of current to wells and pipelines.

5.3.3.9 Electrical interference from foreign sources should be investigated and the results included as a design consideration. (See Section 7.)

5.4 Considerations Influencing Location of Anodes

5.4.1 The anode that will be closest to a well should be placed at a distance determined by testing or accepted empirical means.

5.4.2 Plans for long- and short-term additions or changes in buried physical structures.

5.4.3 Location of pipelines connected to wells.

<sup>&</sup>lt;sup>(2)</sup> National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209.

<sup>&</sup>lt;sup>(3)</sup> National Electrical Code (NEC), National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

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5.4.4 Pipelines used as a negative return and those electrically isolated.

5.4.5 Soil resistivity.

5.4.6 Use of surface or deep vertical type of groundbed.

5.4.7 Location of foreign structures.

5.4.8 Placement where likelihood of physical disturbance or damage is minimal.

- 5.5 Types of CP Systems for Well Casings
  - 5.5.1 Impressed current system
    - 5.5.1.1 Surface groundbed
    - 5.5.1.2 Deep groundbed
  - 5.5.2 Galvanic anode system

5.6 Considerations in the Selection of the Type of CP System

#### 5.6.1 Current requirements

5.6.1.1 The total casing surface area to receive CP, including surface casings and that portion of intermediate and production casing that is to receive protection.

5.6.2 Soil resistivity

5.6.2.1 Resistivity and installation space availability influence the choice of a surface or deep groundbed installation. High-resistivity formations that restrict the flow of current to the casing may necessitate placement of anodes below such formations.

5.6.2.1.1 Resistivity to a 15-m (50-ft) depth for a surface groundbed may be determined by surface measurements or experience.

5.6.2.1.2 Resistivity for depths greater than 15 m (50 ft) for a deep groundbed may be determined by surface measurement, formation resistivity log, or experience.

5.6.3 Future drilling of wells in the area of CP influence.

5.6.4 Future development of the right-of-way area and extensions to the pipeline system connected to wells jointly protected by the same power source and groundbed.

5.6.5 The cost of installation, operation, and maintenance.

5.6.6 Physical space available and condition of land surface for ease of facility installation, ingress, and egress.

5.6.7 Proximity of foreign structures.

5.6.8 Ability to procure easement.

5.6.9 Interference effect.

5.6.10 Power source availability.

5.7 Factors Determining Anode Current Output, Operating Life, and Efficiency

5.7.1 Various anode materials have different rates of deterioration when discharging a given current density from the anode surface in a specific environment. For a given current output, the anode life depends on the anode and backfill materials and the number of anodes in the CP system. Anode performance data may be used to calculate the probable deterioration rate.

5.7.2 The resistance to electrolyte of the anode system may be calculated from available data. Formulas and graphs relating to these factors are available.

5.7.3 The use of a special backfill material with impressed current anodes lengthens their useful life and reduces the effective anode-to-earth electrical resistance. The most common backfill materials are metallurgical coke, calcined petroleum coke, and natural or manufactured graphite.

5.7.4 Entrapment of gas generated by the anodic reaction can impair the ability of the impressed current groundbed to deliver the required current. Suitable provision should be made for venting the anodes, particularly in a deep groundbed. Increasing the number of anodes may reduce gas blockage by reducing current discharge from each anode.

5.7.5 Electroosmotic effects could impair the ability of the impressed current groundbed to deliver the required current. Suitable provisions should be made to ensure adequate moisture around the anodes. Increasing the number of impressed current anodes may reduce electroosmotic effects.

5.7.6 Special applications such as deep groundbeds require careful selection of cables and wires. Refer to NACE SP0572.<sup>1</sup>

5.8 Impressed Current System Design Considerations

5.8.1 Groundbed location and total current required should be determined.

5.8.2 A deep groundbed may be used when lithology prevents equitable distribution of current to the total depth of the well casing. Placing anodes in relatively

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low-resistivity shallow formations compared with deeper formations may concentrate excessive current on upper portions of the well casing and deprive the deeper portions of sufficient current. Refer to NACE SP0572.

5.8.3 Placement of groundbeds too close to a well casing may prevent flow of sufficient current to a lower depth. Increasing total current may create interference with other wells and structures.

5.8.4 The performance of vertically or horizontally placed anodes can be affected by their spacing. In a soil of a given resistivity, the output of an impressed current groundbed may be improved by increasing the space between anodes, assuming the additional cable resistance is considered.

5.8.5 DC power sources that can be used:

5.8.5.1 Rectifier units to convert AC to DC power.

5.8.5.2 Thermoelectric generators.

5.8.5.3 Photovoltaic power systems.

5.8.5.4 Wind- or power-driven generators or alternators with rectification.

5.9 Galvanic Anode System Design Considerations

5.9.1 Galvanic anodes have limited use for CP of well casings.

5.10 Design Factors in Applying CP to More than One Well

5.10.1 Several wells may be cathodically protected as a group. When applying CP, the wells should be treated as a unit, along with associated pipelines or structures, using one or more power sources and groundbeds. Care must be taken to ensure adequate current distribution throughout the length of each well.

5.10.1.1 Well casings in a group may vary in length.

5.10.1.2 Well spacing may vary.

5.10.1.3 Intermediate casings may vary in length.

5.10.1.4 Wells with identical completion procedures and equal lengths of casing may have different current requirements.

5.10.2 The current requirements and electrical resistances of any connecting pipeline, when used as a negative return to a rectifier, can limit the amount of current reaching the well casings.

5.10.3 If detrimental electrical interference is encountered, each CP system must be designed to counteract the effects.

5.10.4 CP design varies regarding the physical field parameters. The most effective design considers:

5.10.4.1 Total amount of current required for casings and other structures.

5.10.4.2 Soil resistivity for installation of anodes.

5.10.4.3 Location of well casing with respect to pipelines and other structures.

5.10.4.4 The individual current demand of each well.

5.10.5 Typical CP design options

5.10.5.1 One DC power source and one groundbed for one or several wells.

5.10.5.2 One DC power source and more than one groundbed for several wells.

5.10.5.3 More than one DC power source and one groundbed for several wells.

5.10.6 Perimeter or isolated wells may require a separate CP system.

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#### Section 6: Installation of CP Systems

#### 6.1 Introduction

6.1.1 This section presents recommended procedures for installation of CP systems that achieve protection of the well casing structures when design considerations recommended in Section 5 and Appendix D have been followed.

6.2 Construction Specifications

6.2.1 All construction work performed on CP systems shall be done in accordance with construction drawings and specifications. The construction specifications shall be in accordance with recommended practices in Section 5 and nonmandatory Appendix D.

6.3 Construction Supervision

6.3.1 All construction work performed on CP systems shall be under the supervision of a trained and qualified inspector. It shall be the inspector's function to verify that the installation is made in strict accordance with the drawings and specifications, or that exceptions are made only with the express consent of qualified personnel, when it can be demonstrated that the effectiveness of the system is not impaired. It should also be the inspector's function to verify that construction methods and techniques are in accordance with good practices.

6.3.2 All deviations from construction specifications shall be noted on as-built drawings.

- 6.4 Galvanic Anodes
  - 6.4.1 Inspection and handling

6.4.1.1 Packaged anodes shall be inspected and steps taken to ensure that the backfill material completely surrounds the anode. The individual container for the backfill material and anode should be intact. If individually packed anodes are supplied in waterproof containers, the containers should be removed before installation. Packaged anodes should be kept dry during storage.

6.4.1.2 The lead wire must be securely connected to the anode. The lead wire should be inspected to ensure that it is not damaged. Care should be taken to avoid damage to insulation and kinking of the lead wire.

- 6.5 Impressed Current Systems
  - 6.5.1 Inspection and handling

6.5.1.1 The rectifier or other power source shall be inspected to ensure that internal connections are mechanically secure and that no damage is apparent. Rating of the direct current source output should comply with construction specifications. Care should be exercised in handling and installation.

6.5.1.2 Impressed current anodes shall be inspected for conformity to specified anode material and size and length of lead wire, and to ensure that the cap, if used, is secure. Care should be exercised to avoid cracking or damaging anodes during handling and installation.

6.5.1.3 The lead wire shall be inspected carefully for defects in insulation (e.g., cracks, abrasions, or excessive thinning below specified thickness). Care should be taken to avoid damage to insulation in the wire. Defects in the lead wire must be repaired or the anode/wire unit must be rejected.

6.5.1.4 Anode backfill material shall conform to specifications.

6.5.2 Installation provisions

6.5.2.1 The rectifier or other power source should be installed so that the possibility of damage or vandalism is minimized.

6.5.2.2 Wiring to rectifiers shall comply with all local and national electrical codes and requirements of the utility supplying power. An external disconnect switch on AC wiring shall be provided. The rectifier case shall be grounded adequately.

6.5.2.3 Impressed current power supplies should be designed to prevent reverse current flow when the unit is not operational.

6.5.2.4 Impressed current anodes should be installed vertically, horizontally, or in deep holes as indicated in the construction specifications. Backfill material, when specified, should be packed around the anodes, eliminating voids. Care shall be taken to avoid damage to the anode,

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wire, and wire connection to the anode during installation.

6.5.2.5 The conductor (negative lead wire) to the structure shall be connected as indicated in the specifications. Conductor connections to the power source must be mechanically secure and electrically conductive. Before the power source is energized, it must be verified that the negative conductor is connected to the structure and the positive conductor is connected to the anodes and to the power source is energized, suitable electrical measurements shall be made to verify that these connections are correct.

6.5.2.6 Underground negative lead wire shall be effectively insulated. Bare or ineffectively insulated wire may require a substantial amount of the total protective current.

6.5.2.7 Underground splices on the positive lead cable to anodes shall be kept to a minimum. Connections between cable and conductor from each anode shall be mechanically secure and electrically conductive. If buried or submerged, these connections must be sealed to prevent

moisture penetration so that electrical isolation is ensured. If the insulation integrity on the buried or submerged positive lead cable, including splices, is damaged, the cable may corrode and fail prematurely.

6.5.2.8 When specifications call for burial of the anode cable, care must be taken to avoid damage to the insulation. Sufficient slack shall be left in the cable to avoid strain on connections and anode leads caused by settling. Backfill materials used around cables should be free of rocks and foreign materials that might damage the wire insulation when installed in the trench. Cables may be installed by plowing if proper precautions are taken.

6.6 Corrosion Control Test Stations and Bonds

6.6.1 Refer to Section D.5 of Appendix D for design of corrosion control test stations and bonds.

6.7 Isolating the Wellhead from Pipelines and Other Structures

6.7.1 Refer to Section D.2 of Appendix D for design of electrical isolation.

#### Section 7: Control of Interference Currents

#### 7.1 Introduction

7.1.1 This section presents recommended practices for the detection and mitigation of interference currents. The mechanisms and detrimental effects of interference currents are described.

#### 7.2 Mechanism of Interference Current

7.2.1 Interference current corrosion on a well casing differs from electrochemical corrosion caused by other conditions. The source of the corrosion current is foreign or separate from the affected well. The foreign structure may be electrically bonded to or isolated from the affected well. Interfering currents may enter or leave the casing at several locations along the well casing. The damage from an interference current occurs in the area where the current leaves the well casing and enters the electrolyte.

7.2.2 The severity of interference resulting from stray electrical current depends on several factors:

7.2.2.1 Distance between wells.

- 7.2.2.2 Location of pipelines with respect to wells.
- 7.2.2.3 Location of interfering current source.

7.2.2.4 Depth of well casing.

7.2.2.5 Location of highly conductive earth formations.

7.2.2.6 Magnitude of potential gradient in the earth that the affected well penetrates. These gradients are created by current flowing to other structures.

7.2.2.7 Location of electric power line grounding system.

7.2.2.8 Quality and extent of the cementing program on the well casing.

7.2.3 Sources of interference currents:

7.2.3.1 Constant current—Sources that have essentially constant DC output are CP rectifiers, thermoelectric generators, photovoltaic and windmill battery units, etc.

7.2.3.2 Fluctuating current—Typical sources are DC electrified railway systems, mine hauling systems, pumps, welding machines, DC power systems, etc.

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7.2.3.3 An interference current may originate in a foreign CP system on nearby wells or pipelines that are electrically isolated from the affected well.

7.2.3.4 Mutual interference current can result from CP applied to other wells in a metallically connected system that includes the affected well.

#### 7.3 Detection of Interference Currents

7.3.1 During well casing CP surveys, personnel should look for electrical changes and facilities that may be a source of interference current.

7.3.1.1 A change in casing-to-electrolyte potential when foreign electrical sources are switched off and on is cause to investigate for downhole well casing interference.

7.3.1.2 Well casing current measurement and downhole well casing potential profiles should be used to assess the presence and magnitude of interference current.

7.3.1.3 The presence of external corrosion and perforation of well casing may be determined by using an electromagnetic thickness measurement tool to find changes in wall thickness.

7.3.2 When interference current is suspected, appropriate tests should be conducted to determine its presence and magnitude. All affected parties shall be notified before tests are performed. (Notification should be channeled through an Underground Corrosion Control Coordinating Committee, where one exists).<sup>(4)</sup> Any one or a combination of the following procedures can be used to determine the existence or extent of interference:

7.3.2.1 Casing potential changes shall, where practical, be measured with respect to a remote reference electrode. The reference electrode shall be placed beyond the earth gradient field of interfering current. The foreign direct current source should be turned on and off during the test.

7.3.2.2 Change in the magnitude of well casing current should be measured, and the direction of flow should be determined while performing a well

casing potential profile. The foreign direct current source should be turned off and on during the test.

7.3.2.3 The variation in current output of the suspected source of interference current should be determined and compared with measurements obtained in Paragraphs 7.3.2.1 and 7.3.2.2. This may require correlation of data with time.

7.4 Methods for Resolving Interference Corrosion Problems

7.4.1 Each interference problem is unique and the solution should be mutually satisfactory to all parties involved.

7.4.2 Mutual interference between well casings may be minimized when wellheads within the electrically connected system are adjusted to equal potential with respect to a remote reference electrode.

7.4.3 The interfering current source should be removed or relocated.

7.4.4 The effect of interference current may be counteracted by adding CP to the affected well.

7.4.5 Mutual interference between wells in a common CP system may be reduced by providing an interference bond, with a current drain regulating device, from the wells to the rectifier.

7.4.5.1 An interference bond of proper resistance should be designed and installed.

7.4.5.2 A current regulating device should be installed in the rectifier cable connected to the wellhead.

7.4.5.3 The current discharge from interfering cathodic rectifiers should be adjusted to eliminate or decrease interference.

7.4.6 The CP groundbed should be relocated.

7.4.7 The design of the CP system should be modified when connecting pipelines (used as negative returns) require a high percentage of the total current for protecting the wells.

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<sup>&</sup>lt;sup>(4)</sup> Information on Underground Corrosion Control Coordinating Committees may be available from the Technical Activities Division, 1440 South Creek Drive, Houston, TX 77084-4906 (telephone: +1 281/228-6200). Underground Corrosion Control Coordinating Committees are asked to keep NACE International Headquarters informed of their activities, but records are more current on some of the groups than on others.

7.4.7.1 Rectifiers and groundbed with reduced current output per unit should be added.

7.4.7.2 The dielectric coating of connecting pipelines should be improved to reduce the total required current.

7.5 Methods to Indicate Resolution of Interference

7.5.1 A satisfactory downhole well casing potential profile log indicating current that is adequate to

eliminate anodic areas on affected casing should be obtained.

7.5.2 Sufficient CP currents, interpreted from surface test data or empirical calculation, should be applied to affected well casing.

7.5.3 Interference current discharges should be neutralized as determined by applicable criteria.

#### **Bibliography for Section 7**

- Gast, W.F. "Well Casing Interference and Potential Equalization Investigation." *Materials Performance* 13, 5 (1974): pp. 31-36.
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Meeting, Reprint No. 906-12-L. Washington, DC: American Petroleum Institute (API), March 1967, p. 15.

- Roberson, G.R. "Effect of Mutual Interference." *Materials Protection* 6, 3 (1967): p. 36.
- Weeter, R.F., R.J. Chandler. "Mutual Interference Between Well Casings with Cathodic Protection." *Materials Performance* 13, 1 (1974): pp. 26-30.

#### Section 8: Operation and Maintenance of CP Systems

#### 8.1 Introduction

8.1.1 The purpose of this section is to designate procedures and practices for energizing and maintaining continuous, effective, and efficient operation of CP systems.

8.1.1.1 Electrical measurements and inspections are necessary to determine that protection has been established according to the applicable criterion and that each part of the CP system is operating properly. Conditions that affect protection may change with time, however, and corresponding changes are required in the CP system to maintain protection. Periodic measurements and inspections shall be made to detect changes in the conditions that affect the CP system. Local conditions may exist in which operating experience indicates that surveys and inspections should be made more frequently than recommended herein.

8.1.1.2 Care should be exercised in selecting the location, number, and type of electrical measurements used to determine the adequacy of CP.

8.2 Tests shall be conducted after each CP system is energized to determine whether the system is satisfying the applicable criterion and is operating efficiently. Tests shall include one or more of the following types of measurements and must relate to the criterion established by this standard.

8.2.1 Casing-to-reference-electrode potential, as applicable.

8.2.2 Calculation technique to estimate CP effectiveness (refer to Paragraph 4.3.3).

8.2.3 Structure-to-structure potential.

8.2.4 Current flow.

8.2.5 Well casing potential profile (refer to Paragraph 4.3.1 and Appendix A).

8.3 Periodic tests are suggested to ensure the continuity of CP; the electrical measurements used in the tests may include one or more of the measurements listed in Paragraph 8.2.

8.4 Inspection and tests of CP facilities should be conducted as follows to ensure their proper operation and maintenance:

8.4.1 All sources of impressed current shall be checked at intervals not to exceed two months. Evidence of proper functioning may include the current output, normal power consumption, a visual or audible signal indicating normal operation, or the satisfactory electrical state of the protected casing.

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8.4.2 All impressed current protective facilities should be inspected annually as part of a preventive maintenance program to minimize in-service failure. Inspections may include a check for electrical shorts, ground connections, meter accuracy, efficiency, and circuit resistance.

8.4.3 Reverse current switches, diodes, and inteference bonds, whose failure would jeopardize structure protection, shall be inspected for proper functioning at intervals not to exceed two months.

8.4.4 The effectiveness of electrical isolation fittings and continuity bonds shall be evaluated during periodic testing. This may be accomplished by on-site inspection or by evaluating corrosion test data.

8.5 The test equipment used for obtaining each electrical value shall be of an appropriate type. Instruments and

related equipment shall be maintained in good operating condition and checked annually for accuracy.

8.6 Remedial measures shall be taken when periodic tests and inspections indicate that protection is no longer adequate according to applicable criteria. These measures may include:

8.6.1 Repair, replacement, or adjustment of components of CP systems.

8.6.2 Providing supplementary facilities when additional CP is necessary.

8.6.3 Repair, replacement, or adjustment of continuity and interference bonds.

8.6.4 Removal of accidental metallic contacts.

8.6.5 Repair of defective electrical isolation devices.

#### Section 9: Corrosion Control Records

9.1 Introduction

9.1.1 The purpose of this section is to describe corrosion control records that document in a clear, concise, workable manner the data pertinent to the design, installation, maintenance, and effectiveness of corrosion control measures for well casings.

9.2 Relative to determination of the need for corrosion control, the following should be recorded when applicable:

9.2.1 Information on corrosion leaks (e.g., date, well identity, location).

9.2.2 Electromagnetic casing thickness measurements.

9.2.3 Casing potential profile data.

9.2.4 Coating type applied to external surfaces of casings.

9.3 Relative to structure design, the following should be recorded:

9.3.1 Location and design of wellhead and associated electrical isolation devices.

9.3.2 Design and procedure for isolating or bonding any associated electrical power source grounding system.

9.3.3 Design and location of test leads, bond cables, and other test facilities.

9.3.4 Details of any other corrosion control measures taken.

9.4 Relative to the design of corrosion control facilities, the following should be recorded:

9.4.1 Results of current requirement tests and how the tests were performed.

9.4.2 Results of soil resistivity surveys at groundbed locations, and where the surveys were made with respect to other wells, pipelines, and structures.

9.4.3 Interference tests and design of interference bonds and drainage switch installations, including:

9.4.3.1 Location of interference source relative to location of wells and other structures.

9.4.3.2 Scheduling of interference tests, correspondence with coordinating committees, coordinating committee minutes, and direct communication with the concerned companies.

9.4.3.3 Record of interference tests conducted, including location of tests, name of company involved, and results.

9.5 Relative to the installation of corrosion control facilities, the following should be recorded:

9.5.1 Installation of CP facilities

9.5.1.1 Impressed current systems

(a) Location and date placed in service.

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(b) Type, size, depth, backfill, and spacing of anodes.

(c) Number of anodes.

(d) Location of groundbed anodes with respect to wells, pipelines, and other structures.

(e) Specifications of rectifier or other energy source.

(f) Type(s) and size(s) of buried cable.

- 9.5.1.2 Galvanic anode systems
- (a) Location and date placed in service.
- (b) Type, size, backfill, and spacing of anodes.
- (c) Number of anodes.

9.5.2 Installation of interference bonds and drainage switches

9.5.2.1 Details of interference bond installation

(a) Locations and names of companies involved.

(b) Resistance value or other pertinent information.

(c) Magnitude and polarity of drainage current.

9.5.2.2 Details of drainage switch installation

- (a) Locations and names of companies involved.
- (b) Type of switch or equivalent device.
- (c) Data showing effective operating adjustment.
- 9.5.2.3 Details of other remedial measures

9.6 Records of surveys, inspections, and tests set forth in Sections 4, 5, 7, and 8 should be maintained to demonstrate that applicable criteria for interference control and CP have been satisfied.

9.6.1 Current drained from the well casing should be recorded at intervals consistent with company requirements.

9.6.2 Other electrical measurements should be recorded as required to monitor the CP for each well and to satisfy the criterion for CP of the wells.

9.7 Relative to the maintenance of corrosion control facilities, the following information should be recorded:

9.7.1 Maintenance of CP facilities

9.7.1.1 Repair of rectifiers or other DC energy sources.

9.7.1.2 Repair or replacement of anodes, connections, and cable.

9.7.2 Maintenance of interference bonds and drainage switches

9.7.2.1 Repair of interference bonds.

9.7.2.2 Repair of drainage switches or equivalent devices.

9.7.3 Maintenance, repair, and replacement of electrical isolation devices, test leads, and other test facilities.

9.8 Records sufficient to demonstrate the evaluation of the need for and the effectiveness of corrosion control measures should be retained as long as the facility involved remains in service. Other related corrosion control records should be retained for a period that satisfies individual company needs.

#### References

1. NACE SP0572 (latest revision), "Design, Installation, Operation, and Maintenance of Impressed Current Deep Anode Beds" (Houston, TX: NACE).

2. F.W. Anney, "Electrical Resistivity of Oil-Country Tubular Steels," U.S. Steel Technical Report, March 31, 1971.

3. NACE SP0177 (latest revision), "Mitigation of Alternating Current and Lightning Effects on Metallic Structures and Corrosion Control Systems" (Houston, TX: NACE).

4. ANSI/ASME B31.8 (latest revision), "Gas Transmission and Distribution Piping Systems" (New York, NY: ANSI, and New York, NY: ASME).

5. NACE SP0169 (latest revision), "Control of External Corrosion on Underground or Submerged Metallic Piping Systems" (Houston, TX: NACE).

#### Appendix A—Casing Potential Profile (Nonmandatory)

#### A.1 Introduction

A.1.1 This appendix describes a typical potential profile tool, its function, and use. Procedures for interpreting data are covered. This appendix supplements Paragraph 4.3.1 of this standard.

A.1.2 The name "casing potential profile" has been widely accepted. The measurement is actually a potential difference, and the plotted data represent a casing potential difference profile. The tool measures a potential difference between two points on the casing as opposed to the potential of a pipe as measured in a pipe-to-soil potential in evaluating pipeline corrosion. The term *potential difference* is used interchangeably with voltage (IR) drop.

A.1.3 A casing potential profile should be performed under the direction of a person qualified by knowledge and experience in this particular endeavor.

A.2 Types of Casing Potential Profile Tools

A.2.1 A typical casing potential profile tool consists of two contacts positioned 3 to 8 m (10 to 26 ft) apart on tubing and separated by an electrical insulator. A wire is attached to each contact and brought to the surface to a voltmeter. The tool is moved along the inside of the casing to take voltage drop measurements as needed. (Refer to Figure A1.)

A.2.2 Some of the contact devices are:

A.2.2.1 Spring-loaded knives that continuously contact the casing while moving up or down. Tension is increased against the casing wall by manipulating the position of knives.

A.2.2.2 "Pipe cutter" wheels permanently tensioned on spreader arms. Wheels continuously ride the casing wall at constant pressure.

A.2.2.3 Spreader arms with contactors that are opened and closed by an electric motor or mechanical means from the ground level. Pressure against the casing wall is adjustable.

A.3 Effect of Electrical Resistance on Data

A.3.1 Variable circuit resistance affects voltage (IR) drop readings. Because the electrical resistance of steel casing is extremely low (in the  $\mu$ -ohm per m range), the equipment design and procedure used to measure voltage are critical. For example, the voltage measured across approximately 6 m (20 ft) of casing can be in the range of 1 to 5,000  $\mu$ V. The resistance portion of the electrical circuit consists of the following:

A.3.1.1 The well casing between the profile tool's upper and lower contacts.

A.3.1.2 Other permanent tool fittings and cable and connectors.

A.3.1.3 Contact of the knives to the casing wall at each setting.

A.3.2 Resistance tables for the various casing grades are available.<sup>2</sup> The resistance of the casing for a given  $API^{(5)}$  grade changes as downhole temperature increases.

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<sup>&</sup>lt;sup>(5)</sup> American Petroleum Institute (API), 1220 L St. NW, Washington, DC 20005.

The resistance of the casing can be measured prior to installation.

A.3.3 A voltage (IR) drop measured across a given length of casing and total resistance can be used to calculate the current flow. The resistance value should be corrected for changes caused by temperature and grade of steel.

A.4 Other Influences on the Measured Voltage (IR) Drop

A.4.1 Thermal voltage differences between upper and lower contacts, casing wall, and knives. This is caused by the contacts riding continuously on the casing wall.

A.4.2 Resistance between contacts and casing wall. Foreign material on the casing wall can increase the total resistance and give an erroneous voltage (IR)

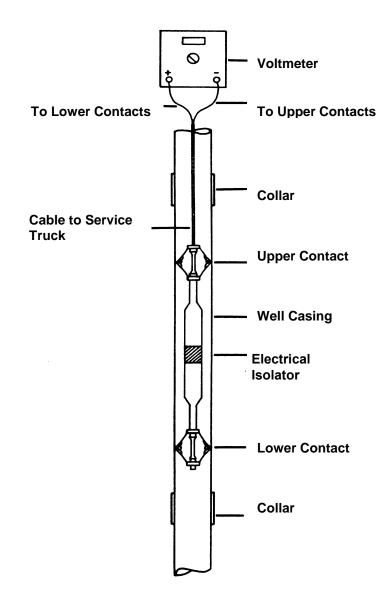


FIGURE A1—Casing Potential Profile Tool

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drop reading. Some foreign materials commonly encountered are corrosion products, scale, petroleum deposits, corrosion inhibitors, and moisture.

A.4.3 Ineffective electrical insulation between upper and lower contacts.

A.4.4 Electrically conductive fluid in the casing and in contact with the tool.

A.5 Use of Instruments

A.5.1 Voltmeters with a high impedance and resolution of 1  $\mu$ V and a short response time are required. They should also have AC rejection and be temperature compensated. Instruments should be calibrated annually.

A.5.2 The accepted procedure is to connect the positive (+) terminal of the voltmeter to the lower contact of the potential tool. A positive reading indicates current flowing up the casing (from positive to negative), and a negative reading indicates current flowing down the casing.

A.5.3 The tool is stopped at a given location in the well casing, and the IR drop readings are repeated, if required, until an acceptable one is obtained. An acceptable reading is one that is consistent with the log and other available data.

A.6 Data Use and Interpretation

A.6.1 A typical example of a casing potential profile plot is shown in Figure A2.

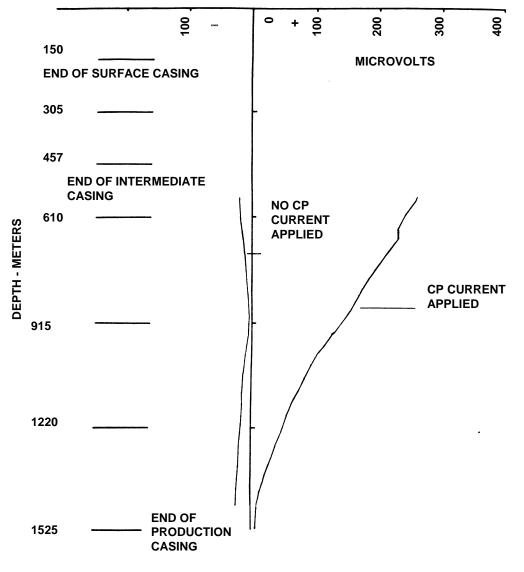


FIGURE A2—Typical Casing Potential Profile Plot

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A.6.2 Considerations in interpreting casing potential profile data:

A.6.2.1 Abrupt or inconsistent changes in single readings may indicate poor contact of the tool with the casing wall.

A.6.2.2 Data taken from a production casing shielded by other casing in the well are not necessarily indicative of current gain or discharge from the production casing to the formation.

A.6.2.3 A positive slope of the plotted voltage (IR) drop versus depth normally indicates an increase in the amount of current being picked up by the casing.

A.6.2.4 A negative slope of the voltage (IR) drop normally indicates a discharge of current from the casing.

A.6.2.5 Changes in slope are caused by a change in current or resistance. Resistance changes can be caused by:

(a) Change of wall thickness (e.g., corrosion, manufacturer's tolerance).

(b) Change of API pipe grade.

(c) The bridging of collars by the contacts of the tool.

A.6.2.6 Each voltage (IR) drop reading taken on a section of the casing (typically several meters) measures the long-line current. The local anodic cells are not detectable within the span of the tool. Current pickup is not necessarily uniform along the casing between tool contacts. Therefore, the

current density at a given area on the casing may be greater or less than that indicated.

A.6.2.7 Casing potential profile data give a reasonable indication of the amount of current flowing and indicate a direction of current flow. The data cannot be interpreted to determine whether sufficient current is being applied to cancel all corrosion cells.

A.7 Well data for each well can assist in interpreting potential profile readings. These data may include the following:

A.7.1 API grade, diameter, length, and weight of casing joint and its location in the well.

A.7.2 Collar locator, used to facilitate positioning of a casing potential profile tool between collars.

A.7.3 Electromagnetic logs, which help determine changes in wall thickness and grade of casing, and allow evaluation of the inner wall surface condition.

A.7.4 Formation resistivity logs that identify strata that may alter current distribution.

A.7.5 Leak history and repair methods.

A.7.6 Other types of logs for a given well can aid in interpreting casing potential profile data. Refer to Paragraph D.7.4 of Appendix D.

A.8 Interference Testing with the Casing Potential Profile Tool

A.8.1 The casing potential profile tool is valuable when used to determine electrical DC interference. Data obtained pertain only to the conditions prevailing at the time of the test.

#### Appendix B—E-Log-I Test (Nonmandatory)

**B.1** Introduction

B.1.1 The purpose of this appendix is to outline the procedure for performing an E-log-I test and to give guidelines for interpretation of data. This appendix supplements Paragraph 4.3.4 of this standard.

B.2 General

B.2.1 An E-log-I test should be performed under the direction of a person qualified by knowledge of and experience in this particular endeavor.

B.3 Prerequisites to Performing an E-log-I Test

B.3.1 All buried metallic structures must be electrically isolated from the casing.

B.3.2 The temporary groundbed should be located at a sufficient distance from the well to give optimum current distribution along the well casing. When feasible, it should be placed where permanent bed location is anticipated.

B.3.3 Other buried metallic structures should be located.

B.3.4 Foreign rectifiers or other DC sources that could influence the test should be located.

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B.3.5 The locations of high-resistivity strata that make it difficult to force current through underlying formations should be determined.

B.3.6 Placement of the reference electrode should be based on well depth, well spacing, and distance to foreign structures, and it should be beyond the influence of the test groundbed.

#### **B.4 Test Procedure**

B.4.1 After the equipment is set up (see Figure B1), the test should be conducted according to the following steps.

B.4.1.1 The "native state" potential, i.e., the potential with zero groundbed current, should be measured and recorded.

B.4.1.2 The test should then be begun by impressing current through the groundbed onto the well casing at the predetermined level (typically 0.1 A, as in Figure B2, for the selected time, typically two or three minutes).

B.4.1.3 At the end of the selected time, the current flow should be interrupted and the potential should be observed. Within a fraction of a second, the potential will drop abruptly. It will then begin a gradual "decay." The potential of interest is that

just prior to the start of the decay. This is frequently referred to as the instant-off potential.

B.4.1.4 The current interruption should last no more than two seconds. A higher current should then be applied to the casing at the next predetermined current level. Typically, increments from 0.1 to 2.0 A are used.

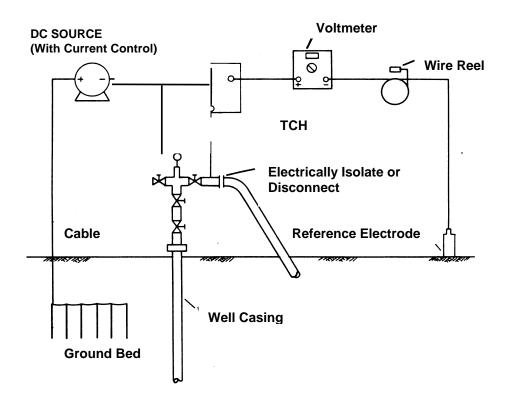
B.4.1.5 The current increments should be selected to meet the requirements of individual conditions and to ensure the proper interpretation of the E-log-I test.

B.4.1.6 Time intervals should be consistent throughout the test.

B.5 Interpretation of Test Results

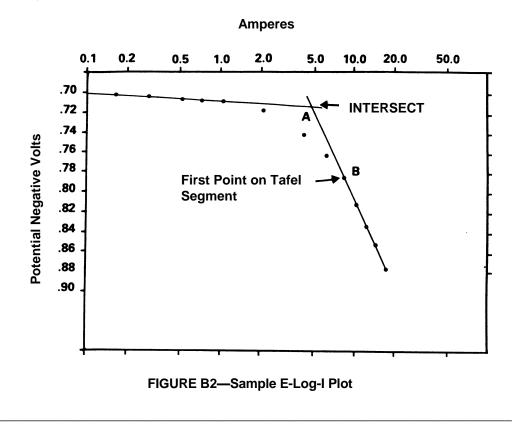
B.5.1 Figure B2 is an example of an E-log-I curve. Casing-electrolyte potentials and current applied are plotted on semilogarithmic scales. The interpretation of the curve is dependent on the experience of the operator. The current required is usually taken at the intersection, point A, or the first point lying on the Tafel segment, point B.

B.5.2 If the E-log-I results have not been verified for a given group of wells, additional testing such as the casing potential profile log should be conducted.





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## Appendix C—Electromagnetic Casing Inspection Instruments (Nonmandatory)

#### C.1 Introduction

C.1.1 Subsurface electromagnetic inspection instruments are used to inspect the casing wall for defects. The inspection helps in determining a need to install a CP system or in determining its effectiveness after installation. These instruments fall into two broad categories; one induces an AC electromagnetic field into the casing wall and the other, a DC electromagnetic field into the casing wall. A comparison of these electromagnetic inspection instruments points out the differences in the methods of measurement and the significance of these differences.

C.2 Corrosion Inspection Instruments

C.2.1 The AC inspection instrument derives its signal by detecting the amount of phase shift measured between the low-frequency transmitter coil and the receiver coil. The transmitter coil is energized with a low-frequency AC current, causing an electromagnetic field to be induced into the casing. The field is detected by the receiver coil, usually located 300 to 600 mm (12 to 24 in.) away. C.2.1.1 The amount of phase shift of the received signal from the transmitter is related to the properties of the casing. These properties are:

- (a) Casing weight.
- (b) Casing size.

(c) Casing grade, including permeability and conductivity.

(d) Metallic influence outside casing, if inspected casing is inside another casing (e.g., scratchers, centralizers).

C.2.1.2 The predominant response is a result of the change in the casing weight. Because there is an "averaging" effect between the transmitter and receiver coil, there must be significant metal loss (e.g., by corrosion) with respect to normal casing weight to cause a meaningful change in the phase shift.

C.2.1.3 The accuracy is such that a change from one API casing weight to another of the same size

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casing is detectable. It is responsive to the change in the amount of metal, whether the change is internal or external.

C.2.1.4 Supplementally, a noncontact electronic caliper is usually available for added internal information, and some instruments are also equipped with a set of closely spaced coils to provide uncalibrated indications of small defects.

C.2.2 The DC inspection instrument derives its casing defect signal by detecting a disturbance in an otherwise stable magnetic field within and surrounding the casing wall. The stable magnetic field is induced into the casing wall. A defect such as a corrosion pit causes a field irregularity or "flux leakage" at that point on both sides of the casing wall, whether the defect itself is on the inside or the outside wall of the casing. This disturbance can be created by a single pit, an isolated defect, or by a group of closely located pits, i.e., general corrosion. The instrument sensors detecting the field disturbances are small and are in contact (as close as possible) with the internal circumferential surface of the casing.

C.2.2.1 Signals emitted by these sensors are caused by changes in the field disturbances, which vary because of:

(a) The strength of the induced DC magnetic field.

- (b) Defect depth.
- (c) Defect shape.

(d) Metallic influence outside casing (e.g., scratchers, centralizers, another casing).

- (e) Casing wall thickness.
- (f) Casing size.

(g) Casing grade, including permeability and conductivity.

(h) The speed with which the sensor passes the defect.

C.2.2.2 Techniques currently in use utilize the amplitude of the sensor signal. Although casing wall thickness affects the signal amplitude, the sensor does not discern that thickness; the amplitude response is usually calibrated to indicate depth of defect penetration in percent of the total casing wall thickness.

C.2.2.3 Instrument sensitivity is normally limited to defect depths greater than 20% of the casing wall and defect areas greater than 32 mm (1.3 in.) in diameter. Accuracy of the corrosion defect measurement is approximately  $\pm 15\%$  of defect depth in ideal single-string conditions when the casing information is known (e.g., weight, grade, etc.)

C.3 The information presented in Table C.1 may be used to determine which instrument is the most effective for certain situations.

C.3.1 Normally, operating conditions for both instruments are for temperatures up to 177°C (351°F), pressures of 100 MPa (14,500 psi), and casing sizes from 110- to 250-mm (4.3- to 9.8-in.) outside diameters. Some instruments can operate in conditions beyond these limits. The performance of either instrument is degraded when run in a multistring casing; however, the DC instrument's operation is less affected.

C.3.2 The running of base logs as soon as possible is recommended for better evaluation of future data.

C.3.3 Clean casing walls result in more reliable inspections.

Type of Instrument	Detects Casing Collars	Detects Small Defects and Defect Depths	Detects Large Holes in Casing	Detects Casing Weight Change	Detection of Outer Casing String	Detects Parted Casing String	Detects Drill Pipe Wear
AC	Yes	No	Yes	Yes	Yes	Yes	Yes
DC	Yes	Yes	Yes	No	No	Yes	No

#### **TABLE C.1—Instrument Effectiveness**

**NACE International** 

## Appendix D—Well Completion Design and Other Factors Associated with CP (Nonmandatory)

#### **D.1** Introduction

D.1.1 The purpose of this appendix is to provide accepted corrosion control practices for the design of CP systems for oil production, natural gas production, and natural gas storage wells and associated aboveground facilities. A person qualified to practice corrosion control should be consulted during all phases of well design and installation (see Paragraph 1.5.) These recommendations should not be construed as taking precedence over recognized electrical safety practices. Electrical grounding procedures at the well surface must conform to local, state, and national codes.

#### D.2 Electrical Isolation

D.2.1 Isolating devices consisting of flange assemblies, prefabricated insulating joints, unions, and couplings should be installed to isolate the well production casing electrically from other wells, associated pipelines, gauge lines, and structures when required to facilitate the application of corrosion control. These devices should be properly rated for temperature, pressure, and dielectric strength. Installation of isolating devices should be avoided in enclosed areas where combustible atmospheres are likely to be present. Typical locations at which electrical insulating devices may be considered are as follows:

D.2.1.1 Where facilities change ownership, e.g., the wellhead.

D.2.1.2 At the junction of bare well casing and associated pipelines and facilities.

D.2.1.3 At the junction of dissimilar metals (to prevent galvanic corrosion).

D.2.2 Isolating devices

D.2.2.1 Inspection and electrical measurements should be performed to ensure that electrical isolation is adequate.

D.2.2.2 Buried isolating devices should be suitably coated or wrapped with insulating material to prevent electrical current transfer through the surrounding soil.

D.2.2.3 Additional or special isolating devices may be needed on pipelines containing conductive fluids. D.2.3 The need for lightning and fault current protection at isolating devices should be considered. Cable connections from isolating devices to arrestors should be short, direct, and of a size suitable for short-term, high current loading.

D.2.4 When electrical contact would adversely affect CP, well casings should be electrically isolated from supporting pipe stanchions and structures.

D.2.5 When an isolating device is required, proper pressure-rated materials manufactured to perform this function should be used and installed according to manufacturer's recommendations.

D.2.6 As much distance as is practical should separate well casings, associated pipelines, and other facilities from electric transmission tower footings, ground cables, and counterpoise. Regardless of separation, consideration should always be given to lightning and fault current protection of well casings and safety of personnel. (See NACE SP0177.<sup>3</sup>)

D.2.7 Plastic fittings used in chemical pump lines must meet electrical and physical requirements.

D.2.8 Isolation of high-temperature natural gas discharge and oil lines requires special design considerations for use of materials.

D.2.9 Nonmetallic isolators should meet specifications for use in buried and aboveground applications, as required.

**D.3 Electrical Continuity** 

D.3.1 Consideration should be given to the electrical properties of screwed casing couplings. To ensure electrical continuity, low-electrical-resistance thread compounds should be used.

D.4 Coatings

D.4.1 A dielectric coating used on a well casing requires a surface that provides a good physical bond between it and the formation or cement to ensure a sealed environment. NOTE: Coatings used on well casings require special dielectric, physical, and chemical qualities, which are beyond the scope of this standard.

D.5 Corrosion Control Test Stations and Bonds

D.5.1 Test stations for potential and current measurements should be provided at the well to

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facilitate CP testing. Such use may include, but not be limited to, the following:

D.5.1.1 Well production casing.

D.5.1.2 Well surface and intermediate casings.

D.5.1.3 Dehydration, oil pumping, natural gas compressor, and other similar facilities.

D.5.1.4 Foreign metallic pipelines or facilities near the well.

D.5.1.5 Gauge lines.

D.5.2 Test leads should be color coded or otherwise permanently identified. Wire should be installed with slack. Damage to wire insulation should be avoided. Test leads should not be exposed to excessive sunlight. Aboveground test stations are preferred. If test stations are flush with the ground, adequate conductor slack should be provided within the test station to facilitate test connections.

D.5.3 An isolating device can be accommodated by attaching an appropriate test wire and low-resistance current-carrying cable to each side of the device. These cables and wires should be appropriately color coded or labeled and terminated at a convenient location for bonding when needed. Shunts may be used to measure current.

D.5.4 The test station may accommodate currentcarrying cable when a pipeline is utilized as the negative return. Current-carrying cable or wire should not be used as a contact for taking casing-to-referenceelectrode potentials.

D.5.5 Attachment of test leads and cables to steel well casings and equipment

D.5.5.1 Test leads are usually attached to an aboveground fitting, which is directly connected to the well casing. Soldering or thermit welding may be used to attach wire or cable when heating requirements do not exceed the temperature limit for casing and fittings. NOTE: Care should be taken to ensure that specified temperature limits are not exceeded during thermit welding to prevent damage to the pipe by copper penetration. Consult ANSI<sup>(6)</sup>/ASME<sup>(7)</sup> B31.8<sup>4</sup>,Paragraph 862.115 on Electrical Connections and Monitoring Points, for additional guidelines on thermit welding. Mechanical connections to flanges and other fittings can be used if they remain secure and

maintain low resistance. Refer to NACE SP0169.5

D.5.5.2 Attaching test wires directly to the production casing below ground level is beyond the scope of this standard. Special consideration must be given to requirements for cementing and completion procedures.

D.5.6 Coating of test wire attachments

D.5.6.1 All test lead wire and cable should be coated with a direct burial type of electrical isolating material. Attachments to fittings or casings should be coated with a dielectric material. The coating should be compatible with the existing coating on the fitting or casing.

D.6 CP

D.6.1 Refer to Sections 5 and 6 of this standard for the design and installation of CP.

D.7 Information Useful for the Design and Monitoring of a CP System

D.7.1 Well piping system specifications and practices.

D.7.1.1 Total length, size, weight, API grade, and location of each casing string in the well.

D.7.1.2 Electrical resistance of steel casing. Tables are available for various grades and temperatures. <sup>(8)</sup>

D.7.1.3 Coatings (dielectric)—well casings and connecting pipelines.

D.7.1.4 Cement types and grades, and locations of cemented intervals.

D.7.1.5 Drilling mud-type, inhibitor.

D.7.1.6 Additives to cement or mud.

D.7.1.7 Completion data regarding backfill around casing and the location of cement or other material.

D.7.1.8 Surface well fittings such as valves for access to casing.

D.7.1.9 Locations of metallic scratchers and centralizers.

D.7.1.10 Locations of metallic stress rings.

#### **NACE International**

<sup>&</sup>lt;sup>(6)</sup> American National Standards Institute (ANSI), 1819 L St., NW, Washington, DC 20036.

<sup>&</sup>lt;sup>(7)</sup> ASME International (ASME), Three Park Avenue, New York, NY 10016-5990.

<sup>&</sup>lt;sup>(8)</sup> Casing resistance data tables available from Manager, Casing Inspection Services, Dresser Atlas, Box 1407, Houston, TX 77251. Tables were based in part on data found in a U.S. Steel Technical Report.<sup>2</sup>

D.7.1.11 Acidizing procedures.

D.7.2 Well and associated pipeline site environments

D.7.2.1 Existing and proposed CP systems.

D.7.2.2 Possible interference sources (see Section 7 of this standard).

D.7.2.3 Surface environmental conditions.

D.7.2.4 Foreign buried metallic structures (including location, ownership, and corrosion control practices).

D.7.2.5 Site accessibility.

D.7.2.6 AC power availability.

D.7.2.7 Status of well's electrical isolation from foreign structures.

D.7.3 Field survey, corrosion test data, and operating experience

D.7.3.1 Electrical resistivity of the electrolyte (soil).

D.7.3.2 Electrical continuity (low resistance is required across well casing threaded couplings).

D.7.3.3 Cumulative leak history.

D.7.3.4 Interference current data.

D.7.4 Well logs used to supplement other test data utilized for design

D.7.4.1 Electromagnetic alternating current and direct current logs (thickness gauge).

D.7.4.2 Electric log—formation resistivity normally available from well completion data.

D.7.4.3 Gamma ray neutron log—determines relative lithology for location of high-resistivity formations.

D.7.4.4 Collar locator log—facilitates other logs such as casing potential profile.

D.7.4.5 Cement bond log or temperature log indicates where cement is located between well casing and formation.

D.7.4.6 Optical inspection inside casing.

D.7.4.7 Caliper log (mechanical feelers) to determine internal wall thickness change or defects such as corrosion pits.

D.7.4.8 Dual induction resistivity log.

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA DEPARTMENT OF CONSERVATION

## DIVISION OF OIL AND GAS

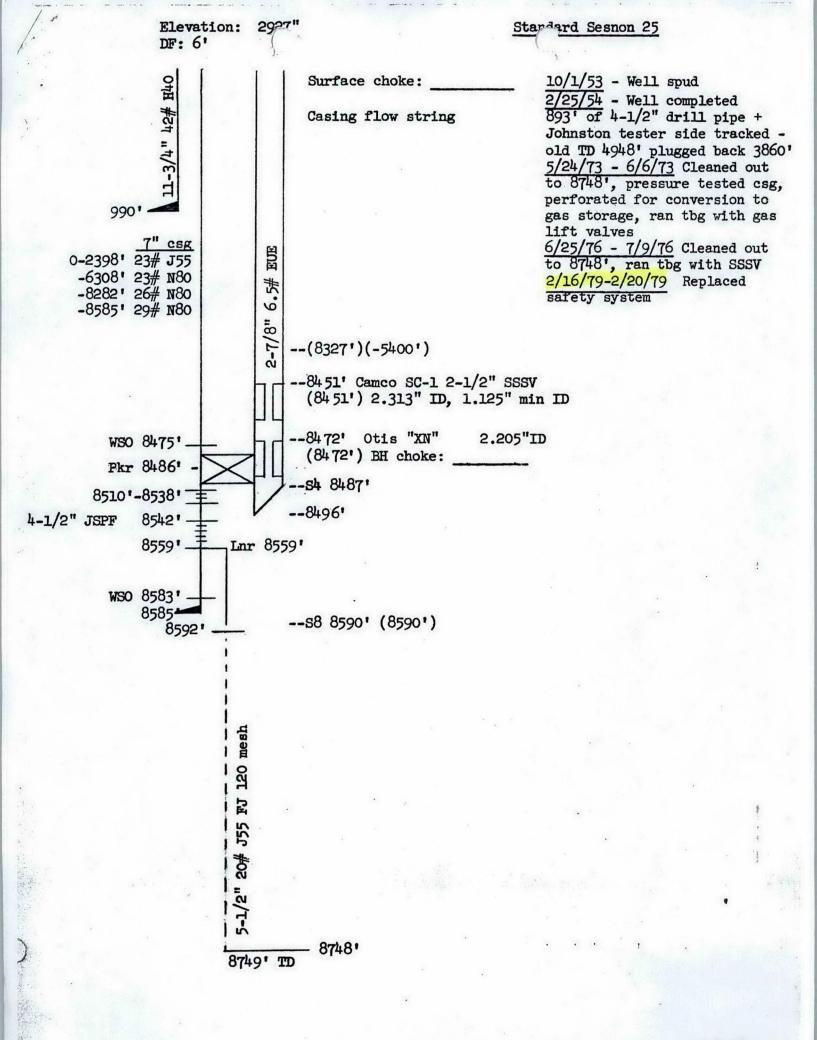
History of Oil or Gas Well

	Well No. SFZU SS-25, Sec.	28	, т. 3	N, 1	1. 16W	S.B	• B. &
	Date September 5, 73 Date 19	Signed	1	52	lingu	uli - fr	
	P. J. Box 54790, Terminal Annex Los Angeles, California 90054 (213) 68 (Address) (Telephone Number)				nt	(President, Secretar	
	It is of the greatest importance to have a complete history of the wel drilling and testing of the well or during re-drilling, altering of casing, as hole size, formation test details, amounts of cement used, top and bot initial production data.	plugging, or	abandonmer	nt with the	dates thereof.	Be sure to inclu-	de such i
ate 73							
24	Before moving in California Production : to 250° into tubing to dewax the well.	Rigged	up and	using	McCullo	ugh, shot	four
	3/8" holes in tubing at 8485' with defluid batch of high gel polymer drilling fluid of drilling fluid.						
5	Circulated out gas and oil from well and tree and installed B.O.P., including hyd Pulled tubing and packer. Ran in hole	dril, co	mplete	shut-c	off and	tubing ra	
26	Ran 4-5/8" bit and casing scraper and cl hole clean recovering carbonate material and ran Dresser Atlas cement bond log an	l from d	rillin	g fluid	. Pulle	ed out of	hole
	time log and recorded 8742'-8000'.						
7	Idle.						
							orded
8	Idle. Ran Dresser Atlas acoustilog and recorde	aper and	cleane	ed out	to 8559		
8	Idle. Ran Dresser Atlas acoustilog and recorde 8560'-8000'. Ran 6" bit and casing scra Ran Baker retrievable retainer and using tested 7" casing as follows:	aper and g Hallib	cleane	ed out cementi	to 8559		
8	Idle. Ran Dresser Atlas acoustilog and recorde 8560'-8000'. Ran 6" bit and casing sera Ran Baker retrievable retainer and using tested 7" casing as follows: 8525'-surface 6000'-surface	Aper and g Hallib 1500 ps: 2000 ps:	cleane urton o i for : i for :	ed out cementi 23 minu 25 minu	to 8559 ng truck tes tes		
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27 28 29	Idle. Ran Dresser Atlas acoustilog and recorde 8560'-8000'. Ran 6" bit and casing scra Ran Baker retrievable retainer and using tested 7" casing as follows: 8525'-surface 6000'-surface 4500'-surface 3000'-surface 2000'-surface 1000'-surface	aper and g Hallib 1500 ps: 2000 ps: 2400 ps: 2800 ps: 3100 ps: 3400 ps:	cleane urton o i for : i for : i for : i for : i for : i for :	ed out cementi 23 minu 25 minu 27 minu 27 minu 25 minu 33 minu	to 8559 ng truck tes tes tes tes tes	( pressure f	e vv

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SED\_RT\_0057 AC\_CPUC\_0000025



SED\_RT\_0058 AC\_CPUC\_0000026 SS-25 History (Cont'd) Page 2

1973

- 5-30 Ran Halliburton tester and set packer at 8471' with tail to 8487'. Opened tool at 11:45 A.M. with strong blow and gas to surface in 3 minutes, shut in and turned to trap at 11:53 A.M. Flowed gas at approximate rate of 4 MM cu. ft. per day for 33 minutes. Shut in for 65 minutes to take initial shut in pressure. Re-opened tool at 1:30 P.M. and flowed for 60 minutes through 1/4" surface choke and 5/8" choke in tester at rate of 1.7 MM cu. ft. per day with surface pressure of 1150 psi. Flowed from 2:30 P.M. until 4:00 P.M. through 1/2" surface choke at rate of 4.2 MM cu. ft. per day with surface pressure of 750 psi. Flowed 4:00 P.M. to 7:00 P.M. through 1" surface choke at rate of 4.5 MM cu. ft. per day with surface pressure of 575 psi. Shut in tester at 7:00 P.M. for final static pressure.
- 5-31 Bled pressure down to 225 psi (trap back pressure). Pulled tester at 8:45 A.M. for final shut in of 11 hours and 45 minutes. Opened backscuttle valve and circulated drilling fluid to pump gas to trap. Pulled out of hole and recovered drilling fluid in bottom 120' of 2-7/8" tubing below backscuttle valve. Recovered no sand in tubing or in tester.

#### PRESSURE RECORDER DATA:

Hydrostatic	3722 psi
Initial Flow	1338 psi
Initial Shut-in	1461 psi
Initial Flow 1/4"	1442 psi.
Flow 1/2" Choke	1386 psi
Flow 1" Choke	1373 psi
Final Shut-in	1459 psi

Ran in with latching tool and found no sand on Baker bridge plug at 8550'. Backscuttled and recovered no sand. Pulled bridge plug to 4975' and reset same.

- 6-1 Removed casing spool. Removed rings and rubber packing from casing head. Filled 7" x 11-3/4" annulus with 50 bbls. of mud. Using jack hammers, dug concrete out of cellar for 20". Rigged up casing jack and spear and unlanded 7" casing with 196,000 lb. pull. Removed slips. Welder cut off conductor and 11-3/4" surface casing. Leveled and tack welded new casing head on 11-3/4" casing.
- 6-2 Completed welding casing head and checked weld with Gamma ray. Rigged up casing jacks and spear. Pulled 196,000 lbs. on 7" casing and landed on slips in casing head and installed packing. Cut off 4-1/2" of 7" casing and rebeveled top of casing. Tested casing head packing and secondary flange pack-off, both to 2800 psi for 30 minutes. Reinstalled B.O.P. Started in well with tool to retrieve bridge plug.
- 6-3 Idle.
- 6-4: Recovered bridge plug from 4975' and found no sand on bridge plug. Using Dresser Pure Atlas 4" Golden Jet gun, shot four 1/2" holes per foot 8559'-8542' and 8538'-8510'. Ran wire brush perforation cleaner and found 13' of fill circulated and worked brush from 8736'-8592'. Pulled out of well.

SS 25 History (Cont'd) Page 3

1973

- 6-5 Ran 2-7/δ" tubing, including packer, nipple, sliding sleeve and five gas lift mandrels (details attached). Hydrotested tubing to 5000 psi and found no leaks. Landed tubing on doughnut with bottom of tubing at 8492'. Using Hydrotest, pumped down tubing but obtained circulation. Pulled and reran bottom gas lift valve with piano wire unit. Using rig pump, set packer but apparently could not shear ball seat.
- 6-5 Pumped water down tubing with hot oil truck and found seat had been sheared with rig pump. Using piano wire unit, shifted sleeve at 8390' to open position. Removed B.O.P., installed new X-mas tree and tested doughnut and tree to 3500 psi, each for 20 minutes. Circulated drilling fluid out of hole with lease water. Displaced water to top gas lift valve with nitrogen. Blew well down to zero pressure and shut-in. Moved out rig.

#### TUBING DETAILS

Derrick floor to top of tubing 160 jts. 2-7/8" 8rd., EUE, J-55 KBMG mandrel w/BK valve 1050 psi 30 jts. 2-7/8" tubing KBMG mandrel w/BK valve 1025 psi 28 jts. 2-7/8" tubing KBMG mandrel w/BK valve 1000 psi 26 jts. 2-7/8" tubing KBMG mandrel w/BK valve 975 psi 23 jts. 2-7/8" tubing KBMG mandrel w/BK valve 950 psi 2 jts. 2-7/8" tubing Baker model "L" sliding sleeve (open) 1 jt. 2-7/8" tubing Baker "F" nipple 1 jt. 2-7/8" tubing Baker FH hydrostatic packer 1 jt. 2-7/8" tubing Baker ball seat & chamfered collar

01-8.351 8.351-49831 49831-49951 4995'-5914' 5914'-5925' 5925' -6784' 6784'-6795' 6795 - 7589 7589'-7600' 7600'-8314' 8314'-8325' 83251-83871 83871-83901 83901-84211 8421'-8422' 8422'-8453' 84531-84601 8460'-8491' 8491'-8492'

STATE OF CALIFORNIA-RESOURCES AGENCY

DEPARTMENT OF CONSERVATION DIVISION OF OIL AND GAS 6401 TELEPHONE ROAD, SUITE 240 VENTURA, CALIFORNIA 93003-4458 (805) 654-4761 GEORGE DEUKMEJIAN, Governor



April 18, 1989 Revised July 26, 1989

R.W. Weibel, Agent Southern California Gas. Co. 810 S. Flower St. Los Angeles, CA. 90017

GAS STORAGE PROJECT Aliso Canyo Sesnon-Frew Zone

The Division of Oil and Gas has responsibility for wells that inject and withdraw natural gas from an underground storage facility. Our records indicate that, although individual wells have been permitted, project approval has not been issued by the Division to conduct underground gas storage operations in the Aliso Canyon field. Therefore, continued operation of the project is approved provided that:

- Form OG105 or Form OG107 is used whenever a new well is to be 1. injection-withdrawal well, use as an drilled for well or whenever an existing well is to observation-collection injection-withdrawal well or to an converted be observation-collection, even if no work is required. (Specific requirements will be outlined in our answer to your notice.)
- 2. When an existing well is to be converted to injection-withdrawal or observation-collection, a test is conducted to demonstrate the mechanical integrity of the casings.
- 3. A monthly injection-withdrawal report is furnished to this divivision listing the amount of gas injected, injection pressure, and amount of gas withdrawn from each well.
- 4. Surface pressures on each active or idle well are measured weekly with a calibrated test gauge, and recorded. Evidence of such measurement and calibration must be made available to this Division upon request.
- 5. All injection piping, valves and facilities meet or exceed design standards for the maximum anticipated injection pressure and are maintained in a safe and leak free condition.
- 6. The gas storage reservoir pressure shall not exceed 3600 psi. Tests may be required to establish that no damage will occur from excessive injection pressures.

Southern California Gas. Co. Aliso Canyon

- 7. A mechanical integrity test is made and filed with this Division for each injection-withdrawal well within three months after injection and/or withdrawal has commenced, at least once every year thereafter, after any significant anomalous rate or pressure change, or as requested by this office to confirm that the stored gas is confined to the intended zones.
- 8. A Division approved monitoring program plan is installed for the gas storage zone. Data shall be available for periodic inspection or as requested by the Division.
- 9. The following data are maintained for surveillance and evaluation of the project and are made available for periodic inspection by personnel from this Division:
  - a. A graph of oil, water, and gas production rates vs. time for each zone.
  - b. A graph of reservoir pressures, gas inventory fluctuations, and injection pressures.
  - c. Observation well data, reservoir fluid distribution, temperature, radioactive tracer, and noise surveys.
- 10. Upon request, the Division is provided with any other data deemed necessary to monitor the operations of the project.
- 11. The Division is notified of any anticipated changes in a project resulting in alteration of conditions that were originally approved, such as: increase in size of the project, increase in the approved zone pressure; changes in the injection-withdrawal intervals; changes in the observation-collection intervals; or monitoring procedures. Such changes shall not be carried out without Division approval.
- 12. Any remedial work in the project area necessary because of the gas storage operation on idle, abandoned, or active wells needed to protect life, health, property and oil, gas, or freshwater zones will be the responsibility of the project operator.
- 13. Injection-withdrawal operations shall cease if any evidence of damage is observed or upon written notice from this Division.

Patrick J. Kinnear Deputy Supervisor Confidential and Protected Materials Pursuant to PUC Section 583, GO 66-D, and D.17-09-023



- 1 Reconductoring of SCE's double-circuit, 66-kV Segments D and E would take place in the community of
- 2 Mission Hills in the City of Los Angeles. The Two fiber optic cable installations are proposed -route
- 3 from San Fernando Substation: Telecommunications Routes #3 and #4. Telecommunications Route #3
- 4 would extend northeast from the substation to a fiber optic connection point within the ROW of an
- 5 existing SCE 220-kV subtransmission line corridor. It, would traverse northeast from the substation
- 6 within the community of Mission Hills in the City of Los Angeles, through into-the City of San
- 7 Fernando, and into then the community of Sylmar in the City of Los Angeles (Telecommunications
- 8 Route #3)(Figure 2-8).
- 9
- 10 Telecommunications Route #4 would extend northeast from San Fernando Substation along the same
- path as Telecommunications Route #3, but would be routed northwest at Truman Street in the City of 11
- San Fernando. Telecommunications Route #4 would follow Truman Street through the community of 12
- 13 Sylmar to where it merges with San Fernando Road, and it would then continue northwest along San
- 14 Fernando Road to a fiber optic connection point located at the entrance to Sunshine Canyon Landfill
- (Figure 2-8). The fiber optic line would be installed on existing overhead wood poles owned by SCE and 15
- the Los Angeles Department of Water and Power, and in new underground conduit in several locations, 16
- including new underground conduit that would cross under I-5. One new 45-foot-tall wood 17
- telecommunications pole would be installed along Telecommunications Route #4 just west of I-5 and 18
- 19 Interstate 210 (I-210) at the intersection of San Fernando Road and Sepulveda Boulevard. 20

#### 2.2 **Components of the Proposed Project** 21

#### 23 2.2.1 Central Compressor Station

24

22

25 The proposed project would include the installation of electric motor-driven compressors with variable-26 speed drivers, to replace the existing gas turbine-driven compressors.

27

28 The proposed compressors would be installed at a new Central Compressor Station, which would be 29 approximately 26,500 square feet (Figure 2-2). The proposed Central Compressor Station enclosures

would house three new electric-driven, variable-speed compressors, as well as scrubbers (which remove 30 impurities from the gas), piping, coolers, and electrical equipment (Figure 2-9). The station would be

- 31 32 constructed in an area that includes the existing office buildings and parking within the footprint of the
- 33 Plant Station site (Figure 2-2). The office buildings would be removed to allow for construction of the
- 34 Central Compressor Station. The Central Compressor Station would not be visible from residential
- 35 properties outside the storage field property line.
- 36

37 The proposed Central Compressor Station site would be fenced and paved for access control, fire control, 38 and maintenance purposes. The station enclosures would be painted and have no reflective surfaces, but 39 permanent nighttime lighting would be installed.

40

#### 41 2.2.1.1 **Electric-driven, Variable-speed Compressors** 42

43 The three electric-driven, variable-speed compressors installed in the proposed Central Compressor

Station would each have approximately 22,000 horsepower for a combined maximum output of 44

approximately 66,000 horsepower. Combined, the compressors would be capable of compressing a total 45

- 46 of approximately 450 to 600 million scf of natural gas per day. The maximum discharge pressure of the
- 47 gas injected into the reservoir would be approximately 3,400 pounds per square inch, gauge.

48



## **REQUIREMENTS FOR CALIFORNIA UNDERGROUND GAS STORAGE PROJECTS**

## FINAL TEXT OF REGULATIONS

## CALIFORNIA CODE OF REGULATIONS, TITLE 14 CHAPTER 4. DEVELOPMENT, REGULATION, AND CONSERVATION OF OIL AND GAS RESOURCES

## Subchapter 1. Onshore Well Regulations

Article 3. Requirements

## [REPEAL SECTION 1724.9]

## 1724.9. Underground Gas Storage Projects

(a) For all underground gas storage projects, the operator shall provide the data required under Section 1724.7 and the operator shall comply with the requirements of Section 1724.10, unless the requirement is clearly not applicable to a gas storage project or the Division otherwise advises that the requirement is not applicable to a gas storage project. The operator shall ensure that required project data is complete and current, regardless of the date of approval of the gas storage project. If project data for an existing project is incomplete, then the operator shall submit the required data to the Division as soon as is practicable. In addition to the data required under Section 1724.7, the operator of an underground gas storage project shall provide the Division with the following:

(1) Characteristics, petrophysical properties, mechanical properties, and maps of the cap rock, including areal extent, isopach thickness, structure contour, formation fracture gradient, primary and secondary permeability, lithology and lithologic variation, threshold pressure, and locations and characteristics of faults and fractures.

(2) Oil and gas reserves of storage zones prior to start of injection, including calculations.

(3) List of proposed surface and subsurface safety devices, tests, and precautions to be taken to ensure safety of the project.

(4) Proposed waste water disposal method.

(b) The Project Approval Letter for an underground gas storage project shall state the maximum and minimum reservoir pressure and include data and calculations supporting the bases for the pressure limits. The pressure limits shall account for the following:

Requirements for California Underground Gas Storage Projects Final Text of Regulations Page 1 of 24 (1) The pressure required to inject intended gas volumes, particularly at total inventory, and the pressure limit shall not exceed the design pressure limits of the reservoir, wells, wellheads, piping or associated facilities.

(2) The minimum reservoir pressure shall not be designed less than historic minimum operated pressure unless reservoir geo-mechanical competency can be demonstrated to the Division's satisfaction. The impacts of intended minimum reservoir pressure shall be accounted for in the data required under subdivision (a)(1) as it relates to geomechanical stress, reservoir liquid influx, surface facility gas cleaning and liquid handling, and liquid disposal, all of which affect the maximum reservoir cycling capacity of the storage field and can impact mechanical integrity of the facilities.

(c) In addition to the mechanical integrity testing requirements under 1724.10(i), the operator shall monitor the tubing-casing annulus, if there is one, of each well that is part of an underground gas storage project. The operator shall monitor for presence of annular gas by measuring and recording annular pressure and annular gas flow. Such monitoring shall done at least once a day when the well is not being used for withdrawal. The operator shall evaluate any anomalous annular gas occurrence and immediately report it to the Division. The operator shall begin complying with this requirement within one month of the effective date of this section. (d) Where installed, the operator of an underground gas storage project shall function test all surface and subsurface safety valve systems within three months of the effective date of this section, and every six months after that. The tests shall be conducted in accordance with manufacturer's recommendations to confirm operational integrity and mitigate any integrity isolation findings. The appropriate district office shall be notified at least 48 hours before performing testing so that Division staff may witness the operations, and documentation of the testing shall be maintained and available for Division review. A closed storage well safety valve system shall be manually re-opened at the site of the valve after an inspection and not opened from a remote location. Within 90 days of finding that a surface or subsurface safety valve is inoperable, the operator shall either repair or remove the safety valve or temporarily plug the well. A longer timeframe for addressing an inoperable surface or subsurface safety valve may be approved by the Division.

(e) Within 21 days of the effective date of this section, the operator of an underground gas storage project shall submit an inspection and leak detection protocol to the Division for review and approval. The protocol shall include inspection of the wellhead assembly and attached pipelines for each of the wells used in an underground gas storage project, and the surrounding area within a 100' radius of the wellhead of each of the wells used in an underground gas storage project, unless the operator can demonstrate that some part of that area is obstructed. The inspection protocol shall provide for inspection at least once a day, employing effective gas leak detection technology such as infrared imaging, and shall provide for immediately reporting detected leaks to the Division. The operator's selection and usage of gas leak detection technology shall take into consideration detection limits, remote detection of difficult to access locations, response time, reproducibility, accuracy, data transfer capabilities, distance from source, background lighting conditions, geography, and meteorology. The Division will consult

Requirements for California Underground Gas Storage Projects Final Text of Regulations Page 2 of 24 with the California Air Resources Board when reviewing an inspection and leak detection protocol submitted under this subdivision.

(f) Within three months of the effective date of this section, and annually thereafter, the operator of an underground gas storage project shall test the operation of the master valve and wellhead pipeline isolation valve for proper function and verify ability to isolate the well. The operator shall submit documentation of the results of testing done under this subdivision within 10 days of completing the testing, but shall immediately notify the Division if testing indicates a lack of function.

(g) Within six months of the effective date of this section, the operator of an underground gas storage project shall submit a Risk Management Plan to the Division for review and approval. The Risk Management Plan shall identify potential threats and hazards to well and reservoir integrity; assess risks based on potential severity and estimated likelihood of occurrence of each threat; identify the preventive and monitoring processes employed to mitigate the risk associated with each threat; and specify a process for periodic review and reassessment of the risk assessment and prevention protocols. Risk assessment and prevention protocols shall be consistent with and additional to any other existing requirement in statute or regulation. The Risk Management Plan shall specify a schedule for submission of risk assessment results to the Division. All Risk Management Plans shall include at least the following risk assessment and prevention protocols:

(1) Ongoing verification and demonstration of the mechanical integrity of each well used in the underground gas storage project and each well that intersects the reservoir used for gas storage. The protocols for verifying and demonstrating well integrity shall not be limited to compliance with the mechanical integrity testing requirements under Section 1724.10(j), and shall include consideration of the age, construction, and operation of each well.

(2) Corrosion monitoring and evaluation including consideration of the following:

(A) Evaluation of tubular integrity and identification of defects caused by corrosion or other chemical or mechanical damage;

(B) Corrosion potential of wellbore produced fluids and solids, including the impact of operating pressure on the corrosion potential of wellbore fluids and analysis of partial pressures; (C) Corrosion potential of annular and packer fluid;

(D) Corrosion potential of current flows associated with cathodic protection systems;

(E) Corrosion potential of all formation fluids, including fluids in formations above the storage zone;

(F) Corrosion potential of uncemented casing annuli; and

(G) Corrosion potential of pipelines and other production facilities attendant to the underground gas storage project.

(3) Protocols for evaluation of wells and attendant production facilities that include monitoring of casing pressure changes at the wellhead, analysis of facility flow erosion, hydrate potential, individual facility component capacity and fluid disposal capability at intended gas and liquid rates and pressures, and analysis of the specific impacts that the intended operating pressure range could have on the corrosive potential of fluids in the system.

Requirements for California Underground Gas Storage Projects Final Text of Regulations Page 3 of 24 (4) Ongoing verification and demonstration of the integrity of the reservoir including demonstration that reservoir integrity will not be adversely impacted by operating conditions.
 (5) Identification of potential threats and hazards associated with operation of the underground gas storage project including the following:

(A) Evaluation of likelihood of events and consequences related to the threats and hazards;

(B) Determination of risk ranking to develop preventive and mitigating measures to monitor or reduce risk;

(C) Documentation of risk evaluation and description of the basis for selection of preventive and mitigating measures;

(D) Provision for data feedback and validation; and

(E) Regular, periodic risk assessment reviews to update information and evaluate risk management effectiveness.

(6) Prioritization of risk mitigation efforts based on potential severity and estimated likelihood of occurrence of each threat.

(h) The requirements of this section shall not be construed to replace or restrict an operator's compliance with any specific requirements applicable to pipelines and associated facilities pursuant to Parts 190-199 of Title 49 of the United States Code of Federal Regulations.

Note: Authority cited: Sections 3013 and 3106, Public Resources Code; and Statutes of 2016, Chapter 673, Section 6. Reference: Sections 3106, 3220 and 3403.5, Public Resources Code.

# [ADOPT NEW ARTICLE 4 WITH SECTIONS 1726, 1726.1, 1726.2, 1726.3, 1726.3.1, 1726.4, 1726.4.1, 1726.4.2, 1726.4.3, 1726.5, 1726.6, 1726.6.1, 1726.7, 1726.8, 1726.9, AND 1726.10]

## Article 4. Requirements for Underground Gas Storage Projects

## 1726. Purpose, Scope, and Applicability.

The purpose of this article is to set forth regulations governing underground gas storage projects and gas storage wells. This article applies to underground gas storage projects and gas storage wells in existence prior to the effective date of this article, as well as new underground gas storage projects and gas storage wells. Underground gas storage projects and gas storage wells are not subject to the requirements of Sections 1724.6 through 1724.10.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.1. Definitions.

(a) The following definitions are applicable to this article:

(1) "Area of review" means the three-dimensional extent of the reservoir used for underground gas storage and surrounding areas that may be subject to its influence. The area

> Requirements for California Underground Gas Storage Projects Final Text of Regulations Page 4 of 24

of review is delineated by the geologic extent of the reservoir such as confining strata, structural closure, decrease or loss of porosity and permeability, or hydrodynamic forces in a three dimensional image.

(2) "Confining strata" means the rock layer or layers at the boundaries of the storage reservoir acting as the primary barriers preventing migration of fluids.

(3) "Fluid" means liquid or gas.

(4) "Gas storage well" means an active or idle well used primarily to inject or withdraw gas from an underground gas storage project.

(5) "Reservoir" means the portion of the geologic stratum that is being used to store natural gas in an underground gas storage project. The entire depth interval of a reservoir from the shallowest to the deepest depth can be subdivided into one or more depth intervals, which are referred to in this article as "zones".

(6) "Underground gas storage project" means a project for the injection and withdrawal of natural gas into an underground reservoir for the purpose of storage. An underground gas storage project includes the reservoir used for storage, the confining strata, gas storage wells, observation wells, and any other wells approved for use in the project. An underground gas storage project also includes the wellheads and, to the extent that they are subject to regulation by the Division, attendant facilities, and other appurtenances.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3220 and 3403.5, Public Resources Code.

## 1726.2. Approval of Underground Gas Storage Projects.

(a) A Project Approval Letter shall be obtained from the Division before any injection or withdrawal occurs as part of an underground gas storage project. The Project Approval Letter shall specify the location and nature of the underground gas storage project, as well as the conditions of the Division's approval. Changes to the operational parameters of an underground gas storage project as set forth in the Project Approval Letter are subject to approval by the Division and shall be noted in either an addendum to the Project Approval Letter or a revised Project Approval Letter. Underground gas storage project operations shall not occur or continue unless consistent with the terms and conditions of a current Project Approval Letter.

(b) The Division will review underground gas storage projects periodically, but not less than once every three years, to verify adherence to the terms and conditions of the Project Approval Letter, and will periodically review the terms and conditions of the Project Approval Letter to ensure that they effectively prevent damage to life, health, property, the environment, and natural resources. Project Approval Letters are subject to suspension, modification, or rescission by the Division.

(c) If the Division determines that operation of an underground gas storage project is inconsistent with the terms and conditions of a current Project Approval Letter, or otherwise poses a threat to life, health, property, the environment, or natural resources, then upon written

notice from the Division specified operations shall cease immediately, or as soon as it is safe to do so.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3220 and 3403.5, Public Resources Code.

## 1726.3. Risk Management Plans.

(a) For each underground gas storage project, the operator shall submit a project-specific Risk Management Plan to the Division for review and approval. For underground gas storage projects in existence at the time that this section goes into effect, the operator shall submit a Risk Management Plan in accordance with the requirements of this section within six months of the effective date of this section. If the Division identifies any deficiencies in the Risk Management Plan, then the Division will consult with the operator and identify an appropriate timeframe for correcting the deficiency. The Risk Management Plan shall specify a schedule for the operator to review and submit updates to the risk assessment and prevention and mitigation protocols to the Division. The Division will review the Risk Management Plan periodically, but not less than once every three years.

(b) The Risk Management Plan shall demonstrate that stored gas will be confined to the approved reservoir and that risks of damage to life, health, property, the environment, or natural resources are identified and prevented or effectively mitigated. In accordance with subdivision (c), the Risk Management Plan shall evaluate threats and hazards associated with operation of the underground gas storage project and identify prevention and mitigation protocols that effectively address those threats and hazards. The Division may, in its discretion, require additional data, additional risk assessment, or modification of prevention and mitigation protocols. Risk assessment and prevention and mitigation protocols in the Risk Management Plan shall be consistent with and in addition to any other existing requirements.

(c) The Risk Management Plan shall include a description of the methodology employed to conduct the risk assessment and identify prevention and mitigation protocols, with references to any third-party guidance followed in developing the methodology. The methodology shall include at least the following:

(1) Identification of potential threats and hazards associated with operation of the underground gas storage project, including identification of the most important potential accident scenarios associated with operation of the underground gas storage project;

(2) Quantitative risk assessment of the probability of threats and hazards and their consequences, using an appropriate methodology identified by the operator that includes:

(A) Evaluation of the frequency and range of consequences, including estimates of the uncertainties in the numerical values;

(B) Identification of the principal equipment failures, external initiating events, and operational errors associated with threats and hazards, and quantification of the impact of these occurrences on the probability of and consequences of the threats and hazards; and

(C) Identification of the engineered or natural features that most affect the extent of the consequences of threats and hazards, and a quantification of their relative roles, including an estimate of the uncertainties in the quantification;

(3) Identification of possible prevention and mitigation protocols to reduce, manage, or monitor risks, including evaluation of the efficacy and cost-effectiveness of the prevention protocols;

(4) Risk assessment on a well-by-well basis, to the extent that risks identified are specific to wells;

(5) Prioritization of risk prevention and mitigation efforts based on potential severity and estimated likelihood of occurrence of each threat;

(6) Selection and implementation of prevention and mitigation protocols;

(7) Documentation of the risk assessment process, including description of the basis for selection of prevention and mitigation protocols;

(8) Data feedback and validation throughout the risk assessment process; and

(9) Regular, periodic risk assessment reviews to update information and evaluate the effectiveness of prevention and mitigation protocols employed, which shall occur not less than once every three years and in response to changed conditions or new information.

(d) In addition to the contents required in subdivision (b), all Risk Management Plans shall include at least the following risk assessment and prevention and mitigation protocols:

(1) Well construction and design standards, consistent with the requirements of Section 1726.5 and including specification of the life expectancy of individual mechanical well barrier elements. If the operator has wells that do not conform with the requirements of Section 1726.5, then the Risk Management Plan shall include a work plan and schedule for either bringing the nonconforming wells into compliance or plugging and abandoning the wells in accordance with Public Resources Code section 3208. The work plan and schedule shall provide for full compliance with Section 1726.5 within seven years, with at least 10 percent of the nonconforming wells addressed in the first year and the total percentage of the nonconforming wells addressed increasing by 15 percent in each subsequent year. The work plan shall include prevention and mitigation protocols for monitoring and testing each well that is not yet in compliance with the requirements of Section 1726.5 so as to mitigate risks associated with the well to the extent feasible.

(2) For each gas storage well, evaluation of whether employment of surface and/or subsurface automatic or remote-actuated safety valves is appropriate based on consideration of at least the following:

(A) The well's distance from dwellings, other buildings intended for human occupancy, or other well-defined outside areas where people may assemble such as campgrounds, recreational areas, or playgrounds;

(B) Gas composition, operational pressures, total fluid flow, and maximum flow potential;

(C) The distance between wellheads or between a wellhead and other facilities, and access availability for drilling and service rigs and emergency services;

(D) The risks created by installation and servicing requirements of safety valves;

(E) The risks to and from the well related to roadways, rights of way, railways, airports, and industrial facilities;

(F) Proximity to environmentally or culturally sensitive areas;

(G) Alternative protection measures which could be afforded by barricades or distance or other measures;

(H) Age of well;

(I) The risks of sabotage;

(J) The current and predicted development of the surrounding area as reflected in the local general plan, topography and regional drainage systems, and environmental considerations;

(K) Topography and local wind patterns; and

(L) Evaluation of geologic hazards such as seismicity, landslides, subsidence, and potential for tsunamis.

(3) A schedule for verification and demonstration of the mechanical integrity of each well used in the underground gas storage project and each well that intersects the reservoir used for gas storage. The mechanical integrity testing protocols for gas storage wells shall, at a minimum, adhere to the requirements of Section 1726.6.

(4) Corrosion monitoring, evaluation, and mitigation including consideration of at least the following:

(A) Evaluation of tubular integrity and identification of defects caused by corrosion or other chemical or mechanical damage;

(B) Corrosion potential of wellbore produced fluids and solids, including the impact of operating pressures, temperatures, and compositions on the corrosion potential of wellbore fluids and analysis of partial pressures;

(C) Corrosion potential of annular and packer fluid;

(D) Corrosion potential of current flows associated with cathodic protection systems;

(E) Corrosion potential of all formation fluids, including fluids in formations above the storage zone; and

(F) Corrosion potential of uncemented casing.

(5) Ongoing monitoring of casing pressure changes at the wellheads of gas storage wells, analysis of facility flow erosion, individual facility component capacity and fluid disposal capability at intended gas and liquid flow rates and pressures, and analysis of the specific impacts that the intended operating pressure and temperature ranges could have on the corrosive potential of fluids in the system.

(6) Monitoring protocols in accordance with the requirements of Section 1726.7.

(7) Ongoing verification and demonstration of the integrity of the reservoir including demonstration that reservoir integrity will not be adversely impacted by operating conditions.

(8) Analysis and risk assessment of hazards associated with the formation of hydrates, and scale from the well stream under various pressure, temperature, and flow rates, including those beyond expected operating parameters.

(9) Analysis and risk assessment of natural and geologic hazards including, but not limited to, seismicity, faults, subsidence, inundation by tsunamis, sea level rise, and floods.

(10) Analysis and risk assessment of hazards associated with the potential for explosion or fire.

(11) If observation wells are employed, identification and documentation of baseline conditions such as wellbore pressure, pressure of monitored annuli, gas composition and liquid level.

(12) An assessment of human factors in operating and maintenance procedures. The human factors assessment shall consider staffing levels; the complexity of tasks; the length of time needed to complete tasks; the level of training, experience and expertise of employees; the human-machine and human-system interface; the physical challenges of the work environment in which the task is performed; employee fatigue and other effects of shiftwork and overtime; communication systems; and the understandability and clarity of operating and maintenance procedures. The human factors assessment shall also consider utilization of error-proof mechanisms, automatic alerts, and automatic system shutdowns.

(13) An effective training program with clearly stated goals. The training program shall specify the type and frequency of training and the risk assessments and prevention and mitigation protocols addressed.

(14) An equipment maintenance program that includes training and proactive inspection, repair, and replacement of equipment at risk of failure so as to ensure safe operation.

(15) An emergency response plan that at a minimum accounts for the threats and hazards identified in the Risk Management Plan and that complies with the requirements of Section 1726.3.1.

(16) Requests for notice from land use agencies of local land use decisions that could affect the Risk Management Plan, and providing notification to the Division of significant pending land use decisions.

(e) The operator shall adhere to the risk prevention and mitigation protocols detailed in its Risk Management Plan unless a variance has been approved by the Division in writing.

(f) The Division will provide completed Risk Management Plans and significant updates to the Risk Management Plans to the California Public Utilities Commission and post them on the Division's public internet website. If any part of a Risk Management Plan is subject to confidential treatment, then the Division will segregate the confidential records and only provide them if the California Public Utilities Commission has agreed to treat the records as confidential.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.3.1 Emergency Response Plan.

(a) The operator of an underground gas storage project shall have an emergency response plan approved by the Division and ready for immediate implementation. The emergency response plan shall specify a schedule for carrying out drills to validate the plan. The drills shall address the readiness of operator personnel with respect to their ability to interact with equipment and their ability to contact required third party service providers for the equipment. The emergency response plan shall identify and consider onsite personnel, outside emergency responders, and potentially affected communities. The operators shall provide local emergency response entities at least 30 days to review and provide input on the emergency response plan.

(b) The emergency response plan shall at a minimum address the following scenarios:

(1) Collisions involving well heads;

(2) Well fires and blowouts;

(3) Hazardous material spills;

(4) Equipment failures;

(5) Natural disasters/emergencies;

(6) Leaks and well failures;

(7) Medical emergencies; and

(8) Explosions.

(c) The emergency response plan shall at a minimum include all of the following:

(1) Clearly written and communicated emergency response plan policy, goals, and objectives;

(2) An incident management system designed to address resource management, communication systems, and incident documentation;

(3) Written action plans establishing assigned authority to the appropriate person(s) at a facility for initiating effective emergency response and control;

(4) Accident-response measures that outline response activities, leakage mitigation approaches, and well control processes for well failure and full blowout scenarios;

(5) Prepositioning, as feasible, and identification of materials and personnel necessary to respond to leaks, including materials and equipment to respond to and stop the leak itself as well as to protect public health and safety.

(6) A schedule for regular drills, providing for an opportunity for involvement of the Division and local emergency response entities, and providing an opportunity for drills initiated by local emergency response entities;

(7) An effective training program with clearly stated goals. The training program shall specify the type and frequency of training and the emergency scenarios addressed;

(8) Recordkeeping for all drills and training;

(9) A schedule for regular evaluation and update of the emergency response plan;

(10) Protocols for emergency reporting and response to appropriate government agencies;

(11) Specification of personnel roles and responsibilities;

(12) Internal and external communication protocol;

(13) Up-to-date emergency contact information including area codes; and

(14) A protocol for public notice of a large, uncontrollable leak to any potentially impacted community, as defined in the Risk Management Plan, if the leak cannot be controlled within 48 hours of discovery by the operator.

(d) The operator shall review and update the emergency response plan after key personnel changes, but no less often than once every three years. When reviewing and updating the emergency response plan, the operator shall again provide local emergency response entities at least 30 days to review and provide input on the emergency response plan.

Requirements for California Underground Gas Storage Projects Final Text of Regulations Page 10 of 24 Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3183, 3184 and 3403.5, Public Resources Code.

## 1726.4. Underground Gas Storage Project Data Requirements.

(a) For all underground gas storage projects, the operator shall provide the Division with data, analysis, and interpretation that demonstrate that stored gas will be confined to the approved zone(s) of injection and that the underground gas storage project will not cause damage to life, health, property, the environment, or natural resources. The operator shall provide the data specified in this section and any data that, in the judgment of the Division on a case-by-case basis, are pertinent and necessary for the proper evaluation of the project. The operator shall ensure that required data is complete, current, and accurate, regardless of the date of approval of the gas storage project. The data submitted to the Division shall include at least the following:

(1) Oil and gas reserves of all storage zones prior to start of injection, including calculations, to indicate the storage capacity of the reservoir being considered for gas storage.

(2) Description of existing surface and subsurface safety devices, tests, and precautions to be taken to ensure safety of the project.

(3) Produced water disposal method.

(4) Maximum and minimum reservoir pressure for the underground gas storage project and the data and calculations supporting the bases for the pressure limits. The pressure limits shall account for the following:

(A) The pressure required to inject fluids, particularly at total inventory, shall not exceed the design pressure limits of the wells, well heads, pipelines, or other associated facilities; or the fracture pressure of the reservoir or confining strata.

(B) The minimum reservoir pressure shall take into account the historic minimum operating pressure and reservoir geomechanical competency. The impacts of intended minimum reservoir pressure shall be accounted for as it relates to geomechanical stress and liquid influx.

(5) An engineering and geological study demonstrating that injected gas will not migrate out of the approved zone or zones, such as through another well, geologic structure, faults, fractures or fissures, or holes in casing. The study shall include, but is not limited to:

(A) Statement of primary purpose of the project.

(B) Reservoir characteristics of each storage zone, such as porosity, permeability, average thickness, areal extent, fracture gradient, original and present temperature and pressure, and original and residual oil, gas, and water saturations.

(C) A comprehensive geologic characterization of the gas storage project including lithology of the storage zone or zones and sealing mechanisms as well as all formations encountered from surface to the deepest well in the project. The geologic characterization shall include any information that may be required to ensure injected or withdrawn gas and other reservoir fluids do not have an adverse effect on the project or pose a threat to life, health, property, the environment, or natural resources. The geologic characterization shall include potential

pathways for fluid migration and areas or formations where potential entrapment of migrated fluid could occur. Information to accompany the geologic characterization shall include, but is not limited to:

(i) Structure contour maps drawn on a geologic marker at or near the top of each gas storage zone in the project area, indicating faults and other lateral containment features.

(ii) Isopach map of each gas storage reservoir or subzone and the confining strata in the project area.

(iii) At least two geologic cross sections, one on strike and one on dip, through at least four gas storage wells in the project area and the areas immediately adjacent.

(iv) A representative geophysical log to a depth below the deepest gas storage zone identifying all geologic units, formations, groundwater that has 10,000 or less milligrams per liter of total dissolved solids content, groundwater that has 3,000 or less milligrams per liter of total dissolved solids content, oil or gas zones, and gas storage reservoirs.

(v) Additional information may be requested by the Division on a case-by-case basis, and may include, but is not limited to: additional isopach maps, three-dimensional modeling, oil-water, gas-water, or oil-gas contact maps of the project, or other information which would delineate known features such as faults and fractures within the area of review for the underground gas storage project.

(D) Reservoir fluid data for each gas storage zone, such as oil gravity and viscosity, water quality, presence and concentrations of non-hydrocarbon components in the associated gas (e.g. hydrogen sulfide, helium, etc.), and specific gravity of gas.

(E) A map of the area of review showing the location and status of all wells within and adjacent to the boundary of the area of review. The wellbore path of directionally drilled wells shall be shown, with indication of the interval penetrating the gas storage zone(s) of the underground gas storage project.

(F) All data specified in Section 1726.4.1, provided in the form of graphical casing diagrams or flat file data sets, for all wells that are within the area of review and that are in the same or a deeper zone as the gas storage reservoir, including directionally drilled wells that intersect the area of review in the same or deeper zone.

(G) Identification of all wells associated with oil and gas production that are within the area of review but that are not in the same or a deeper zone as the underground gas storage project, including description of the total depth of the well and the estimated top of the gas storage reservoir below the well.

(H) Wells completed in or penetrating through the intended gas storage reservoir shall be identified and evaluated for containment assurance for the design of gas storage operation volumes, pressures, and flow rates. The operator shall identify, and the Division confirm, wells which may require integrity testing or well logging in order to meet the integrity demonstration. The Division may select plugged and abandoned wells to be re-entered, examined, re-plugged and abandoned, or monitored to manage identified containment assurance issues prior to approval of gas storage operations.

(I) The planned or estimated well drilling and plugging and abandonment program to complete the project, showing all gas storage wells, plugged and abandoned wells, other wells related to the project, and the boundaries of the underground gas storage project.

(J) Maps of the locations of injection wells and zones, mining, and other subsurface industrial activities not associated with oil and gas production or gas storage operations within the area of review, to the extent it is publicly available.

(6) A gas storage injection and withdrawal plan that includes at least the following:

(A) Maximum anticipated surface injection pressure and maximum anticipated daily rate of injection, by well.

(B) Monitoring system or method to be utilized to ensure the gas injected is confined to the intended approved zone(s) of injection.

(C) A wellhead monitoring system for the detection of leaks.

(D) A list of cathodic protection measures where employed.

(E) Analysis of the gas injected, submitted to the Division on an annual basis.

(7) The name and API number of all gas storage wells and other wells that are part of the underground gas storage project.

(8) Any data that, in the judgment of the Division on a case-by-case basis, are pertinent and necessary for the proper evaluation of the underground gas storage project.

(b) Updated data shall be provided to the Division if there are changes in operating conditions, such as gas plant or compressor changes, or if more accurate data become available, such as updated cross sections, new reservoir characteristics data, or new pressure flow modeling.

(c) All data filed with the Division under this section shall be submitted electronically. All maps, diagrams, and exhibits shall be clearly labeled as to scale, north arrow, coordinate system, and purpose, and shall clearly identify wells, boundaries, zones, contacts, and other relevant data.

(d) Where it is infeasible to supply the data specified in subdivision (a), the Division may accept alternative data that demonstrate that injected gas will be confined to the approved reservoir or reservoirs of injection and that the underground gas storage project will not cause damage to life, health, property, the environment, or natural resources.

(e) The operator shall consult with the Division if the operator believes that there is a basis under state or federal law for confidential treatment of any data submitted to the Division. If the Division agrees that there is a basis for confidential treatment of data submitted, then the Division will take appropriate steps to maintain the confidentiality of that data.

(f) The Division will make all data received under this section available to the California Public Utilities Commission upon request. If the requested records are subject to confidential treatment, then the Division will only provide the records if the California Public Utilities Commission has agreed to treat the records as confidential.

(g) For underground gas storage projects in existence at the time that this section goes into effect, the operator shall submit revised and updated project data in accordance with the requirements of this section within 180 days of the effective date of this section.

Note: Authority cited: Sections 3013, 3180 and 3106, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.4.1. Casing Diagrams.

(a) Casing diagrams submitted under Section 1726.4, subdivision (a)(5)(F), shall adhere to the following requirements:

(1) Casing diagrams shall at a minimum include all of the following data:

(A) Operator, lease name, well number, and API number of the well;

(B) Date the well was spudded;

(C) Ground elevation from sea level;

(D) Reference elevation (i.e., rig floor or Kelly Bushing);

(E) Base of groundwater that has 3,000 or less milligrams per liter of total dissolved solids content;

(F) Base of groundwater that has 10,000 or less milligrams per liter of total dissolved solids content;

(G) Sizes, weights, grades, and connection types of casing and tubing;

(H) Details on associated equipment such as subsurface safety valves, packers, and gas lift mandrels;

(I) Depths of casing shoes, stubs, and liner tops;

(J) Depths of perforation intervals, water shutoff perforations, cement port, cavity shots, cuts, patches, casing damage, top of junk or fish left in well, and any feature that influences flow in the well or may compromise the mechanical integrity of the well;

(K) Hole size diameter and depth of drilled hole;

(L) Cement plugs inside casings, including top and bottom of cement plug and the date(s) the plug(s) was emplaced, with method of determination;

(M) All cement fill behind casings, including top and bottom of cemented interval, with method of determination;

(N) Type and density of fluid between cement plugs;

(O) Depths and names of the formation(s), zone(s), and geologic markers penetrated by the well, including the top and bottom of the gas storage zone(s) and the top and bottom of the confining strata;

(P) All information used to calculate the cement slurry (e.g., volume, density, yield) including, but not limited to, cement type and additives, for each cement job;

(Q) All of the information listed in this section for all previously drilled or sidetracked well bores; and

(R) Identification of wellhead and wellhead valve assembly equipment by model and pressure rating.

(2) Measured depth and true vertical depth shall be provided for all measurements required under subdivision (a)(1).

(3) For directionally drilled wells, a directional survey shall be provided with inclination, azimuth measurements, bottomhole location, and surface location.

(4) Casing diagrams shall be submitted in an electronic format.

(5) For all wells to be used for gas injection and/or withdrawal, the casing diagram shall include the mechanical well barrier elements that comprise the primary and secondary barriers as specified in Section 1726.5.

(6) When multiple boreholes are drilled in a well, all of the information listed in this section is required for both the original hole and for any subsequent redrilled or sidetracked well bores.

(b) In lieu of graphical casing diagrams, operators may satisfy the requirements of Section 1726.4, subdivision (a)(5)(F), by submitting a flat file data set containing all of the information described in this section.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

### 1726.4.2. Evaluation of Wells Within the Area of Review.

(a) The following requirements apply, at minimum and subject to augmentation by the Division as the Division deems appropriate on a project-specific basis, to ensure that wells within the area of review will not be a potential conduit for fluid migration outside the approved gas storage zone:

(1) All wells within the area of review and that are in the same or a deeper zone as the gas storage reservoir, including directionally drilled wells that intersect the area of review in the same or deeper zone, shall be evaluated for the potential to allow fluid to migrate outside of the approved zone of gas storage. The operator should identify, and the Division confirm, wells which may require integrity testing or well logging in order to provide the requisite assurances that such wells will not act as conduits for fluid migration.

(2) Plugged and abandoned wells within the area of review shall have cement across all perforations and extending at least 100 feet above the highest of the top of a landed liner, the uppermost perforations, the casing cementing point, the water shutoff holes, or the approved gas storage zone. The Division may select plugged and abandoned wells to be re-entered, examined, re-plugged and abandoned, or monitored to manage identified containment assurance issues.

(3) If a plugged and abandoned well within the area of review does not meet the cement specifications of subdivision (a)(2), the Division may approve an alternative demonstration that the well will not be a potential conduit for fluid migration outside the approved gas storage zone. The Division's approval of such an alternative demonstration shall be supported by written findings by the Division that identify each plugged and abandoned well in the area of review that does not meet the cement specifications of subdivision (a)(2), specify how the well does not meet the requirements of subdivision (a)(2), and identify the basis for the Division's approval of the alternative demonstration.

Note: Authority cited: Sections 3013, 3180 and 3106, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.4.3. Records Management.

(a) The operator of an underground gas storage project shall establish a Records Management Program to ensure documentation of essential information is created, maintained, protected, and retrievable when needed. The operator shall submit its Records Management Plan to the Division.

(b) The Records Management Program shall identify all records related to evidence of conformity to the requirements in this article as essential, and these records shall be maintained for the lifetime of the project.

(c) The Records Management Program shall establish a filing and storage strategy that ensures records are accessible and protected against environmental damage. Records may exist in many different formats and shall be managed according to the format in which they are maintained. Records may be protected following a graded approach, commensurate with the value of the record and the cost to reproduce the information.

(d) The Records Management Program shall establish a process for tracking records throughout their entire information life cycle so that it is clear at all times where a record exists, which is the most current version of the record, and the history of change or modification of the record.

(e) The Records Management Program shall allow for prompt retrieval and production of records upon request from the Division.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.5. Well Construction Requirements.

(a) Operators shall design, construct, modify, and maintain gas storage wells and every other well that penetrates the gas storage reservoir of the operator's underground gas storage project to effectively ensure mechanical integrity under anticipated operating conditions for the underground gas storage project. The operator shall ensure that a single point of failure does not pose an immediate threat of loss of control of fluids and make certain that integrity concerns with a gas storage well are identified and addressed before they can become a threat to life, health, property, the environment, or natural resources. This section does not apply to wells that have been plugged and abandoned in accordance with Public Resources Code section 3208.

(b) Operators can demonstrate that a gas storage well adheres to the performance standard in subdivision (a) by demonstrating all of the following:

(1) The well has been constructed with both primary and secondary mechanical well barriers to isolate the storage gas within the storage reservoir and transfer storage gas from the surface into and out of the storage reservoir.

(A) The primary mechanical barrier is the barrier that is exposed to the withdrawal or injection flow stream. The primary mechanical barrier shall be able to withstand full operating pressure as demonstrated by the pressure testing required under Section 1726.6, subdivision (a)(3), and through annular pressure monitoring as required under Section 1726.7, subdivision (a). An example of a well configuration that meets the minimum requirements for a primary mechanical barrier is a well configuration that includes:

(i) A wellhead master valve;

(ii) Tubing hanger with seals;

(iii) Production tubing; and

(iv) A production packer.

(B) The secondary mechanical barrier is not exposed to the withdrawal or injection flow stream under normal operations. The secondary mechanical barrier shall be able to withstand full operating pressure as demonstrated by the pressure testing required under Section 1726.6, subdivision (a)(3), and casing evaluation logs as required under Section 1726.6, subdivision (a)(2). In the event of a primary mechanical barrier failure, the secondary mechanical barrier shall be able to contain the leaking fluids until the primary mechanical barrier is re-established. An example of a well configuration that meets the minimum requirements for a secondary mechanical barrier is a well configuration that includes:

(i) Wellhead components, including casing hanger and seal assembly; and

(ii) Production casing to surface.

(2) Each string of casing is designed to safely contain the expected internal and external pressures and tensile loads.

(3) The surface casing is of sufficient size, weight, grade, competency, and depth to support subsequent drilling operations.

(4) The production casing is of sufficient size, weight, grade, competency, and depth to maintain the well integrity, and is compatible with fluid chemical composition. The production casing is designed to accommodate fluids on injection and withdrawal at the maximum expected operational pressures and velocities. The production casing is free of open perforations or holes other than the planned completion interval(s). Perforations created for investigative or remedial work are sealed to establish hydraulic isolation.

(5) Casing connections are appropriate for use in the well design and exceed the expected mechanical loads.

(6) The gas storage well is cemented so as to maintain the integrity of the storage zone(s) by providing isolation of the reservoir and preventing communication of fluids from the storage zone or other zones of interest.

(7) All casing was cemented in a manner that ensures proper distribution and bonding of cement in the annular spaces. Additionally, cementing operations meet or exceed the following requirements:

(A) Surface casing is cemented with sufficient cement to fill the annular space from the shoe to the surface to protect ground water.

(B) Intermediate and production casings, if not cemented to the surface, are cemented in accordance with the requirements of Section 1722.4.

(8) For new wells, the cementing operations used a cement slurry designed for the anticipated wellbore and formation conditions.

(9) Cement plugs provide for effective zonal isolation.

(10) Any remedial cement slurry and placement techniques are designed for the specific wellbore conditions, formations, and type of repairs.

(11) Cement bond log or evaluation is on file that indicates an adequate cement bond between the casing, cement, and geologic formations. A competent cement bond extends across the confining strata, and at least 100 feet above the gas storage reservoir.

(12) For wells equipped with tubing and packer, packer is set in cemented casing within confining strata or other appropriate location.

(c) If the operator does not demonstrate that a gas storage well meets the criteria of subdivision (b), then the operator shall demonstrate that an alternative method of well design and construction has been employed that effectively adheres to the performance standard of subdivision (a). An alternative method of well design and construction under this subdivision shall include both primary and secondary mechanical well barriers to isolate the storage gas within the storage reservoir and transfer storage gas from the surface into and out of the storage reservoir. The Division will determine on a case-by-case basis whether the operator has effectively demonstrated that a gas storage well that does not conform to the criteria in subdivision (b) meets the performance standard in subdivision (a).

(d) The requirements of this section are in addition to all other well construction requirements of this chapter.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3220 and 3403.5, Public Resources Code.

#### 1726.6. Mechanical Integrity Testing.

(a) The operator shall, at a minimum, conduct the following mechanical integrity testing on each gas storage well and every other well that penetrates the gas storage reservoir of the operator's underground gas storage project, with the exception of wells that have been plugged and abandoned in accordance with Public Resources Code section 3208:

(1) A temperature and noise log shall be conducted at least annually to ensure integrity. Logging shall include a repeat section of no less than 200 feet, preferably across intervals where anomalies are present. If an anomaly is identified that indicates a possible loss of or threat to the mechanical integrity of the well, then the operator shall immediately report the anomaly to the appropriate district office. If the operator is unable to explain any anomaly, then the well shall not be used for injection or withdrawal without subsequent approval from the Division.

(2) A casing wall thickness inspection to estimate internal and external corrosion, employing such methods as magnetic flux or ultrasonic technologies, shall be performed at least once

every 24 months to determine if there are possible issues with casing integrity. Logging shall include a repeat section of no less than 200 feet, preferably across intervals where anomalies are present. The results shall be compared against prior results and any other available data to determine the corrosion rate. If the casing wall thickness inspection indicates that within the next 24 months thinning of the casing will diminish the casing's ability to contain 115 percent of the well's maximum allowable operating pressure utilizing Barlow's equation or another, similarly effective method, then the well shall be remediated and shall not be used for injection or withdrawal without subsequent approval from the Division. The Division may approve a less frequent casing wall thickness inspection schedule for a well if the operator demonstrates that the well's corrosion rate is low enough that biennial inspection is not necessary.

(3) Pressure testing of the production casing shall be conducted at a minimum frequency determined on a well-by-well basis under Section 1726.3, subdivision (d)(3), provided that the well-specific minimum pressure testing frequency has been reviewed and approved by the Division. If the Division has not approved a well-specific minimum pressure testing frequency for a well as part of the Risk Management Plan, then the operator shall pressure test the well at least once every 24 months. If injection in the gas storage well is through tubing and packer, then the pressure test shall be of the casing-tubing annulus of the well. Pressure testing shall be conducted in accordance with the parameters specified in Section 1726.6.1. If a required pressure test is not successfully completed, then the operator shall immediately notify the Division and the well shall not be used for injection or withdrawal without subsequent approval from the Division.

(b) A newly constructed gas storage well, or a reworked gas storage well that has had its existing production casing modified from its previous condition during rework activities, shall be tested in accordance with subdivision (a) prior to use. The Division may waive some or all of the mechanical testing requirements for a reworked gas storage based on the nature of the work performed.

(c) The Division may require additional testing as needed to demonstrate the integrity of the well.

(d) The appropriate district office shall be notified at least 48 hours before performing mechanical integrity testing so that Division staff may have an opportunity to witness the testing. All mechanical integrity testing shall be documented and copies of test results shall be submitted to the Division in an electronic format within 30 days.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

#### 1726.6.1. Pressure Testing Parameters.

(a) Pressure testing required under Section 1726.6 shall be conducted according to the following parameters:

(1) Pressure testing shall be conducted with a liquid unless the Division approves pressure testing with gas.

(2) If pressure testing will be conducted with a liquid that contains additive other than brine, corrosion inhibitors, or biocides, then the operator shall consult with the Division regarding the contents of the liquid prior to commencing testing.

(2) The wellbore shall be filled with a stable column of fluid that is free of excess gasses.

(3) Pressure tests shall be recorded and a calibrated gauge shall be used that can record a pressure with an accuracy within one percent of the maximum allowable injection pressure.

(4) Pressure tests shall be conducted at an initial test pressure of at least 115 percent of the maximum allowable injection pressure at the wellhead.

(5) The pressure test shall be continuous for one hour. A pressure test is successful if the pressure gauge does not show more than a 10 percent decline from the initial test pressure in the first 30 minutes, and does not show more than a 2 percent decline from the pressure after the first 30 minutes in the second 30 minutes.

(b) The Division may modify the testing parameters on a case-by-case basis if, in the Division's judgment, the modification is necessary to ensure an effective test of the integrity of the casing.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.7. Monitoring Requirements.

(a) The operator shall monitor for the presence of gas in all annuli by measuring and recording annular and tubing pressure at least once a day. The operator shall evaluate any anomalous annular gas occurrence and immediately report it to the Division. This requirement may be met by employment of a real-time data gathering system, such as Supervisory Control and Data Acquisition.

(b) The operator shall monitor the material balance of an underground gas storage project's storage reservoir relative to the original design and expected reservoir behavior. The operator shall evaluate and correct unexpected conditions detected during monitoring in order to avoid an incident or loss. Monitoring frequency shall be based on factors such as reservoir and well fluid loss potential and flow potential, as outlined in the Risk Management Plan.

(1) The operator shall submit material balance support data to the Division at least once a year, or upon request by the Division.

(2) Acceptable reservoir integrity monitoring and analysis methods include, but are not limited to, the following four methods:

(A) Monitoring average reservoir pressure versus inventory and comparing that to expected conditions in order to allow for the discovery and correction of any anomalies or unexpected conditions. Liquid level shall be taken into account when utilizing observation wells. Semiannual field shut-in tests, usually conducted at the point of seasonally high and low inventories, shall be conducted for inventory verification.

(B) Installation and monitoring of strategically located observation wells in the vicinity of spill points, within an aquifer, and above the confining strata. Observation wells shall be in potential collector formations to detect the presence or movement of gas.

(C) Monitoring offset hydrocarbon production or disposal operations for unexplained flow or pressure changes. The monitoring shall include operations in zones above and below the storage reservoir as well as laterally offset locations.

(D) Conducting subsurface correlation and gas identification logs such as gamma rayneutron logs to confirm the location of gas being injected into the intended storage reservoir, as needed.

(c) The operator shall immediately report to the Division any instance of an unintended surface or cellar gas release of any size, in any location within the area of review of the underground gas storage project. Unless the operator demonstrates that the gas is not from the underground gas storage project or a gas storage well, Division may require the operator to chemically fingerprint the gas from such a release, and the operator shall provide the results of the gas analysis to the Division as soon as they are available.

(d) The operator of an underground gas storage project shall employ a real-time data gathering system, such as Supervisory Control and Data Acquisition, by January 1, 2020. At a minimum, the real-time data gathering system shall be deployed and utilized in accordance with the following requirements:

(1) The real-time data gathering system shall include pressure sensors for every casing annulus and tubing with data transmission to an operations center.

(2) The real-time data gathering system shall have alarms set for each annulus to monitor for pressure indicative of potential leaks or potential migration of gas. The alarms shall alert the operations center if pressure exceeds preconfigured set points. For tubing, the alarm set point shall not be higher than the maximum allowable injection pressure at the wellhead. For the annulus between production casing and tubing, the alarm set point shall be determined based on annular fluid, the initial pressure when the packer was set, and operational configuration. For strings without any anticipated surface pressure, such as surface or intermediate casings, the alarm set point shall not be higher than 100 psi or the alarm set point approved under subdivision (d)(3)(C).

(3) If there is sustained casing pressure above 100 psi in a string without anticipated surface pressure, and it is believed to be caused by shallow gas or other fluid migration, then the operator shall do the following:

(A) The operator shall first bleed off annular pressure and track pressure and time for the well to build up pressure back to the observed sustained casing pressure.

(B) Next, the operator shall sample the fluids building up in the annulus and confirm that the accumulation is not due to migration of storage gas by performing chemical fingerprinting or other diagnostic tests approved by the Division.

(C) If the diagnostic testing under subdivisions (A) and (B) confirm that the pressure build-up is not due to migration of storage gas, the operator shall propose an alarm set point to the Division that is no greater than 100 psi above the observed sustained casing pressure, unless such pressure would pose a risk to casing integrity. The operator's proposal shall at a minimum address the results from the diagnostic testing, the effect of the proposed alarm set point pressure on casing integrity, the likely source of pressure and fluid composition determined from

chemical fingerprinting, and a long-term monitoring plan. The alarm set point shall not be increased until it has been approved by the Division.

(D) If the observed sustained casing pressure plus 100 psi would pose a risk to the integrity of the casing, then the operator shall develop and implement a plan to address the situation, subject to the Division's approval.

(E) If the testing under subdivisions (A) and (B) indicate that the pressure build-up is due to migration of storage gas, then the operator shall conduct further testing to determine the pathway of migration and take remedial action as needed in accordance with a plan approved by the Division.

(e) The operator of an underground gas storage project shall develop a program, which shall be submitted to the Division for review and approval, to conduct a baseline and subsequent gas detection logs on each gas storage well to detect gas indications behind casing. The operator shall provide the results of the gas detection logs to the Division with comparison of the logs noting any changes in the indicated gas behind the casing. If the comparison indicates increasing gas accumulations behind casing, then the operator shall submit a response plan for the Division's approval.

(f) The operator of an underground gas storage project shall adhere to an inspection and leak detection protocol that has been approved by the Division. The protocol shall include inspection of the wellhead assembly and attached pipelines for each of the gas storage wells used in association with the underground gas storage project, and the surrounding area within a 100-foot radius of the wellhead of each of the wells used in an underground gas storage project. The inspection protocol shall provide for inspection at least once a day, employing effective gas leak detection technology such as infrared imaging, and shall provide for immediately reporting leaks to the Division. The operator's selection and usage of gas leak detection technology shall take into consideration detection limits, remote detection of difficult to access locations, response time, reproducibility, accuracy, data transfer capabilities, distance from source, background lighting conditions, geography, and meteorology. The Division will consult with the California Air Resources Board when reviewing an inspection and leak detection protocol submitted under this subdivision. The requirements of this subdivision shall cease to apply to an underground gas storage project if the California Air Resources a monitoring plan under its regulations for that facility.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.8. Inspection, Testing, and Maintenance of Wellheads and Valves.

(a) Where installed, the operator of an underground gas storage project shall test all surface safety valves on the wellhead and all subsurface safety valve systems at least every six months. The tests shall be conducted in accordance with American Petroleum Institute Recommended Practice 14B (6th Edition, September 2015), hereby incorporated by reference, or a Division approved equivalent, to confirm operational integrity. The appropriate district office shall be

notified at least 48 hours before performing testing so that Division staff may witness the operations, and documentation of the testing shall be maintained and available for Division review. A closed storage well safety valve system shall be re-opened with operator staff at the site of the valve to ensure the absence of any unforeseen issues. Within 90 days of finding that a surface or subsurface safety valve is inoperable, the operator shall either repair the safety valve or temporarily plug the well. An appropriate alternative timeframe for testing a valve or addressing an inoperable surface or subsurface safety valve may be required by the Division.

(b) At least annually, the operator of an underground gas storage project shall test all valves on the wellhead, including the master valve and wellhead pipeline isolation valve for proper function and verify ability to isolate the well.

(c) The operator shall equip gas storage wells with valves to provide isolation of the wells from the pipeline system and to allow for entry into the wells.

(d) The operator shall equip all ports on the wellhead assembly above the casing bowl of gas storage wells with valves, blind flanges, or similar equipment that are rated to withstand the maximum operational pressures.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

## 1726.9. Well Leak Reporting.

(a) For the purposes of this section, and for the purposes of Public Resources Code sections 3183 and 3184, "reportable leak" means:

(1) A leak from a gas storage well that is above 50,000 parts per million by volume total hydrocarbons, as measured using methodology that the operator has demonstrated will provide consistent and reliable measurements, such as US EPA Reference Method 21;

(2) A leak from a gas storage well that is above 10,000 parts per million by volume total hydrocarbons, as measured using methodology that the operator has demonstrated will provide consistent and reliable measurements, such as US EPA Reference Method 21, for more than five days; or

(3) Any leak that poses a significant present or potential hazard to public health and safety, property, or to the environment.

(b) If a gas storage well has a reportable leak, then the operator shall immediately inform the Division.

(c) The requirements of this section are in addition to, and do not supersede, any other requirements for reporting or responding to leaks from a gas storage well.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3183, 3184, 3220 and 3403.5, Public Resources Code.

## 1726.10. Requirements for Decommissioning.

(a) If an operator intends to discontinue an underground gas storage project, then the operator shall submit a Decommissioning Plan to the Division. The Decommissioning Plan is subject to the Division's review and approval and shall ensure that stored gas will continue be confined to the approved zone(s) of injection and that the underground gas storage project will not cause damage to life, health, property, the environment, or natural resources. At a minimum, the Decommissioning Plan shall address all of the following:

(1) Identification of the intended use of the wells and facilities after decommissioning, including a plan for obtaining requisite approvals for the use.

(2) A plan for managing remaining gas in the underground gas storage reservoir.

(3) A plan for repurposing or decommissioning all wells and facilities associated with the underground gas storage project.

(4) Consultation with the California Public Utilities Commission.

(5) Any other information requested by the Division on a project-specific basis.

(b) An underground gas storage project is subject to the requirements of this article until the Division has approved a Decommissioning Plan and the Division has certified that the operator has completed all steps required under the Decommissioning Plan to the Division's satisfaction.

Note: Authority cited: Sections 3013, 3106 and 3180, Public Resources Code. Reference: Sections 3106, 3180, 3181, 3220 and 3403.5, Public Resources Code.

### SOUTHERN CALIFORNIA GAS COMPANY

#### (DATA REQUEST SED-SCG-48 DATED DECEMBER 4, 2019

#### SOCALGAS RESPONSE DATED DECEMBER 19, 2019

SoCalGas provides the following Responses to the Safety Enforcement Division (SED) data request dated December 4, 2019 in I.19-06-016. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas' responses do not include information collected or modeled by Blade Energy Partners' during its Root Cause Analysis Investigation. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas objects to the instructions submitted by SED and to the continuing and indefinite nature of this request on the grounds that they are overbroad and unduly burdensome. Special interrogatory instructions of this nature and continuing interrogatories are expressly prohibited by California Code of Civil Procedure Section 2030.060(d) and 030.060(g), respectively. SoCalGas will provide responsive documents in existence at the time of its response. Should SED seek to update its request, SoCalGas will respond to such a request as a new data request in the future.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding. Finally, at the time of this Response, there are no pending oral data requests from SED to SoCalGas.

# **QUESTION 1:**

Please refer to SoCalGas Opening testimony of Mr. Dan Neville in I.19-06-016, page 3 line 27 to page 4 line 1, which states, "To evaluate the integrity of the casing body and connections, SoCalGas performed a pressure test to 3400 pounds per square inch (psi), above the maximum operating pressure of 3150 psi." With this statement in mind, please answer the following:

- a. To what period of time is this statement referring?
- b. By SED's calculations, the test shown above is approximately 1.08 times the

### SOUTHERN CALIFORNIA GAS COMPANY

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maximum operating pressure. Please confirm this is accurate. If SoCalGas disagrees with this, please provide the factor of the test above the maximum operating pressure.

- c. On what date did SoCalGas pressure test the casing body and connections of well SS25 to 3400 psi?
- d. Please provide the complete pressure test record showing the pressure test, including the date and psi.
- e. Did SoCalGas ever exceed the stated maximum operating pressure on well SS-25?
- f. If the answer to question 1h is yes, please answer:
  - 1. How many times?
  - 2. The dates and times of such times.
  - 3. The pressure and length of each time at which well SS-25 was operated above 3150 psi.
  - 4. The reason well SS-25 was operated above 3150 psi.

## **RESPONSE 1:**

- a. The pressure test occurred on May 29, 1973 during the workover to convert the well to gas storage.
- SoCalGas objects to this request to the extent it does not seek information or documents but rather seeks to have SoCalGas confirm a mathematical calculation. SoCalGas further objects to the extent the request assumes the maximum operating pressure was applicable on May 29,1973. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. The maximum operating pressure of 3150 psi was established in 2016. SoCalGas confirms the test is about 1.08 times this maximum operating pressure.
- c. May 29, 1973.
- d. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase "complete pressure test record." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please refer to the following electronic documents previously provided to CPUC-SED that include the SS-25 well file documents and/or well related information with Bates ranges:

AC\_CPUC\_0000023 - AC\_CPUC\_0000759

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AC\_CPUC\_0012338 - AC\_CPUC\_0012389 AC\_CPUC\_0206158 - AC\_CPUC\_0208846.

e. SoCalGas objects to this request as overly broad and unduly burdensome, and to the extent the request assumes the maximum operating pressure was applicable on or before October 23, 2015. SoCalGas further objects to this request to the extent it fails to provide time period to which SoCalGas may tailor its response. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas interprets this request to seek information on or before October 23, 2015. Please see previously provided electronic documents with Bates Ranges:

AC CPUC 0009479; AC CPUC 0009485; AC CPUC 0009492; AC CPUC 0009498; AC\_CPUC\_0009504; AC\_CPUC\_0009510; AC\_CPUC\_0009516; AC\_CPUC\_0009522; AC CPUC 0009528; AC CPUC 0009540; AC CPUC 0009546; AC CPUC 0009552; AC CPUC 0009558; AC CPUC 0009564; AC CPUC 0009570; AC CPUC 0009576; AC CPUC 0009582; AC CPUC 0009588; AC CPUC 0009594; AC CPUC 0009600; AC CPUC 0009606; AC CPUC 0009612; AC CPUC 0009618; AC CPUC 0009624; AC\_CPUC\_0009630; AC\_CPUC\_0009679; AC\_CPUC\_0009680; AC\_CPUC\_0009683; AC CPUC 0009687; AC CPUC 0009688; AC CPUC 0009691; AC CPUC 0009695; AC CPUC 0009696; AC CPUC 0009700; AC CPUC 0009704; AC CPUC 0009708; AC CPUC 0009712; AC CPUC 0009713; AC CPUC 0009716; AC CPUC 0009717; AC CPUC 0009720; AC CPUC 0009724; AC CPUC 0009728; AC CPUC 0009729; AC CPUC 0009732; AC CPUC 0009736 ; AC CPUC 0009737; AC CPUC 0009740; AC CPUC 0009744; AC CPUC 0009748; AC CPUC 0009749; AC CPUC 0009752; AC CPUC 0009753; AC\_CPUC\_0009756; AC\_CPUC\_0009757; AC\_CPUC\_0009762; AC\_CPUC\_0009766; AC CPUC 0009767; AC CPUC 0009769 ; AC CPUC 0009771; AC CPUC 0009772 ; AC CPUC 0009775; AC CPUC 0009776; AC CPUC 0009779; AC CPUC 0009780; AC CPUC 0009783; AC CPUC 0009787; AC CPUC 0009788; AC CPUC 0009791 ; AC CPUC 0009793; AC CPUC 0009794 ; AC\_CPUC\_0009798; AC\_CPUC\_0009799; AC\_CPUC\_0009802; AC\_CPUC\_0009803; AC CPUC 0009806; AC CPUC 0009807; AC CPUC 0009810; AC CPUC 0009811; AC CPUC 0009814; AC CPUC 0009815; AC CPUC 0009818; AC CPUC 0009822; AC CPUC 0009823; AC CPUC 0009826; AC CPUC 0009830; AC CPUC 0009831; AC CPUC 0009835; AC CPUC 0009837; AC CPUC 0009838; AC CPUC 0009841; AC CPUC 0009844; AC CPUC 0009845; AC CPUC 0009848; AC CPUC 0009850;

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AC_CPUC_0009852; AC_CPUC_0009854; AC_CPUC_0009856; AC_CPUC_0009858;
AC_CPUC_0009860; AC_CPUC_0009862; AC_CPUC_0009864; AC_CPUC_0009866;
AC_CPUC_0009868; AC_CPUC_0009870; AC_CPUC_0009872; AC_CPUC_0009874;
AC_CPUC_0009876; AC_CPUC_0009878; AC_CPUC_0009880; AC_CPUC_0009882;
AC_CPUC_0009884; AC_CPUC_0009886; AC_CPUC_0009888; AC_CPUC_0009890;
AC_CPUC_0009892; AC_CPUC_0009894; AC_CPUC_0009896; AC_CPUC_0009898;
AC_CPUC_0009900; AC_CPUC_0009902; AC_CPUC_0009904; AC_CPUC_0009906;
AC_CPUC_0009908; AC_CPUC_0009910; AC_CPUC_0009912; AC_CPUC_0009914;
AC_CPUC_0009916; AC_CPUC_0009918; AC_CPUC_0009920; AC_CPUC_0009922;
AC_CPUC_0009924; AC_CPUC_0009926; AC_CPUC_0009928; AC_CPUC_0009930;
AC_CPUC_0009932; AC_CPUC_0009936; AC_CPUC_0009938; AC_CPUC_0009940;
AC_CPUC_0009942; AC_CPUC_0009944; AC_CPUC_0009946; AC_CPUC_0009948;
AC_CPUC_0009950; AC_CPUC_0009952; AC_CPUC_0009954; AC_CPUC_0009956;
AC_CPUC_0009958; AC_CPUC_0009960; AC_CPUC_0009962; AC_CPUC_0009964;
AC_CPUC_0009966; AC_CPUC_0009968; AC_CPUC_0009970; AC_CPUC_0009972;
AC_CPUC_0009974; AC_CPUC_0009976; AC_CPUC_0009978; AC_CPUC_0009980;
AC_CPUC_0009982; AC_CPUC_0009984; AC_CPUC_0009986; AC_CPUC_0009988;
AC_CPUC_0009990; AC_CPUC_0009992; AC_CPUC_0009994; AC_CPUC_0009996;
AC_CPUC_0009998; AC_CPUC_0010000; AC_CPUC_0010002; AC_CPUC_0010004;
AC_CPUC_0010006; AC_CPUC_0010008; AC_CPUC_0010010; AC_CPUC_0010012;
AC_CPUC_0010014; AC_CPUC_0010016; AC_CPUC_0010018; AC_CPUC_0010020;
AC_CPUC_0010022; AC_CPUC_0010026; AC_CPUC_0010028; AC_CPUC_0010030;
AC_CPUC_0010032; AC_CPUC_0010034; AC_CPUC_0010036; AC_CPUC_0010038;
AC_CPUC_0010040; AC_CPUC_0010042; AC_CPUC_0010044; AC_CPUC_0010045;
AC_CPUC_0010048; AC_CPUC_0010052; AC_CPUC_0010054; AC_CPUC_0010056;
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AC_CPUC_0010079; AC_CPUC_0010084; AC_CPUC_0010091; AC_CPUC_0010096;
AC_CPUC_0010097; AC_CPUC_0010108; AC_CPUC_0010109; AC_CPUC_0010114;
AC_CPUC_0010115; AC_CPUC_0010126; AC_CPUC_0010127; AC_CPUC_0010131;
AC_CPUC_0010136; AC_CPUC_0010137; AC_CPUC_0010143; AC_CPUC_0010144;
AC_CPUC_0010157; AC_CPUC_0010167; AC_CPUC_0010175; AC_CPUC_0010176;
AC_CPUC_0010177; AC_CPUC_0010186; AC_CPUC_0010187; AC_CPUC_0010188;
AC_CPUC_0010196; AC_CPUC_0010197; AC_CPUC_0010208; AC_CPUC_0010209;
AC_CPUC_0010211; AC_CPUC_0010218; AC_CPUC_0010221; AC_CPUC_0010222;
AC_CPUC_0010223; AC_CPUC_0010228; AC_CPUC_0010229; AC_CPUC_0010232;
AC CPUC 0010233; AC CPUC 0010248; AC CPUC 0010249; AC CPUC 0010252;
AC_CPUC_0010261; AC_CPUC_0010262; AC_CPUC_0010270; AC_CPUC_0010271;
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AC CPUC 0010277; AC CPUC 0010288; AC CPUC 0010289; AC CPUC 0010291; AC CPUC 0010296; AC CPUC 0010297; AC CPUC 0010300; AC CPUC 0010301; AC CPUC 0010310; AC CPUC 0010312; AC CPUC 0010319; AC CPUC 0010320; AC CPUC 0010323; AC CPUC 0010329; AC CPUC 0010342; AC CPUC 0010343; AC CPUC 0010347; AC CPUC 0010350; AC CPUC 0010351; AC CPUC 0010357; AC\_CPUC\_0010370; AC\_CPUC\_0010371; AC\_CPUC\_0010377; AC\_CPUC\_0010384; AC CPUC 0010385; AC CPUC 0010397; AC CPUC 0010406; AC CPUC 0010413; AC CPUC 0010414; AC CPUC 0010415; AC CPUC 0010423; AC CPUC 0010424; AC CPUC 0010429; AC CPUC 0010430; AC CPUC 0010437; AC CPUC 0010445; AC CPUC 0010448; AC CPUC 0010455; AC CPUC 0010456; AC CPUC 0010461; AC\_CPUC\_0010470; AC\_CPUC\_0010473; AC\_CPUC\_0010483; AC\_CPUC\_0010484; AC CPUC 0010488; AC CPUC 0010511; AC CPUC 0010515; AC CPUC 0010527; AC CPUC 0010528; AC CPUC 0010532; AC CPUC 0010537; AC CPUC 0010540; AC\_CPUC\_0010547; AC\_CPUC\_0010555; AC\_CPUC\_0010557; AC\_CPUC\_0010558; AC CPUC 0010561; AC CPUC 0010563; AC CPUC 0010572; AC CPUC 0010576; AC CPUC 0010586; AC CPUC 0010599; AC CPUC 0010613; AC CPUC 0010617; AC CPUC 0010621; AC CPUC 0010631; AC CPUC 0010638; AC CPUC 0010641; AC CPUC 0010648; AC CPUC 0010649; AC CPUC 0010655; AC CPUC 0010658; AC CPUC 0010659; AC CPUC 0010660; AC CPUC 0010680; AC CPUC 0010690; AC CPUC 0010691; AC CPUC 0010700; AC CPUC 0010705; AC CPUC 0010711; AC CPUC 0010715; AC CPUC 0010716; AC CPUC 0010719; AC CPUC 0010721; AC CPUC 0010727; AC CPUC 0010743; AC CPUC 0010754; AC CPUC 0010756; AC CPUC 0010764; AC CPUC 0010765; AC CPUC 0010769; AC CPUC 0010770; AC CPUC 0010778; AC CPUC 0010779; AC CPUC 0010786; AC CPUC 0010787; AC CPUC 0010793; AC CPUC 0010799; AC CPUC 0010813; AC CPUC 0010842; AC CPUC 0010848; AC CPUC 0010849; AC CPUC 0010857; AC CPUC 0010863; AC\_CPUC\_0010865; AC\_CPUC\_0010874; AC\_CPUC\_0010875; AC\_CPUC\_0010882; AC CPUC 0010887; AC CPUC 0010888; AC CPUC 0010897; AC CPUC 0010908; AC CPUC 0010919; AC CPUC 0010924; AC CPUC 0010926; AC CPUC 0010929; AC CPUC 0010935; AC CPUC 0010941; AC CPUC 0010948; AC CPUC 0010950; AC CPUC 0010957; AC CPUC 0010961; AC CPUC 0010965; AC CPUC 0010981; AC CPUC 0010989; AC CPUC 0010994; AC CPUC 0010996; AC CPUC 0011014; AC CPUC 0011019; AC CPUC 0011029; AC CPUC 0011033; AC CPUC 0011041; AC CPUC 0011050; AC CPUC 0011054; AC CPUC 0011062; AC CPUC 0011077; AC CPUC 0011090; AC CPUC 0011125; AC CPUC 0011140; AC CPUC 0011148; AC CPUC 0011150; AC CPUC 0011164; AC CPUC 0011169; AC CPUC 0011170; AC CPUC 0011173; AC CPUC 0011176; AC CPUC 0011179; AC CPUC 0011182;

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AC\_CPUC\_0011185; AC\_CPUC\_0011188; AC\_CPUC\_0011191; AC\_CPUC\_0011194; AC\_CPUC\_0011197; AC\_CPUC\_0011200; AC\_CPUC\_0011203; AC\_CPUC\_0011206; AC\_CPUC\_0011209; AC\_CPUC\_0011212; AC\_CPUC\_0011215; AC\_CPUC\_0011218; AC\_CPUC\_0011221; AC\_CPUC\_0011224; AC\_CPUC\_0011227; AC\_CPUC\_0011230; AC\_CPUC\_0011233; AC\_CPUC\_0011236; AC\_CPUC\_0011239; AC\_CPUC\_0011242; AC\_CPUC\_0011245; AC\_CPUC\_0011248; AC\_CPUC\_0011251; AC\_CPUC\_0011254; AC\_CPUC\_0011269; AC\_CPUC\_0011272; AC\_CPUC\_0011263; AC\_CPUC\_0011266; AC\_CPUC\_0011281; AC\_CPUC\_0011272; AC\_CPUC\_0011275; AC\_CPUC\_0011278; AC\_CPUC\_0011293; AC\_CPUC\_0011296; AC\_CPUC\_0011287; AC\_CPUC\_0011290; AC\_CPUC\_0011305; AC\_CPUC\_0011308; AC\_CPUC\_0011311; AC\_CPUC\_0011302; AC\_CPUC\_0011317; AC\_CPUC\_0011320; AC\_CPUC\_0011337; AC\_CPUC\_0011340; AC\_CPUC\_0011343; AC\_CPUC\_0011348; AC\_CPUC\_0011337; AC\_CPUC\_0011340; AC\_CPUC\_0011343; AC\_CPUC\_0011348; AC\_CPUC\_0011351; AC\_CPUC\_0011340; AC\_CPUC\_0011359; AC\_CPUC\_0011348; AC\_CPUC\_0011351; AC\_CPUC\_0011340; AC\_CPUC\_0011359; AC\_CPUC\_0011348; AC\_CPUC\_0011351; AC\_CPUC\_0011340; AC\_CPUC\_0011359; AC\_CPUC\_0011348; AC\_CPUC\_0011351; AC\_CPUC\_0011340; AC\_CPUC\_0011359; AC\_CPUC\_0011348; AC\_CPUC\_0011351; AC\_CPUC\_0011340;

f. SoCalGas objects to this request as overly broad and unduly burdensome, and to the extent the request assumes the maximum operating pressure was applicable on or before October 23, 2015. SoCalGas further objects to this request to the extent it fails to provide time period to which SoCalGas may tailor its response. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas interprets this request to seek information on or before October 23, 2015. Please see Response 1e.

## **QUESTION 2:**

Please refer to SoCalGas opening testimony of Mr. Dan Neville, page 7, lines 17 to 18, which states, "Additionally, each well was connected to a kill network of piping so that an individual well could be killed from a nearby well." With this in mind, please answer the following during the 111 day incident beginning on October 23, 2015:

- a. Was well SS-25 connected to the kill network of piping referenced above?
- b. If the answer to question 2a is yes, which wells were connected to well SS-25 via the kill network of piping?
- c. Did SoCalGas use any of the wells identified in response to question 2b to kill well SS-25?
- d. If the answer to question 2c is "no" for any of the wells connected to well

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SS-25 via the kill network of piping, why did SoCalGas not use that well in an effort to kill well SS-25?

- e. Has SoCalGas successfully used the kill network of piping to kill an individual well at Aliso Canyon natural gas storage facility before?
- f. If the answer to question 2e is yes, provide a spreadsheet that does the following:
  - i. Identify each well that was killed.
  - ii. Identify each well from which the kill was made through the kill network of piping.
  - iii. Identify the date each such kill was made of each well that was killed.

## **RESPONSE 2:**

- a. Yes.
- b. Please see SoCalGas' response to SED Data Request 47 Response 9 dated December 13, 2019 (Bates Range: I1906016\_SCG\_SED\_DR\_47\_0000581) for the remote kill network that shows connections to gas storage wells.
- c. No.
- d. Please see SoCalGas' response to SED Data Request 47 Response 9 dated December 13, 2019.
- e. SoCalGas objects to this request to the extent it assumes the kill network can only be used to kill a well from a nearby well. SoCalGas further objects to this request to the extent it fails to provide time period to which SoCalGas may tailor its response. Subject to and without waiving the foregoing objectionx, SoCalGas responds as follows. SoCalGas interprets this request to seek information prior to October 23, 2015. Yes, on December 15, 1988, Porter 44 was killed utilizing the kill network from its well pad.
- f. SoCalGas objects to this request to the extent it assumes the kill network can only be used to kill a well from a nearby well. SoCalGas further objects to this request to the extent it fails to provide time period to which SoCalGas may tailor its response. Subject to and without waiving the foregoing objectionx, SoCalGas responds as follows. SoCalGas interprets this request to seek information prior to October 23, 2015. Please see Response 2e.

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## **QUESTION 3:**

Please refer to SoCalGas opening testimony of Mr. Dan Neville, page 7, lines 18 to 20, which states, "Company procedures dictated that the well kill valves on the wellhead remain in the open position at all times during operations, thus maintaining remote kill ability at all times. With this in mind, please answer:

- a. Provide the company procedure referenced in this passage. Be sure it is the procedure that was in place for the 111 days beginning on October 23, 2015.
- b. Identify the page in this procedure that dictates what SoCalGas states in this passage.
- c. Did SoCalGas follow its own procedure identified in this passage with respect to the well kill valves on SS-25?
- d. If the answer to question 3c is no, what aspects of the procedure did SoCalGas not follow?
- e. If the answer to question 3c is no, why did SoCalGas not follow certain aspects of this procedure?
- f. Provide the records showing that the well kill valves on the SS-25 wellhead remained in the open position at all times during operations from October 1, 2015 to the end of February, 2016.

# **RESPONSE 3:**

- Please see the enclosed electronic documents with the following Bates Ranges: I1906016\_SCG\_SED\_DR\_48\_0000001 -I1906016\_SCG\_SED\_DR\_48\_0000007.
- b. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the term "dictates." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please refer to Section 4.2 of I1906016\_SCG\_SED\_DR\_48\_0000001 -I1906016\_SCG\_SED\_DR\_48\_0000007.
- c. Yes.
- d. N/A
- e. N/A
- f. SoCalGas objects to this request to the extent it assumes SoCalGas was required to keep the well kill valve in an open position at all times from October 1, 2015 through February 2016 and/or to maintain a record of the well kill valve remaining in an open position. Subject to and without waving the forgoing

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objection SoCalGas responds as follows. Please see Response 3a.

## **QUESTION 4:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 3, lines 9 to 11, which states, "SoCalGas provided Boots & Coots personnel with information regarding the SS-25 well and the pending situation before they traveled so they were familiar with the well design on arrival and prepared to take action." With this in mind, please answer:

- a. Provide the information SoCalGas provided Boots & Coots personnel regarding the SS-25 well and the pending situation before they traveled so they were familiar with the well design on arrival and prepared to take action.
- b. Provide the requests Boots & Coots personnel made for information regarding the SS-25 well and the pending situation before they traveled.
- c. Identify any questions from Boots & Coots personnel provided in response to question 4b that SoCalGas did not completely answer.
- d. Provide the incomplete answers that were identified in response to question 4c.
- e. Identify any questions from Boots & Coots personnel provided in response to question 4b that SoCalGas did not accurately answer.
- f. Provide the inaccurate answers that were identified in response to question 4e.

## **RESPONSE 4:**

- a. Please refer to the following electronic documents with Bates range: I1906016\_SCG\_SED\_DR\_48\_0000008 -I1906016\_SCG\_SED\_DR\_48\_0000013.
- b. SoCalGas objects to this request to the extent it assumes Boots & Coots made formal written requests for information before they traveled to Aliso Canyon. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please refer to Response 4a.
- c. SoCalGas objects to this request to the extent it assumes Boots & Coots made formal written requests for information before they traveled to Aliso Canyon. SoCalGas objects to this request to the extent it assumes SoCalGas did not completely answer questions from Boots & Coots. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. See Response 4a.
- d. SoCalGas objects to this request to the extent it assumes Boots & Coots made

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formal written requests for information before they traveled to Aliso Canyon. SoCalGas objects to this request to the extent it assumes SoCalGas did not completely answer questions from Boots & Coots. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. See Response 4a.

- e. SoCalGas objects to this request to the extent it assumes Boots & Coots made formal written requests for information before they traveled to Aliso Canyon. SoCalGas objects to this request to the extent it assumes SoCalGas did not accurately answer questions from Boots & Coots. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. See Response 4a.
- f. SoCalGas objects to this request to the extent it assumes Boots & Coots made formal written requests for information before they traveled to Aliso Canyon. SoCalGas objects to this request to the extent it assumes SoCalGas did not accurately answer questions from Boots & Coots. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. See Response 4a.

# **QUESTION 5:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 6, lines 15 to 16, which states, "DOGGR's presence was significant, as the agency with the most operational expertise, and included reviewing several of the well kill plans prior to the work being performed." With this statement in mind, please answer:

- a. Provide the well kill plans referenced in this statement that SoCalGas provided to DOGGR.
- b. Provide the dates that SoCalGas provided these well kill plans to DOGGR

# **RESPONSE 5:**

- a. SoCalGas objects to this request to the extent it assumes SoCalGas provided the well kill plans to DOGGR. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. As described in the opening testimony of Mr. Schwecke, DOGGR was on site and reviewed several of the well kill plans. Boots and Coots well kill plans were previously provided with electronic Bates Range AC\_CPUC\_SED\_DR\_16\_0000349 - AC\_CPUC\_SED\_DR\_16\_0000360.
- b. SoCalGas objects to this request to the extent it assumes SoCalGas provided the well kill plans to DOGGR. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. See Response 5a.

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## **QUESTION 6:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 1, lines 12 to 14. "Out of an abundance of caution and prudence within two days of discovering the leak, SoCalGas began considering and preparing a contingency plan for a relief well in case a top well kill was not successful."

- a. Please state all of the evidence SoCalGas had gathered within the first two days after the discovery of the leak that led SoCalGas to initiate plans for a relief well.
- b. Provide all evidence that documents this early planning.

# **RESPONSE 6:**

SoCalGas objects to this request as overly broad and unduly burdensome, and as vague and ambiguous, particularly with respect to the phrase "all of the evidence." SoCalGas further objects to this request to the extent it assumes SoCalGas began considering and preparing a contingency plan for a relief well based on gathered evidence. Subject to and without waving the forgoing objections SoCalGas responds as follows. SoCalGas interprets this request as seeking documentation which shows SoCalGas began considering and preparing a contingency plan for a relief well within the first two days after the discovery of the leak. Please refer to Section V of Mr. Schwecke's Opening Testimony. Please see the following electronic documents with Bates range: I1906016\_SCG\_SED\_DR\_48\_0000058 - I1906016\_SCG\_SED\_DR\_48\_000059.

# **QUESTION 7:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 2, lines 9 through 12. "The personnel reported the unusual observation to a SoCalGas drilling manager, who instructed his drilling crew to mobilize the necessary equipment to stop the flow of gas from the reservoir, or 'kill' the well. SoCalGas crews mobilized resources, including wireline trucks, pump trucks, and vacuum trucks, which were on site or mobilized to the facility."

- a. Please explain the purpose for the "kill" of each resource listed: wireline trucks, pump trucks, and vacuum trucks.
- b. How long did it take to mobilize resources before everything was in place for a well kill? Was that amount of time typical for a SoCalGas well kill? If not,

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what was different from others?

c. Explain how the auto-kill pipe network was or was not utilized during the first well kill.

## **RESPONSE 7:**

- a. Pump trucks pump kill fluids from storage tanks into a wellbore. Vacuum trucks load and transport kill fluid into storage tanks. Wireline refers to the cabling technology used to lower down wireline tools or measuring devices into a wellbore. A wireline unit was not mobilized or utilized for the first well kill attempt.
- b. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the term, "typical." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. SoCalGas typically mobilizes resources for planned well kills. This well kill was unplanned. Please refer to the previously provided electronic documents with Bates Range: AC CPUC SED DR 16 0000649 - AC CPUC SED DR 16 0000650.
- c. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase, "auto-kill pipe network." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. SoCalGas interprets this request to seek information related to the kill system. Please see SoCalGas' response to SED Data Request 47 Response 2d dated December 13, 2019.

# **QUESTION 8:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 2, line 31 through page 3, line 2. "While executing the procedure, SoCalGas observed fractures in the earth spreading out from the wellhead, and additional gas flow was noted through the cracks in the ground. SoCalGas personnel immediately shut down the well kill attempt and evacuated to a safe area."

- a. Provide all procedures for well kills and safety procedures that SoCalGas personnel were using at the time of the SS25 well kill and identify within those procedures any instructions that address the circumstances of fractures in the earth spreading out from the wellhead and gas flow through the cracks.
- b. Provide all documentation by SoCalGas personnel and its contractors of this initial event of fractures in the earth and gas flow from the fractures.

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## **RESPONSE 8:**

- a. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase, "procedures for well kills and safety procedures." Subject and notwithstanding the foregoing objection, SoCalGas responds as follows. SoCalGas interprets this request as seeking SoCalGas' formal written standards related to well kills as of October 24, 2015. Please see electronic document with Bates Range: I1906016\_SCG\_SED\_DR\_48\_0000014 -I1906016\_SCG\_SED\_DR\_48\_0000028.
- b. SoCalGas objects to this request as overly broad and unduly burdensome. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please see previously provided with electronic documents with Bates Range: AC\_CPUC\_SED\_DR\_16\_0000651 - AC\_CPUC\_SED\_DR\_16\_0000652.

# **QUESTION 9:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 3, footnote 1, last sentence: "To my knowledge, SoCalGas has required the assistance of a well control specialist on only one prior occasion that occurred in the 1970s." Provide all documentation of that well kill, including any procedures and documented "lessons learned" that resulted from that well kill event.

# **RESPONSE 9:**

SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrases "all documentation" and "lessons learned." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas interprets this request to seek SoCalGas' formal written report regarding the incident at Fernando Fee 34. Please see electronic document with Bates Range:

I1906016\_SCG\_SED\_DR\_48\_0000029 - I1906016\_SCG\_SED\_DR\_48\_0000057.

# **QUESTION 10:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 7, line 30 through page 8, line 2: "Also during the pendency of the leak, SoCalGas took reasonable and prudent action to implement other measures to reduce leak impacts and comply with the requests of regulators. SoCalGas ceased injection into the Aliso

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Canyon storage facility and initiated withdrawals to lower reservoir pressure to support well kill efforts and reduce the amount of gas released."

- a. Other than ceasing injection into the Aliso Canyon storage facility and initiating withdrawals, what reasonable and prudent actions did SoCalGas take that were actually implemented? Of those actions identified, which ones were successful and why?
- b. Provide the Aliso Canyon Reservoir pressure on the date of each of the seven SS25 well kill attempts. Provide or cite to already provided records that are the source of this information.

# RESPONSE 10:

- a. Please refer to Section III.B.iv. of Mr. Schwecke's Opening Testimony.
- b. Please see previously provided electronic documents with Bates Range: AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

# **QUESTION 11:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 9, lines 16 to 18: "... when a wireline truck was required for diagnostic work, personnel had to carefully move the truck on site, install a lubricator to feed the wireline downhole, and transport and erect a crane to set the lubricator and run the wireline through the lubricator."

- a. Provide documentation showing each time the wireline truck was moved onto the Well SS25 site for diagnostic work from October 23, 2015 until Well SS25 was declared sealed by DOGGR.
- b. Provide all diagnostic records, including field notes and readable logs related to, or generated by, the wireline diagnostic activities.

# RESPONSE 11:

- a. Please refer to the previously provided electronic document with Bates Range: AC\_CPUC\_SED\_DR\_16\_0025631 AC\_CPUC\_SED\_DR\_16\_0025808.
- b. SoCalGas objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all diagnostic records." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. SoCalGas interprets this request to seek documentation

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showing the wireline activities from October 23, 2015 through February 18, 2016. See Response 11a.

## **QUESTION 12:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 9, lines 28-29: "On October 25, 2015, Boots & Coots began assessing SS-25 and determined that the obstruction in the SS-25 tubing was a hydrate."

- a. Explain why Boots & Coots decided the obstruction in the SS-25 tubing was a hydrate.
- b. What, exactly, was the hydrate?
- c. Provide all records used by Boots & Coots to make the determination that the obstruction was a hydrate.
- d. Provide all records generated by Boots & Coots and the diagnostic procedures they used to make the determination that the obstruction was a hydrate.

# RESPONSE 12:

SoCalGas objects to this request to the extent it does not seek information or documents but rather seeks to have SoCalGas explain the thought-process, understanding, and rational of a third party. SoCalGas further objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all records." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. Please refer to the previously provided electronic document with Bates Range: AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

## **QUESTION 13:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 11, lines 6-7: "...on November 6, 2015, Boots & Coots used the coiled tubing unit to successfully clear the hydrate from the SS-25 tubing."

- a. Please explain in text how the coiled tubing unit was used to clear the hydrate from the SS-25 tubing.
- b. Provide all records, including field notes and readable logs that document the use of the coiled tubing unit to clear the hydrate from the SS-25 tubing, and

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the results, including any notes or tests used to confirm that it was hydrate that was blocking the SS-25 tubing.

c. Did SoCalGas or its contractors determine that there was, or was not, hydrate in the annular space between the tubing and casing of SS-25? Please explain how that determination was made and provide any records that were created that support that finding.

## **RESPONSE 13:**

SoCalGas objects to this request to the extent it does not seek information or documents but rather seeks to have SoCalGas explain the understanding and determinations of a third party. SoCalGas further objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all records." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. Please see previously provided electronic document with Bates Range: AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

# **QUESTION 14:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 12, lines 13-15:

"... Boots& Coots was able to perform additional testing with diagnostic equipment, including temperature and noise tests through the tubing, to assess the conditions in the well."

- a. Provide all records, including field notes, that document the testing and diagnostic results, including but not limited to temperature and noise tests through the tubing, to assess the conditions in the well.
- b. What information was gained from the referenced testing that SoCalGas and its contractors used to design the next well kill?

# **RESPONSE 14:**

SoCalGas objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all records." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please see previously provided electronic document with Bates Range:

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## **QUESTION 15:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 12 footnote 7: "This withdrawal effort reduced the amount of gas that was released into the air."

- a. What procedure did SoCalGas use for the withdrawal effort? Provide a copy of the version of the Procedure in effect on October 23, 2015 and any revisions to the procedure between October 23, 2015 and January 21, 2016.
- b. Provide all records that show calculations and results that quantify the reduction of the amount of gas that was released into the air from November 11, 2015 to January 21, 2016.

# **RESPONSE 15:**

- b. SoCalGas objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all records."
   Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please refer to the following link which provides the January 12, 2016 Aliso Canyon preliminary methane emissions estimates by the California Air Resources Board (CARB):

https://ww3.arb.ca.gov/research/aliso\_canyon/aliso\_canyon\_natural\_gas\_leak\_u pdatessa\_flights\_thru\_jan\_12\_2016.pdf?\_ga=2.53068520.1705387443.1576530 570-1855999613.1493842063

# **QUESTION 16:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 13, lines 7-8: "... first kill attempt through the coil tubing unit . . ."

- a. How deep into the well did the coil tubing reach?
- b. What testing or diagnostic equipment was being used during or immediately after this well kill attempt?
- c. Provide all records, field notes and test results that document Boots & Coots' first well kill attempt.
- d. Provide all records, field notes and test results from the first well kill attempt that document the results of Boots & Coots first well kill attempt.

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#### **RESPONSE 16:**

SoCalGas objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all records." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please see previously provided electronic document with Bates Range:

AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

#### QUESTION 17:

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 13, line 9: "Fluid pumped into the well appeared to escape into the surrounding subsurface formation."

- a. What information or observations caused SoCalGas and its contractors to come to the conclusion that fluid was escaping into the surrounding subsurface formation?
- b. During this kill attempt, at what depth was the fluid escaping into the surrounding subsurface formation?
- c. If a depth was determined, or estimated, provide all records and data that SoCalGas and its contractors relied on to make that depth determination or estimate.

#### RESPONSE 17:

SoCalGas objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all records." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please see previously provided electronic document with Bates Range:

AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

#### **QUESTION 18:**

What was the bottom hole pressure used by SoCalGas and Boots & Coots to calculate the required weight of kill fluid for each of the seven well kill attempts?

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#### RESPONSE 18:

SoCalGas objects to this request to the extent it assumes SoCalGas calculated the required weight of kill fluid for each of the seven well kill attempts. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please see previously provided electronic document with Bates Range:

AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

#### QUESTION 19:

For well kill attempts 1 through 7, what models or standard calculations were used by SoCalGas and Boots & Coots to determine the best approach to kill the SS-25 well?

- a. Provide documentation that explains the methodology for each well kill attempt.
- b. Provide the calculations and results of the calculations for each well kill attempt.

#### RESPONSE 19:

Please see previously provided electronic document with Bates Range: AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

#### **QUESTION 20:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 13, lines 2526: "Following each kill attempt, Boots & Coots performed diagnostic work to understand and assess the well."

- a. Provide all records, including field notes, diagnostic test results and calculations generated or used by Boots & Coots to understand and assess the well.
- b. For each well kill attempt, provide a text explanation of what Boots & Coots came to understand about the well after the kill attempt and how they assessed the condition of the well.

#### RESPONSE 20:

SoCalGas objects to this request to the extent it does not seek information or

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documents but rather seeks to have SoCalGas provide an explanation of what Boots & Coots came to understand about the well after the well kill attempt and how they assessed the condition of the well. SoCalGas further objects to this request as vague and ambiguous, particularly with respect to the phrase "all records." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. Please see previously provided electronic document with Bates Range:

AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

#### **QUESTION 21:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 14, lines 6-7: "On December 22, 2015, Boots & Coots, with the assistance of the additional well kill experts and the National Laboratories, conducted the seventh top well kill attempt."

- a. Provide a list of all of the experts (with their affiliations) who were involved in designing and implementing the seventh top well kill attempt.
- b. Describe what was different about the seventh well kill attempt from the preceding 6 well kill attempts
- c. Identify all models used by the experts identified in response to subpart a of this data request to design the seventh well kill attempt.
- d. Provide all records, field notes, field monitoring, testing and diagnostics related to the planning, implementation and abandonment of the seventh SS-25 well kill attempt.

#### RESPONSE 21:

- a. Boots & Coots ultimately designed and implemented the seventh top well kill attempt. The following consultants provided assistance during the seventh well kill attempt:
  - Don Shackelford (Sierra Hamilton)
  - John Wright (Wild Well)
  - Pete Slagel (1816 Hamilton)
  - Morton Haug Emilsen (Add Energy)
  - Jim Fox
  - James Mansdorfer
- b. Please see previously provided electronic document with Bates Range:

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AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808.

- c. SoCalGas objects to this request as overly broad and unduly burdensome, and vague and ambiguous, particularly with respect to the phrase "all records." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. Please see previously provided electronic document with Bates Range: AC\_CPUC\_SED\_DR\_16\_0025631 AC\_CPUC\_SED\_DR\_16\_0025808.
- d. Please refer to Response 21b.

#### **QUESTION 22:**

Please refer to SoCalGas opening testimony of Rodger Schwecke, page 16, lines 10-11:

"From December 15 to December 21, 2015. Boot & Coots and other contractors . . ."

- a. Provide a list of all "other contractors" that drilled the relief well.
- b. For each contractor identified, provide the name and title of the person(s) on site during the drilling.

#### **RESPONSE 22:**

Please see previously provided electronic document with Bates Range: AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808 and AC\_CPUC\_SED\_DR\_16\_0000361 - AC\_CPUC\_SED\_DR\_16\_0000648.

#### **QUESTION 23:**

Describe all of the activities that occurred at the site of Well SS-25 during the period from December 15, 2015 through February 10, 2016, identify the persons who were present at the well site during that period, and provide daily records that document all activities that occurred.

#### **RESPONSE 23:**

Please see previously provided electronic documents with Bates Range: AC\_CPUC\_SED\_DR\_16\_0000361 - AC\_CPUC\_SED\_DR\_16\_0000648 and AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808

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#### **QUESTION 24:**

Please refer to the Prepared Opening Testimony of Ms. Amy Kitson on Behalf of Southern California Gas Company, page 3, lines 1-14, which states,

Solution 6: Conduct a Casing Failure Analysis

This mitigation/solution has already been implemented. The Blade Report incorrectly asserts that SoCalGas did not investigate the causes of previous casing failures. In order to remediate a leak discovered in any gas storage well, SoCalGas necessarily had to analyze and diagnose the issue first, before repairing it. In describing Solution 6, the Blade Report states that "casing failures need to be formally investigated." [Footnote 3, referencing page 232 of Blade Report.] The Blade Report fails to recognize, however, that a "formal investigation" of the type Blade appears to envision would likely entail a level of examination that would not be feasible for an active well, nor necessary. While Blade was able to cut, extract, and thoroughly examine the casing at well SS-25 because there were plans to abandon the well, it is not feasible for SoCalGas to perform the same level of failure analysis on active gas storage wells. Further, although the SS-25 failure occurred at a relatively shallow depth, even Blade experienced difficulty cutting and extracting the casing. For casing failures thousands of feet belowground, operational issues may inhibit the cutting and extracting of casing.

With this passage in mind, please answer the following:

- a. In stating that, "The Blade Report incorrectly asserts that SoCalGas did not investigate the causes of previous casing failures.", is it SoCalGas's point that SoCalGas did in fact investigate the causes of any previous casing failures at Aliso Canyon natural gas storage facility?
- b. If the answer to question 24a is yes, please list in spreadsheet format all such previous casing failures at Aliso, which SoCalGas investigated. As part of this list, please include columns with the following information:
  - 1. The well that experienced the casing failure;
  - 2. The date or range of dates that SoCalGas investigated the casing failure;
  - 3. The individuals responsible for investigating the casing failure;
  - 4. The findings of the investigation of the casing failure;
  - 5. All documentation related to the investigation of the casing failure;
  - 6. Reference to the documents and page numbers showing the findings of

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the investigation of each casing failure.

#### RESPONSE 24:

SoCalGas objects to this request to the extent it is overly broad, vague, ambiguous and unduly burdensome. SoCalGas further objects to this request to the extent it exceeds the scope of this proceeding as defined in the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. Subject to and without waving the forgoing objection SoCalGas responds as follows. SoCalGas assessed and addressed casing failures. SoCalGas can provide additional information regarding specific casing failures identified by SED.

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SUBJECT

Summary of Porter 44 Incident

On December 14, 1988 a solvent injection program utilizing a Čamco coiled tubing unit had been planned on well Porter 44 at Aliso Canyon. A similar procedure had been completed on Porter 39 at noon that day utilizing the same coiled tubing unit. While the contractors rigged off Porter 39 and moved to Porter 44, I stayed at Porter 39 and displaced the solvent into the well utilizing injection gas from the Station.

I arrived at Porter 44 as NowCam was running into the well with the coiled tubing. Bob Hazel, Rasha Hijazi, the WelChem representative, a field operator from Aliso Canyon, the coiled tubing unit operator and the two Halliburton operators were present.

At approximately 3:30 p.m. while running into the well with the coiled tubing, a sudden explosion occurred at the packoff of the coiled tubing unit. No injuries were suffered, but material was observed blowing out with the gas around the packoff area. The coiled tubing operator tried to come out of the hole while the gas was blowing, but stopped after what appeared to be between 30 second to 1 minute due to the increased intensity of the blowout. I heard second hand the unit operator attempted to operate the rams hydraulically inside the cab but I did not observe this.

The NowCam operator then tried to close the bottom set of rams manually by turning the manually operated rams on the BOPE stack itself. This placed the operator approximately 5' below the gas blowout area of the unit. The NowCam operator apparently was able to quickly shut one side of the rams (which we thought at the time to be pipe rams.) He then went to the other side of the rams and worked for several minutes trying to close the other ram without success. Due to physical fatigue he finally gave up on trying to close the ram.

During the immediate time after the blowout, the Halliburton crew was instructed to turn off the engine of the pump truck which was located approximately 10' from the well. After the NowCam operator stopped trying to come out of the hole with the coiled tubing unit, he was told to shutdown the unit due to concern of a spark setting of the gas blowing into the atmosphere.

After the rams were unsuccessfully operated, it became apparent the well would have to be killed from a remote location since the risk of a spark, thus igniting, at the wellsite was too great. A plan

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ATTACHMENT D M. E. Melton Summary of Porter 44 Incident Page 2

was then made and the appropriate contractors, people and equipment were called and/or ordered to kill Porter 44 from well Porter 46 which at the time provided the shortest length of isolated kill piping, it had a Baker tank onsite, and it had a large area to stage the necessary equipment.

While the planning was going on to commence the remote well kill, a hydrate apparently formed in the restricted area around the pipe ram area of the BOPE. It eventually shutoff the flow to a small leak. At this time, Halliburton was instructed to start their truck and remove it from the location so it could be utilized to start pumping for the kill.

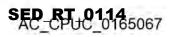
Several minutes had elapsed while the well was in its "dormant" state, when the hydrate plug suddenly blewout and the well was flowing uncontrollably once again. Over the next 16 to 17 hours, the piping and equipment was maneuvered to the point where the well was finally killed and brought under control at 9:30 a.m. December 15.

In a short review, the NowCam personnel stated they had changed packing on the unit after Porter 39 and before Porter 44 due to wear. A piece of the new packing that blewout of the stuffing box of the coiled tubing unit on Porter 44 was found at the wellsite shortly after the blowout occurred. The packing appeared to have almost "melted" or been deformed by some chemical process during a quick examination. The people of NowCam later obtained the packing and apparently still have it in their possession. There is still considerable discussion as to how the well was finally killed as well as a step-by-step listing of all the events as they occurred during the incident. A more complete discussion of the incident will be provided later.

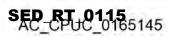
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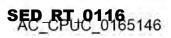
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		Date: 2	6-Oct-2015		Well Name and	Number:	Standard	Senson 25	Report #	2
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1000 may	10000	AFE #:	Northridge, CA, 913	326		Country: Location:	A 16	USA so Canyon Stora	ana Engility	
Custor	mer Repre	A DAY OF A DAY				Vell Type:	Alls	Gas	age raciily	
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-		Date:	27-Oct-2015		Well Name a	nd Number:	Standard S	enson 25	Report #	# :	3
	Custor	ner Name:	Southern California			County:		Los Angele			
Custon	ner Billing	Address:	12801 Tampa Ave			State:		California	a		
2222620		AFE #:	Northridge, CA, 9	1326		Country: all Location:	Alia	USA	as Fasili	<b>.</b>	_
Custor	ner Repre	Sentative:			VVe	Well Type:	Alisc	Canyon Stora Gas	ige Facili	ity	_
			Danny Walzel			Job Type:		Well Contr	ol	-	_
			Standard Senson 2	25		Rig No:		N/A			
	and the second sec	n of Charge			nments	Units	U	nit Charge		Total	
		ntrol Specia			/ Clayton	1	\$	11,500.00		11,50	
		ol Specialis			Kopecky	1	\$	10,000.00	\$	10,00	
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- I.A	a second s	aily Expens			. / J.K. / M.B.	4	\$	325.00	\$	1,30	-
		otel			. / J.K. / M.B.	4	\$	163.00	\$	65	_
		rfare		Mike	Baggett	1	\$	2,527.00		2,52	_
		tal Car				1	\$	192.00	\$		2.00
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1-3/4" ca <b>Hour</b> 6:45 7:15 8:30 10:15 11:15 13:30 14:45	asing to 99 Hour 7:15 8:30 10:15 11:15 13:30 14:45 15:00	0 ft. 7" cas Traveled f Performed 307 psi. 2 Rigged up Spot slick Continued Opened o 7" x 11-3/4 choke. Ch	rom hotel to location site assessment. 2-7/8" - 34 psi. to flow 2-7/8" x 7" line unit and gener l isolating kill lines a rbitz valve on with of 4" - 308 psi. 2-7/8" noke pressure 275	n several fissures on p /2" slotted liner to 8,7 on. Inspected slick line Discussed the day's of annulus to test separa ator. and with draw lines to draw line. 2-7/8" x 7" x 7" - 16 psi. 2-7/8" - psi. Gas rate 3 Mcf/d	ad site. 45 ft. 2-7/8" tubing Activity o e unit. operations with SCC ator. well 25. annulus pressure de 78 psi, Began blee ay.	n Site GC representativ ecreased from 2 eding 7" x 11-3/4	es. 7" x 11-3 60 psi to 15 p " annulus thro	/4" - 325 psi. 2 si. Monitored b bugh test separ	well. rator on f	11/64	4.0
1-3/4" ca <b>Hour</b> 6:45 7:15 8:30 10:15 11:15 13:30	asing to 99 Hour 7:15 8:30 10:15 11:15 13:30 14:45	0 ft. 7" cas Traveled f Performed 307 psi. 2 Rigged up Spot slick Continued Opened o 7" x 11-3/4 choke. Cl Opened c	rom hotel to location site assessment. 2-7/8" - 34 psi. to flow 2-7/8" x 7" line unit and gener l isolating kill lines a rbitz valve on with of 4" - 308 psi. 2-7/8" noke pressure 275 hoke to 23/64. Cho	n several fissures on p /2" slotted liner to 8,7 on. Inspected slick line Discussed the day's of annulus to test separa ator. and with draw lines to draw line. 2-7/8" x 7" x 7" - 16 psi. 2-7/8" - psi. Gas rate 3 Mcf/d oke pressure 300 psi.	ad site. 45 ft. 2-7/8" tubing Activity o e unit. operations with SCC ator. well 25. annulus pressure de 78 psi, Began blee ay. 2-7/8" x 7" - 21 psi	n Site BC representativ ecreased from 2 eding 7" x 11-3/4 2-7/8" 75 psi.	es. 7" x 11-3 60 psi to 15 p " annulus thro Closed choke	/4" - 325 psi. 2 si. Monitored b bugh test separ	well. rator on f	11/64	4.0
1-3/4" ca <b>Hour</b> 6:45 7:15 8:30 10:15 11:15 13:30 14:45	asing to 99 Hour 7:15 8:30 10:15 11:15 13:30 14:45 15:00	0 ft. 7" cas Traveled f Performed 307 psi. 2 Rigged up Spot slick Continued Opened o 7" x 11-3/4 choke. Cl Opened c	rom hotel to location site assessment. 2-7/8" - 34 psi. to flow 2-7/8" x 7" line unit and gener isolating kill lines a rbitz valve on with o 4" - 308 psi. 2-7/8" hoke pressure 275 hoke to 23/64. Cho - 25 psi. 2-7/8" - 7	n several fissures on p /2" slotted liner to 8,7 on. Inspected slick line Discussed the day's of annulus to test separa ator. and with draw lines to draw line. 2-7/8" x 7" x 7" - 16 psi. 2-7/8" - psi. Gas rate 3 Mcf/d	ad site. 45 ft. 2-7/8" tubing Activity o e unit. operations with SCC ator. well 25. annulus pressure de 78 psi, Began blee ay. 2-7/8" x 7" - 21 psi	n Site BC representativ ecreased from 2 eding 7" x 11-3/4 2-7/8" 75 psi.	es. 7" x 11-3 60 psi to 15 p " annulus thro Closed choke	/4" - 325 psi. 2 si. Monitored b bugh test separ	well. rator on f	11/64	4.0
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		Date:	28-Oct-2015		Well Name a	nd Number:	Standard S	enson 25	Repo	nt# 4
	Custor	ner Name:	Southern California C	Sas Company		County:		Los Angele	es	
Custon	ner Billing	Address:	12801 Tampa Ave., \$			State:		California	i	
202101	1010000	and the state of	Northridge, CA, 913	26		Country:	A 17-	USA		184
Custor	nor Ponre	AFE #: sentative:			VVe	Well Type:	Aliso	Canyon Stora Gas	ige Fai	cility
			Danny Walzel			Job Type:		Well Contr	ol	
			Standard Senson 25		-	Rig No:		N/A		
D	escription	of Charge	s: Level	Com	ments	Units	U	nit Charge		Total
		ntrol Specia			Clayton	1	\$	11,500.00	\$	11,500.00
		ol Specialis			Kopecky	1	\$	10,000.00		10,000.00
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		pecialist aily Expens	4		J.K. / M.B.	4	\$	9,200.00 325.00	\$	9,200.00
		ally Expens	c		/ J.K. / M.B.	4	\$	163.00	\$ \$	652.00
				0.07 0.01	a service, inclus	-	*	100,00	\$	
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					mated Daily Total	-			\$	44,447.00
					Vell Summary					
			hed to surface with se							
	-	0 ft. /" cas	sing to 8,585 ft. 5-1/2	" slotted liner to 8,74			ter depth 8,4	58 ft.	_	
Hour	Hour				Activity of	n Site				
6:45 7:15	7:15		from hotel to location.	and an and the a						
7:45	7:45		morning safety/operat site assessment. G		on well and onnon	r to hour deares	rod			
8:00	9:30						seu.			
	0,00				SI 7-7/8" Y 7" - 12	Binsi 2-7/8" - 17	Onsi Bled t	whind pressure	to 86	nsi.
9:30	11:30							ubing pressure ed pressure o		psi.
9:30	11:30	Closed all	casing valves. Insta annulus - 134 psi. B	lled A-Frame on wel						psi.
9:30 11:30	11:30 12:15	Closed all 2-7/8" x 7 Made up	casing valves. Insta "annulus - 134 psi. B 1-5/8" sample bailer.	lled A-Frame on wel lled to 124 psi. Stabbed lubricator.	I. Continued rigging Opened up well. 2	g up slick line. (* -7/8" x 7" - 109 p	0:00) Check si. 2-7/8" - 8	ed pressure o 7 psi. RIH witi	n h samp	ple bailer
		Closed all 2-7/8" x 7 Made up Sat down	casing valves. Insta "annulus - 134 psi. B 1-5/8" sample bailer. hard at 467 ft. Pulled	lled A-Frame on wel lled to 124 psi. Stabbed lubricator.	I. Continued rigging Opened up well. 2	g up slick line. (* -7/8" x 7" - 109 p	0:00) Check si. 2-7/8" - 8	ed pressure o 7 psi. RIH witi	n h samp	ple bailer
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		Date:	29-Oct-2015		Well Name an	d Number:	Standard Ser	nson 25	Repor	t# 5
	Custor		Southern Californ	ia Gas Company		County:		Los Angele	a series of the second s	
Custor	ner Billing	Address:	12801 Tampa Av	the second se		State:		California	1	
Guston	ner Binnig	and the state of	Northridge, CA,	91326		Country:		USA	_	
-		AFE #:			We	Il Location:	Aliso C	Canyon Stora	ige Fac	cility
		sentative:	Danny Walzel		-	Well Type: Job Type:		Gas Well Contr	in l	-
			Standard Senson	25		Rig No:		N/A	01	
P		of Charge			ments	Units	Uni	t Charge	1	Total
	and the second second	ntrol Specia	the second		Clayton	1	\$	11,500.00	\$	11,500.0
		ol Specialis	a sector of the	the second se	Kopecky	1	\$	10,000.00		10,000.0
S	r. Well Co	ntrol Engine	er 4	Danny	Walzel	1	\$	11,500.00	\$	11,500.0
		pecialist	4		Baggett	1	\$	9,200.00		9,200.0
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				v	Vell Summary				_	
				h several fissures on pa					d 770	psi.
		00 ft, 7" cas	sing to 8,585 ft. 5	1/2" slotted liner to 8,74	and the second	And the second sec	er depth 8,468	l ft.		
Hour	Hour				Activity on	i Site				
6:30	7:00		rom hotel to locat						_	
7:00	7:30		morning safety/op	Observed ice on fissu	incontracted coller		d to have mad	a fluid avera	inht C	haakad
7.30	0.15			- 429 psi. 2-7/8" x 7" -			d to have mad	e liuid overn	igni, c	neckeu
8:15	8:30			osi. Flowed annulus for			essure 509 ps			
8:30	9:30			ne. Laid down lubricato					20 psi.	
		7" x 11-3/4	4" - 560 psi. Chec	ked pressures on 25B.	2-7/8" - 2,450 psi.	2-7/8" x 7" - 2,4	50 psi. 7" x 11	-3/4" - 44 psi	L.	
9:30	10:30	property and the second		er bar and lubricator.						
10:30	10:45		levels on SS 25.							
10:45	11:00		" x 7" annulus f/ 4		75 0 7 01 71	100 1 71 44	0/41 504	-		
11:00	12:00	a description of the second	and the second	naster valve. 2-7/8" - 3	15 psi. 2-1/8 x / -	402 DSI. / X 11	-3/4 - 591 psi			
		Hald DIC	I to discuss slight			CONTRACTOR INCOME				
12:00		a data hara ta base anno bata data	VI to discuss slick	to a Research of the second seco	RIH Sat down at 3		ol temperatur	59 deg E	2-7/8"	54 nei
12:00 12:30	13:15	Made up '	1.625" sample bail	er. Stabbed lubricator.		37 ft. POOH. To				
12:00		Made up ' Stabbed I	1.625" sample bail	er. Stabbed lubricator. 1.625" sample bailer.		37 ft. POOH. To				
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12:00 12:30 13:15 13:45 14:15 15:30 16:00 18:00	13:15 13:45 14:15 15:30 16:00 18:00 18:30	Made up <sup>4</sup> Stabbed II in sample Met with F Blew down Attended Will move Continued 11-3/4" - 6 Traveled t	1.625" sample bail ubricator. RIH with bailer. Rigged do IALCO representa in with draw and kil end of the day me Halliburton pump monitoring press 597 psi. (17:30) 2 o hotel.	er. Stabbed lubricator. n 1.625" sample bailer. wn slick line. tives to discuss coiled to l lines from 450 psi to 5 eting. Coiled tubing uni truck closer to SS 25. ures. (16:30) 2-7/8" - 5 -7/8" - Shut in. 7" - 631 Proje	Sat down at 37 ft. 1 tubing operations. A 50 psi. Discussed re it will take 2 days to SCGC will continue 51 psi. 7" - 685 psi. 1 psi. 11-3/4" - 770 p ected Operations	37 ft. POOH. To POOH. Tool ten A coiled tubing ur moving lines to i arrive at location running diagnos 11-3/4" 731 psi. psi.	nperature - 19 nit is being mo solate SS 25 f n. Will remove stics on nearby (17:00) 2-7/8	deg F. Obse bilized from H rom facility lin lateral lines wells.	Houma Houma nes. from S	; LA. ;S 25.
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12:00 12:30 13:15 13:45 14:15 15:30 16:00 18:00	13:15 13:45 14:15 15:30 16:00 18:00 18:00 18:30 18:30 Iateral line Signature f	Made up ' Stabbed II in sample Met with F Blew down Attended ' Will move Continued 11-3/4" - 6 Traveled t s from SS 2 ure Custom Boots and 0 me	1.625" sample bail ubricator. RIH with bailer. Rigged do IALCO representant with draw and kill end of the day me Halliburton pump I monitoring press 397 psi. (17:30) 2 o hotel. 25. Rig up CT. W her Representativ Coots Represent Hours on Locatio 11	er. Stabbed lubricator. n 1.625" sample bailer. wn slick line. tives to discuss coiled to l lines from 450 psi to 5 eting. Coiled tubing unit truck closer to SS 25. ures. (16:30) 2-7/8" - 5 -7/8" - Shut in. 7" - 631 Projet ash through hydrates. e ative n Travel Hours 1	Sat down at 37 ft. 1 tubing operations. A 50 psi. Discussed re it will take 2 days to SCGC will continue 51 psi. 7" - 685 psi. 1 psi. 11-3/4" - 770 p ected Operations Attempt to kill well w Approvals Prin Dann	37 ft. POOH. To POOH. Tool ten A coiled tubing un moving lines to i arrive at location running diagnos 11-3/4" 731 psi. psi. ith 10.8 ppg CaC t Name t Name y Walzel	hperature - 19 hit is being mo solate SS 25 f h. Will remove tics on nearby (17:00) 2-7/6	deg F. Obse bilized from H rom facility lii lateral lines. wells. 3" - 55 psi. 7	Prved id Houmanes. from S " - 634 Da Da	te
12:00 12:30 13:15 13:45 14:15 15:30 16:00 18:00 8 emove	13:15 13:45 14:15 15:30 16:00 18:00 18:00 18:30 18:30 18:30 Iateral line Signature E ignature E mployee Na Danny Clayte Danny Walz	Made up ' Stabbed II in sample Met with F Blew down Attended ' Will move Continued 11-3/4" - 6 Traveled t s from SS 2 are Custom Boots and 0 me on el	1.625" sample bail ubricator. RIH with bailer. Rigged do IALCO representant with draw and kill end of the day me Halliburton pump I monitoring press 397 psi. (17:30) 2 o hotel. 25. Rig up CT. W er Representative Coots Represent Hours on Location 11 11	er. Stabbed lubricator. n 1.625" sample bailer. wn slick line. tives to discuss coiled to l lines from 450 psi to 5 eting. Coiled tubing unit truck closer to SS 25. ures. (16:30) 2-7/8" - 5 -7/8" - Shut in. 7" - 631 Projet ash through hydrates. e ative 1 1	Sat down at 37 ft. 1 tubing operations. A 50 psi. Discussed re it will take 2 days to SCGC will continue 51 psi. 7" - 685 psi. 1 psi. 11-3/4" - 770 p ected Operations Attempt to kill well w Approvals Prin Dann	37 ft. POOH. To POOH. Tool ten A coiled tubing un moving lines to i arrive at location running diagnos 11-3/4" 731 psi. psi. ith 10.8 ppg CaC t Name t Name y Walzel	hperature - 19 hit is being mo solate SS 25 f h. Will remove tics on nearby (17:00) 2-7/6	deg F. Obse bilized from H rom facility lii lateral lines. wells. 3" - 55 psi. 7	Prved id Houmanes. from S " - 634 Da Da	te
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	Greens R , TX. 770 8884			4				s an estimat on this she		
			-Oct-2015	1	Well Name an	d Number: Si	andard Se	nson 25	Report	# 6
_	Custo		uthern California Ga			County:		Los Angele		
Custor	ner Billing		801 Tampa Ave., SC rthridge, CA, 91326			State: Country:	_	California USA		
		AFE #:			Wel	I Location:	Aliso	Canyon Stora	ge Fac	ility
		esentative:	141.1.1			Well Type:		Gas		
R		erated By: Da	nny Walzel andard Senson 25			Job Type: Rig No:		Well Contr N/A	ol	
D		n of Charges:	Level	Com	ments	Units	Un	it Charge	-	Total
		ntrol Specialist			/ Clayton	1	\$	11,500.00	\$	11,500.0
	and the second se	rol Specialist	4		Kopecky	1	\$	10,000.00		10,000.0
S		ntrol Engineer	4		y Walzel	1	\$	11,500.00		11,500.00
		Specialist aily Expense	4	and the second s	Baggett . / J.K. / M.B.	1 4	\$	9,200.00		9,200.0
		otel			. / J.K. / M.B.	4	\$	163.00	\$	652.0
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		tal Car				1	\$	192.00	cin Y .	192.00
	Ren	tal Car				1	\$	103.00	\$	103.00
							1		\$	- C
									\$	
				Est	imated Daily Total				\$	44,447.00
		90 ft. 7" casing			ad site. Surface cas 45 ft. 2-7/8" tubing to Activity on	o 8,510 ft. Packer			d 830	psi.
7:00 7:30	7:30 8:15		rning safety/operatio	ns meeting.						
		psi, 11-3/4" -	823 psi.		s has decreased. Ch					
8:15 11:45 12:30	11:45 12:30 13:00	Isolated wells representative decreased fro Removed tub Lunch	823 psi. 25A and 25B from i e to discuss equipm m 830 psi to 750 ps ing kill lateral from v	njection and with ent requirements i. vell 25.	draw lines. Blew dow for coiled tubing ope	vn lines from 250 ps rations. (10:50) W	si to 0 psi. ell 25 11-3	Met with Wea /4" casing pre	atherfor	d
11:45	12:30	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 2" LP compare 2" LP needle Nippled up 2-	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange nion flanges with 2" ( valves on kill and wi 9/16" 5M x 4-1/16" 1	njection and with ent requirements i. rell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped as with 2" tapped supped bull plugs th draw lines. OM DSA, 4-1/16"	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves of '10M Gate Valve, an	vn lines from 250 ps rations. (10:50) W ine from tubing hea g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1	d. Remov 1/16" 5M v ulus casing y valves.	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same /valves. Insta Installed tapp OSA on upper	manum manum Insta alled 2- ed flan	d natic Iled 1/16" 5M ges w/ r valve.
11:45 12:30 13:00 15:00	12:30 13:00 15:00	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 12" LP compar 2" LP needle Nippled up 2- Installed Rote Well 25A: Bio	823 psi. 25A and 25B from i e to discuss equipmon 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange volves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from	njection and with ent requirements i. rell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" on well 25 7" casi	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves of	In lines from 250 ps rations. (10:50) W ine from tubing hea g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 1-3/4" casing outle	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves /16" 15M [ t valve. 7"	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same valves. Insta Installed tapp OSA on upper - 585 psi. 11	manum manum Insta alled 2- ed flan	d natic Iled 1/16" 5M ges w/ r valve.
11:45 12:30 13:00	12:30 13:00 15:00 16:00	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 2" LP compar 2" LP needle Nippled up 2- Installed Rote	823 psi. 25A and 25B from i e to discuss equipmon 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange volves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from	njection and with ent requirements i. rell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" on well 25 7" casi	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves of '10M Gate Valve, an ing outlet valve and 1	In lines from 250 ps rations. (10:50) W ine from tubing hea g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 1-3/4" casing outle	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves /16" 15M [ t valve. 7"	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same valves. Insta Installed tapp OSA on upper - 585 psi. 11	manum manum Insta alled 2- ed flan	d natic Iled 1/16" 5M ges w/ r valve.
11:45 12:30 13:00 15:00	12:30 13:00 15:00 16:00 17:30	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 12" LP compar 2" LP needle Nippled up 2- Installed Rote Well 25A: Bio	823 psi. 25A and 25B from i e to discuss equipmon 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange volves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from	njection and with ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" on well 25 7" casi n 920 ps/ to 700 p	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves of 10M Gate Valve, an ing outlet valve and 1 osi. Shut in. Well 25	In lines from 250 ps rations. (10:50) W ine from tubing hea g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 1-3/4" casing outle	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves /16" 15M [ t valve. 7"	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same valves. Insta Installed tapp OSA on upper - 585 psi. 11	manum manum Insta alled 2- ed flan	d natic Iled 1/16" 5M ges w/ r valve.
11:45 12:30 13:00 15:00 16:00 17:30	12:30 13:00 15:00 16:00 17:30 18:00	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 2" LP compar 2" LP compar 2" LP compar 2" LP needle Nippled up 2- Installed Rote Well 25A: Bil Traveled to h	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 ps ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange nion flanges with 2" ( valves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from otel.	njection and with ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" on well 25 7" casi n 920 psi to 700 p	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves of '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25	Ine from tubing head ine from tubing head head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 1-3/4" casing outle 7" - 584 psi. 11-3	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves. /16" 15M I t valve. 7" 3/4" - 771 ;	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same valves. Insta Installed tapp OSA on upper - 585 psi. 11	manum manum Insta alled 2- ed flan	d natic Iled 1/16" 5M ges w/ r valve.
11:45 12:30 13:00 15:00 16:00 17:30	12:30 13:00 15:00 16:00 17:30 18:00	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 2" LP compar 2" LP compar 2" LP compar 2" LP compar 2" LP compar 2" LP needle Nippled up 2- Installed Rote Well 25A: Bil Traveled to h	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 ps ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange nion flanges with 2" ( valves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from otel.	njection and with ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" on well 25 7" casi n 920 psi to 700 p	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves of '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 Shut in. Well 25 ected Operations and tubing. Prepare Approvals	Ine from tubing head ine from tubing head head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 1-3/4" casing outle 7" - 584 psi. 11-3	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves. /16" 15M I t valve. 7" 3/4" - 771 ;	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same valves. Insta Installed tapp OSA on upper - 585 psi. 11	manum manum Insta alled 2- ed flan	d natic lled 1/16" 5M ges w/' r valve. 770 psi.
11:45 12:30 13:00 15:00 16:00 17:30	12:30 13:00 15:00 15:00 16:00 17:30 18:00 18:00 3 25B. Rig	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 2" LP comparing 2" LP comparing 2" LP comparing 2" LP needle Nippled up 2- Installed Rote Well 25A: Bill Traveled to h	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange nion flanges with 2" ti valves on kill and wi 9/16" 5M x 4-1/16" 1 9/16" 5M x 4-1/16" 1 ed 8-5/8" casing from otel.	njection and with ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" on well 25 7" casi n 920 psi to 700 p	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves or '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 '10M Gate Valve, and ng outlet valve and 1 bsi. Shut in. Well 25 '10M Gate Valve, and ng outlet valve and 1 bsi. Shut in. Well 25 '10M Gate Valve, and '10M Gate Valve, a	Ine from tubing head ine from tubing head head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 1-3/4" casing outle 7" - 584 psi. 11-5 for coiled tubing op t Name	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves. /16" 15M I t valve. 7" 3/4" - 771 ;	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same valves. Insta Installed tapp OSA on upper - 585 psi. 11	manum manum Insta alled 2- ed flan r maste -3/4" -	e
11:45 12:30 13:00 15:00 16:00 17:30	12:30 13:00 15:00 15:00 16:00 17:30 18:00 18:00 3 25B. Rig	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 2" LP comparing 2" LP comparing 2" LP comparing 2" LP needle Nippled up 2- Installed Rote Well 25A: Bill Traveled to h	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 ps ing kill lateral from w and withdraw lateral casing head. Remo LP companion flange inon flanges with 2" ( valves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from otel.	njection and with ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" on well 25 7" casi n 920 psi to 700 p	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves on '10M Gate Valve, an ing outlet valve and 1 osi. Shut in. Well 25 '10M Gate Valve, an ing outlet valve and 1 osi. Shut in. Well 25 ' ected Operations and tubing. Prepare Approvals Prin	Ines from 250 ps rations. (10:50) W ine from tubing head g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 (1-3/4" casing outle to roiled tubing op for coiled tubing op t Name	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves. /16" 15M I t valve. 7" 3/4" - 771 ;	Met with Wea /4" casing pre ed 3-1/8" 5M /alve on same valves. Insta Installed tapp OSA on upper - 585 psi. 11	manum manum insta alled 2- ed flan maste	e
11:45 12:30 13:00 15:00 16:00 17:30	12:30 13:00 15:00 16:00 17:30 18:00 18:00 8 25B. Rig Signature I	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 2" LP compative 2" LP needle Nippled up 2- Installed Rote Well 25A: Bil Traveled to h	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flanges with 2" to valves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from otel. to pump and flow from Representative ots Representative	njection and withe ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" OM DSA, 4-1/16" on well 25 7" casi n 920 psi to 700 p Proj om casing annuli a	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves on '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 'Approvals Prin Prin Dann	Ines from 250 ps rations. (10:50) W ine from tubing head g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 (1-3/4" casing outle to 7" - 584 psi. 11-5 for coiled tubing op t Name t Name y Walzel	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves. /16" 15M I t valve. 7" 3/4" - 771 ;	Met with Wea	manum manum . Insta alled 2- ed flan r maste -3/4" - Dat	e e
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11:45 12:30 13:00 15:00 16:00 17:30	12:30 13:00 15:00 15:00 16:00 17:30 18:00 18:00 8:25B, Rig Signature I Signature I Employee Na Danny ClayI	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2" 12" LP compative 2" LP needle Nippled up 2- Installed Rote Well 25A: Bil Traveled to h Installed Rote Well 25A: Bil Traveled to h Solots and Coc ame H on	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flanges with 2" to valves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing from otel. to pump and flow from Representative pts Representative lours on Location 10.5	njection and withe ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" OM DSA, 4-1/16" OM vell 25 7" casi n 920 psi to 700 p Proj om casing annuli a Travel Hours 1	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves on '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 'Approvals Prin Prin Dann	Ines from 250 ps rations. (10:50) W ine from tubing head g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 (1-3/4" casing outle to 7" - 584 psi. 11-5 for coiled tubing op t Name t Name y Walzel	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves. /16" 15M I t valve. 7" 3/4" - 771 ;	Met with Wea	manum manum . Insta alled 2- ed flan r maste -3/4" - Dat	e e
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11:45 12:30 13:00 15:00 16:00 17:30	12:30 13:00 15:00 16:00 17:30 18:00 18:00 8:25B. Rig Signature I Signature I Employee Na Danny Clayt Danny Watz	Isolated wells representativ decreased fro Removed tub Lunch Removed kill valve from 7" 3-1/8" 5M 2"   2" LP compative 2" LP needle Nippled up 2- Installed Rote Well 25A: Bil Traveled to h Installed Rote Well 25A: Bil Traveled to h Boots and Coo	823 psi. 25A and 25B from i e to discuss equipmon m 830 psi to 750 psi ing kill lateral from w and withdraw lateral casing head. Remo LP companion flanges with 2" to valves on kill and wi 9/16" 5M x 4-1/16" 1 emount transducers ed 8-5/8" casing fromo otel. to pump and flow from Representative bits Representative lours on Location 10.5 10.5	njection and withe ent requirements ii. vell 25. s from 7" casing s oved 2-1/6" 5M m es with 2" tapped apped bull plugs th draw lines. OM DSA, 4-1/16" OM DSA, 4-1/16" OM vell 25 7" casi n 920 psi to 700 p Proj om casing annuli a Travel Hours 1 1	draw lines. Blew dow for coiled tubing oper spool and with draw I anumatic from tubing bull plugs with needle with needle valves on '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 '10M Gate Valve, an ing outlet valve and 1 bsi. Shut in. Well 25 'Approvals Prin Prin Dann	Ines from 250 ps rations. (10:50) W ine from tubing head g head. Installed 2- es valve on 7" annu n tubing head casin d 4-1/16 10M x 4-1 (1-3/4" casing outle to 7" - 584 psi. 11-5 for coiled tubing op t Name t Name y Walzel	si to 0 psi. ell 25 11-3 d. Remov 1/16" 5M v ilus casing g valves. /16" 15M I t valve. 7" 3/4" - 771 ;	Met with Wea	manum manum . Insta alled 2- ed flan r maste -3/4" - Dat	e e

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6:30	7:15	Traveled 1	from hotel to loca	tion.		rionnij on one							
7:15	7:30	Attended	morning safety/or	perations meet	ing. Performed sit	te assessment. We	ell 25: TI	g - Shu	in. 7	" - 574 psi. 1	1-3/4"	- 716 ps	si.
7:30	9:30	Checked	surface casing pr	essure on 25A	- 52 psi Removed	d click line againme	mit for mit	Ded 2E	O		hales i	manifold	2.
9:30	11:00	Removed	anterenter for Dans										1.4
	11.00				head outlet valves	s. Installed 2-1/16"	x 1502	thread h	alf ada	apter flanges	on san	ne.	
	11.00	Removed			head outlet valves		x 1502	thread h	alf ada	apter flanges	on san	ne.	
		Removed valve.	companion flang	e from 7" casir	head outlet valves ng outlet valve. Ins	s. Installed 2-1/16" stalled 3-1/8" 5M x	x 1502 1502 th	thread h read half	alf ada adapi	apter flanges ter flange. In:	on san	ne.	
11:00	12:30	Removed valve. Lined up o	companion flang	e from 7" casin 5A tubing press	head outlet valves ng outlet valve. Ins sure 2,600 psi, 8-5	s. Installed 2-1/16"	x 1502 1502 th 25: 7" -	thread h read half 576 psi	alf ada adapt	apter flanges ter flange. In: /4" - 737 psi.	on san stalled	ne. 1" plug	5
11:00	12:30	Removed valve. Lined up o Pumped 3 889 psi. N	companion flang on 25A tubing. 25 30 bbls 8.7 ppg pd	e from 7" casin 5A tubing press olymer pill. Dis	head outlet valves ng outlet valve. Ins sure 2,600 psi, 8-5 splaced with 152 bl	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi. Well	x 1502 1502 th 25: 7" -	thread h read half 576 psi h. Tubin	alf ada adapt 11-3/ g pres	apter flanges ter flange. In: /4" - 737 psi. sure 550 psi.	on san stalled	ne. 1" plug	5
11:00	12:30	Removed valve. Lined up o Pumped 3 889 psi. V Lunch.	companion flang on 25A tubing. 2 30 bbls 8.7 ppg p Nell 25: 7" - 578	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" -	head outlet valves ng outlet valve. In sure 2,600 psi. 8-5 placed with 152 bl 749 psi. Well 25A	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI 5: Bled 8-5/8" casin	x 1502 1502 th 25: 7" hut down g from 8	thread h read half 576 psi 576 psi 576 psi 576 psi 589 psi to	alf ada adapt 11-3/ g pres 770 j	apter flanges ter flange. In: '4" - 737 psi. sure 550 psi. psi. Shut in.	on san stalled 8-5/8	ne. 1" plug " casing	5
11:00	12:30	Removed valve. Lined up o Pumped 3 889 psi. M Lunch. Removed	companion flang on 25A tubing. 29 30 bbls 8.7 ppg po Nell 25: 7" - 578 gauges and 3-1/	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani	head outlet valves ng outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7"	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi. Well bls 8.5 ppg KCI. St	x 1502 1502 th 25: 7" hut down g from 8	thread h read half 576 psi 576 psi 576 psi 576 psi 589 psi to	alf ada adapt 11-3/ g pres 770 j	apter flanges ter flange. In: '4" - 737 psi. sure 550 psi. psi. Shut in.	on san stalled 8-5/8	ne. 1" plug " casing	5
11:00 12:30 13:00	12:30 13:00 13:30	Removed valve. Lined up of Pumped 3 889 psi. V Lunch. Removed flange. In	companion flang on 25A tubing. 25 30 bbls 8.7 ppg po Nell 25: 7" - 578 gauges and 3-1/ istalled 1" plug vi	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge	head outlet valves ing outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" 25.	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI bled 8-5/8" casin casing outlet valve	x 1502 1502 th 25: 7" hut down g from 8	thread h read half 576 psi 576 psi 576 psi 576 psi 589 psi to	alf ada adapt 11-3/ g pres 770 j	apter flanges ter flange. In: '4" - 737 psi. sure 550 psi. psi. Shut in.	on san stalled 8-5/8	ne. 1" plug " casing	5
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11:00 12:30 13:00 13:30	12:30 13:00 13:30 14:00	Removed valve. Lined up of Pumped 3 889 psi. M Lunch. Removed flange. In Well 25A: Filled 25A Met with v	companion flang on 25A tubing. 25 30 bbls 8.7 ppg p Nell 25: 7" - 578 gauges and 3-1/ istalled 1" plug v Bled 8-5/8" casi x 2-7/8" x 8-5/8" a velder to díscuss	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nnulus with 205 fabricating valv	head outlet valves ag outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. am 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI x: Bled 8-5/8" casin casing outlet valve i.	x 1502 1502 th 25: 7" - hut down g from 8 . Install and 600	thread half 576 psi 576 psi 389 psi to ed 3-1/8 psi on 2	alf ada adapt 11-3/ g pres 770 p '5M x 2-7/8"	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled 8-5/8 half ad	ne. 1" plug " casing	5
11:00 12:30 13:00 13:30 14:00 15:45	12:30 13:00 13:30 14:00 15:45 16:30	Removed valve, Lined up of Pumped 3 889 psi. M Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7	companion flang on 25A tubing. 25 30 bbls 8.7 ppg p Nell 25: 7" - 578 gauges and 3-1/ istalled 1" plug v Bled 8-5/8" casi x 2-7/8" x 8-5/8" a velder to díscuss " - 584 psi. 7" x 1	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nnulus with 205 fabricating valv	head outlet valves ag outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. am 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. Sl bled 8-5/8" casin casing outlet valve i. t 50 psi on annulus	x 1502 1502 th 25: 7" - hut down g from 8 . Install and 600	thread half 576 psi 576 psi 389 psi to ed 3-1/8 psi on 2	alf ada adapt 11-3/ g pres 770 p '5M x 2-7/8"	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled 8-5/8 half ad	ne. 1" plug " casing	5
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11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00	Removed valve. Lined up of Pumped 3 889 psi. M Lunch. Removed flange. In Well 25A; Filled 25A Met with v 2-7/8" x 7' Traveled 1	companion flang on 25A tubing. 23 30 bbls 8.7 ppg pe Nell 25: 7" - 578 gauges and 3-1/ istalled 1" plug v. Bled 8-5/8" casi v2-7/8" x 8-5/8" a velder to díscuss " - 584 psi. 7" x 1 to hotel.	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nnulus with 203 fabricating valv 11-3/4" - 727 ps	head outlet valves ag outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Pre	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI casing outlet valve i. t 50 psi on annulus le to operate wellhe perations pare for coiled tubin	x 1502 1502 th 25: 7" - hut down g from 8 . Install and 600 rad ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapt 11-3/ g pres 770 p '5M x 2-7/8"	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled 8-5/8 half ad	ne. 1" plug " casing	5
11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00	Removed valve. Lined up of Pumped 3 889 psi. V Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7' Traveled 1	companion flang on 25A tubing. 23 30 bbls 8.7 ppg pe Nell 25: 7" - 578 gauges and 3-1/ istalled 1" plug v. Bled 8-5/8" casi v2-7/8" x 8-5/8" a velder to díscuss " - 584 psi. 7" x 1 to hotel.	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nulus with 20 fabricating valv 11-3/4" - 727 ps	head outlet valves ag outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si.	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI casing outlet valve i. t 50 psi on annulus le to operate wellhe perations pare for coiled tubin	x 1502 1502 th 25: 7" - hut down g from 8 . Install and 600 rad ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapt 11-3/ g pres 770 p '5M x 2-7/8"	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled 8-5/8 half ad	ne. 1" plug " casing lapter	5
11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00	Removed valve. Lined up of Pumped 3 889 psi. V Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7' Traveled 1	companion flang on 25A tubing. 23 30 bbls 8.7 ppg p4 Well 25: 7" - 578 gauges and 3-1/ istalled 1" plug v: Bied 8-5/8" casi 2-7/8" x 8-5/8" a velder to discuss " - 584 psi. 7" x 1 to hotel.	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nulus with 20 fabricating valv 11-3/4" - 727 ps	head outlet valves ag outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Pre	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI casing outlet valve i. t 50 psi on annulus le to operate wellhe perations pare for coiled tubin vals	x 1502 1502 th 25: 7" - hut down g from 8 . Install and 600 rad ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapt 11-3/ g pres 770 p '5M x 2-7/8"	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled 8-5/8 half ad	ne. 1" plug " casing lapter	5
11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00 Rig up on	Removed valve. Lined up of Pumped 3 889 psi. M Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7' Traveled 1 Well 25 to p	companion flang on 25A tubing. 23 30 bbls 8.7 ppg p4 Well 25: 7" - 578 gauges and 3-1/ istalled 1" plug v: Bied 8-5/8" casi 2-7/8" x 8-5/8" a velder to discuss " - 584 psi. 7" x 1 to hotel.	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nnulus with 203 fabricating valv [1-3/4" - 727 ps	head outlet valves ag outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Pre	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI casing outlet valve i. t 50 psi on annulus le to operate wellhe perations pare for coiled tubin vals	x 1502 1502 th 25: 7" - hut down g from 8 . Install and 600 rad ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapt 11-3/ g pres 770 p '5M x 2-7/8"	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled 8-5/8 half ad	ne. 1" plug " casing lapter te	5
11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00 Rig up on	Removed valve. Lined up of Pumped 3 889 psi. M Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7' Traveled 1 Well 25 to p	companion flang on 25A tubing. 25 30 bbls 8.7 ppg pd Nell 25: 7" - 578 gauges and 3-1/ istalled 1" plug vi Bled 8-5/8" casi 2-7/8" x 8-5/8" a velder to díscuss " - 584 psi. 7" x 1 to hotel.	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nnulus with 203 fabricating valv [1-3/4" - 727 ps	head outlet valves ag outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Pre	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI casing outlet valve i. t 50 psi on annulus le to operate wellhe to operate wellhe perations pare for coiled tubin /als Print Name	x 1502 1502 th 25: 7" - hut down g from 8 and 600 and ball and 600 and ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapt 11-3/ g pres 770 p '5M x 2-7/8"	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled half ad hut in.	ne. 1" plug " casing lapter te	5
11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00 Rig up on	Removed valve. Lined up of Pumped 3 889 psi. M Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7" Traveled 1 Traveled 1 well 25 to p well 25 to p	companion flang on 25A tubing. 25 30 bbls 8.7 ppg pd Nell 25: 7" - 578 gauges and 3-1/ istalled 1" plug vi Bled 8-5/8" casi 2-7/8" x 8-5/8" a velder to díscuss " - 584 psi. 7" x 1 to hotel.	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nnulus with 203 fabricating valv 11-3/4" - 727 ps	head outlet valves ing outlet valves. Ins sure 2,600 psi, 8-5 iplaced with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Prej Approv	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI Bled 8-5/8" casin casing outlet valve i. t 50 psi on annulus le to operate wellhe to operate wellhe perations pare for coiled tubin vals Print Name	x 1502 1502 th 25: 7" - hut down g from 8 and 600 and ball and 600 and ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapi 11-3/ g pres 5 770 j ' 5M x 2-7/8" Well 2	apter flanges ter flange. In: 4" - 737 psi. sure 550 psi. psi. Shut in. 1502 thread tubing.	on san stalled 8-5/8 half ad nut in. Da	ne. 1" plug " casing lapter te	
11:00 12:30 13:00 13:30 14:00 15:45 16:30 II 25B. S E	12:30 13:00 13:30 14:00 15:45 16:30 17:00 17:00 Rig up on Signatu	Removed valve. Lined up of Pumped 3 889 psi. M Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7" Traveled flange. Well 25 to p well 25 to p ure Custom Boots and 0 me	companion flang on 25A tubing. 23 30 bbls 8.7 ppg pr Well 25: 7" - 578 gauges and 3-1/ stalled 1" plug v Bied 8-5/8" casi 2-7/8" x 8-5/8" a welder to discuss " - 584 psi. 7" x 1 to hotel.	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nnulus with 203 fabricating valv 11-3/4" - 727 ps	head outlet valves ing outlet valves. Ins sure 2,600 psi, 8-5 iplaced with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Prej Approv	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI : Bled 8-5/8" casin casing outlet valve i. t 50 psi on annulus le to operate wellhe to operate wellhe perations pare for coiled tubin /als Print Name Danny Walze	x 1502 1502 th 25: 7" - hut down g from 8 and 600 and ball and 600 and ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapi 11-3/ g pres 5 770 j ' 5M x 2-7/8" Well 2	apter flanges ter flange. In: sure 550 psi. sure 550 psi. psi. Shut in. 1502 thread tubing. 5: 2-7/8" - Si	on san stalled 8-5/8 half ad nut in. Da	ne. 1" plug " casing lapter lapter te	
11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00 Rig up on Signatu ignature B mployee Na Danny Clayte Danny Walz	Removed valve. Lined up of Pumped 3 889 psi. V Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7" Traveled 1 	companion flang on 25A tubing. 23 30 bbls 8.7 ppg pr Well 25: 7" - 578 gauges and 3-1/ istalled 1" plug vi Bied 8-5/8" casi 2-7/8" x 8-5/8" a welder to discuss " - 584 psi. 7" x 1 to hotel. Dump and flow from ner Representati Coots Representati 9.25 9.25	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nulus with 200 fabricating valu 11-3/4" - 727 ps and the second fabricating	head outlet valves ng outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension handisi. Projected Op li and tubing. Pre Approv Hours	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI : Bled 8-5/8" casin casing outlet valve i. t 50 psi on annulus le to operate wellhe to operate wellhe perations pare for coiled tubin /als Print Name Danny Walze	x 1502 1502 th 25: 7" - hut down g from 8 and 600 and ball and 600 and ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapi 11-3/ g pres 5 770 j ' 5M x 2-7/8" Well 2	apter flanges ter flange. In: sure 550 psi. sure 550 psi. psi. Shut in. 1502 thread tubing. 5: 2-7/8" - Si	on san stalled 8-5/8 half ad nut in. Da	ne. 1" plug " casing lapter lapter te	
11:00 12:30 13:00 13:00 14:00 15:45 16:30 III 25B. S E	12:30 13:00 13:30 14:00 15:45 16:30 17:00 Rig up on Signatu ignature E mployee Na Danny Clayth Danny Walz James Kopeo	Removed valve. Lined up of Pumped 3 889 psi. V Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7 Traveled 1 	companion flang on 25A tubing. 23 30 bbls 8.7 ppg pr Well 25: 7" - 578 gauges and 3-1/ stalled 1" plug v Bied 8-5/8" casi 2-7/8" x 8-5/8" a welder to discuss " - 584 psi. 7" x 1 to hotel. pump and flow from the representation Coots Representation 9-25 9-25 9-25 9-25	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 1 8" 5M compani alve and gauge ng pressure fro nulus with 200 fabricating valu 11-3/4" - 727 ps and the second second pabricating annu tabricating annu we and the second second fabricating annu the second second second pabricating annu the second second second pabricating annu the second second second pabricating annu the second second second second second second pabricating annu the second second second second second second second pabricating annu the second second second second second second second pabricating annu the second second second second second second second second pabricating annu the second second second second second second second second pabricating annu the second	head outlet valves ng outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Pre Approv Hours	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI : Bled 8-5/8" casin casing outlet valve i. t 50 psi on annulus le to operate wellhe to operate wellhe perations pare for coiled tubin /als Print Name Danny Walze	x 1502 1502 th 25: 7" - hut down g from 8 and 600 and ball and 600 ad ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapi 11-3/ g pres 5 770 j ' 5M x 2-7/8" Well 2	apter flanges ter flange. In: sure 550 psi. sure 550 psi. psi. Shut in. 1502 thread tubing. 5: 2-7/8" - Si	on san stalled 8-5/8 half ad nut in. Da	ne. 1" plug " casing lapter lapter te	
11:00 12:30 13:00 13:30 14:00 15:45 16:30	12:30 13:00 13:30 14:00 15:45 16:30 17:00 Rig up on Signatu ignature B mployee Na Danny Clayte Danny Walz	Removed valve. Lined up of Pumped 3 889 psi. V Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7 Traveled 1 	companion flang on 25A tubing. 23 30 bbls 8.7 ppg pr Well 25: 7" - 578 gauges and 3-1/ istalled 1" plug vi Bied 8-5/8" casi 2-7/8" x 8-5/8" a welder to discuss " - 584 psi. 7" x 1 to hotel. Dump and flow from ner Representati Coots Representati 9.25 9.25	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 8" 5M compani alve and gauge ng pressure fro nulus with 200 fabricating valu 11-3/4" - 727 ps and the second fabricating	head outlet valves ng outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Pre Approv Hours	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI : Bled 8-5/8" casin casing outlet valve i. t 50 psi on annulus le to operate wellhe to operate wellhe perations pare for coiled tubin /als Print Name Danny Walze	x 1502 1502 th 25: 7" - hut down g from 8 and 600 and ball and 600 ad ball	thread half read half 576 psi Tubin 89 psi to ed 3-1/8 valves.	alf ada adapi 11-3/ g pres 5 770 j ' 5M x 2-7/8" Well 2	apter flanges ter flange. In: sure 550 psi. sure 550 psi. psi. Shut in. 1502 thread tubing. 5: 2-7/8" - Si	on san stalled 8-5/8 half ad nut in. Da	ne. 1" plug " casing lapter lapter te	
11:00 12:30 13:00 13:30 14:00 15:45 16:30 I 25B. S E	12:30 13:00 13:30 14:00 15:45 16:30 17:00 Rig up on Signatu ignature E mployee Na Danny Clayth Danny Walz James Kopeo	Removed valve. Lined up of Pumped 3 889 psi. V Lunch. Removed flange. In Well 25A: Filled 25A Met with v 2-7/8" x 7 Traveled 1 	companion flang on 25A tubing. 23 30 bbls 8.7 ppg pr Well 25: 7" - 578 gauges and 3-1/ stalled 1" plug v Bied 8-5/8" casi 2-7/8" x 8-5/8" a welder to discuss " - 584 psi. 7" x 1 to hotel. pump and flow from the representation Coots Representation 9-25 9-25 9-25 9-25	e from 7" casir 5A tubing press olymer pill. Dis psi. 11-3/4" - 1 8" 5M compani alve and gauge ng pressure fro nulus with 200 fabricating valu 11-3/4" - 727 ps and the second second m casing annu- ve	head outlet valves ng outlet valve. Ins sure 2,600 psi, 8-5 placed with 152 bl 749 psi. Well 25A ion flange from 7" as. om 770 psi to 0 psi 5 bbl 8.5 KCI. Left ve extension hand si. Projected Op li and tubing. Pre Approv Hours	s. Installed 2-1/16" stalled 3-1/8" 5M x 5/8" - 940 psi, Well bls 8.5 ppg KCI. SI : Bled 8-5/8" casin casing outlet valve i. t 50 psi on annulus le to operate wellhe to operate wellhe perations pare for coiled tubin /als Print Name Danny Walze	x 1502 1502 th 25: 7" - hut down g from 8 . Install and 600 ad ball -	thread half read half 576 psi Tubin, 89 psi to ed 3-1/8"	alf adda adapi 11-3/ g pres 5 770 j ' 5M x 2-7/8" Well 2 Hours	apter flanges ter flange. In: sure 550 psi. sure 550 psi. psi. Shut in. 1502 thread tubing. 5: 2-7/8" - Si	on san stalled 8-5/8 half ad nut in. Da	ne. 1" plug " casing lapter lapter te	



17.00 D70.0	Greens Ro , TX. 7706 8884									or the date is not ar
		Date:	1-Nov-2015		Well Name an	d Number:	Standard Sens	on 25	Report #	8
-			Southern California G 12801 Tampa Ave., S	the second se		County: State:		Los Angele California	a day day and	1 m
Custon	ner Billing	Address:	Northridge, CA, 9132			Country:		USA		
Custor	mar Danta	AFE #: sentative:				I Location:	Aliso Ca	nyon Stora	age Facilit	у
			Danny Walzel			Well Type: Job Type:		Gas Well Contr	rol	
			Standard Senson 25			Rig No:	1 10 0	N/A		
		of Charge htrol Specia			ments Clayton	Units 1		Charge 11,500.00	1	Total 11,500.00
	Well Contr	ol Specialis	st 4	James	Kopecky	1	\$	10,000.00	\$	10,000.00
S		ntrol Engine pecialist	eer 4		y Walzel Baggett	1	\$	9,200.00		11,500.00
(		aily Expens			./ J.K. / M.B.	4	\$	325.00	1.11	1,300.00
	Н	otel		D.C./ D.W	. / J.K. / M.B.	4	\$	163.00	\$	652.00
	Ren	al Car				1	\$	192.00	\$	192.00
		al Car				1	\$	103.00	\$	103.00
						-			\$	
								_	\$	
					imated Daily Total				\$	44,447.00
landord	Cancon 2	E has brees	had to autors with as		Vell Summary	_				_
			ched to surface with se sing to 8,585 ft. 5-1/2"			o 8,510 ft. Pac	ker depth 8,468 f	t.		
Hour	Hour				Activity on					
6:30	7:15		from hotel to location.							
7:15	7:30		morning safety/operation d site assessment. We		tin 7"-676 pei 11	-3/4" - 600 pei				
7:45	8:30		Halliburton Coiled Tubir				pot coiled tubing	equipmen	t.	
8:30	11:15		o on 25B. Tubing press				7 ppg polymer p	ill down tub	bing. Pun	nped
11:15	11:45		3.5 ppg KCI. Shut dow Installed valve extension							
11:45	12:30	Lunch.	instance valve external	Si nanole on odler	wen nead casing val	WG.				
12:30	12:45		Tubing Pressure - 0 p				- 1,000 psi. 8-5/	6" - 140 psi	k.	
12:45	14:30		0 psi. Well 25: 2-7/8" location for coiled tubir				sed rig up require	ments for	well 25	Onvx
	1.000		fabricate 602 x 1502							-1910
14:30	16:00	the second second second	and rigged up 110T cr	the set hand, it will be all the set of the set	reel arrived at Aliso	Canyon Storag	e Facility.			
16:00	16:30	Traveled 1	end of the day meeting to hotel.							
	-									
-										
_										
	-									
				Proj	ected Operations					
ig up on	well 25 to	pump and	flow from casing annu	li and tubing. Prep	pare for coiled tubing	operations.				
					Approvals			_		
	Signatu	re Custom	ner Representative			t Name		I	Date	
	_									
	ignature E	Boots and	Coots Representative	S = 1	Prin	t Name		1	Date	
S					1	y Walzel				
			Hours on Location	Travel Hours		Employee Name	Hours of	n Location	Trav	el Hours
E	mployee Na			1 05						
E	Danny Clayto		9.25	1.25	-					
E	Danny Clayto Danny Walz	el	9.25	1.25					-	
E I J	Danny Clayto	el ky								
E I J	Danny Clayte Danny Watz James Kopee	el ky	9.25 9.25	1.25 1.25						

	Greens Ro , TX. 7700 3884				DE 4 COOTS SERVICES		This is an estima listed on this sh invoice.		
		Date: 2-Nov-2		a the second second second	Well Name and		tandard Senson 25	Repor	t# 9
	Custor	mer Name: Souther	n California Ga Fampa Ave., SC			County: State:	Los Ange Californ		
Custom	ner Billing		ige, CA, 9132			Country:	USA	a	
1		AFE #:	0.1.5.1		Well	Location:	Aliso Canyon Stor	age Fac	ility
	Contraction of the second	esentative:	Malaal			Vell Type:	Gas Well Con	tral	
Re		erated By: Danny V e - Well #: Standar				Job Type: Rig No:	N/A	troi	-
De		of Charges:	Level	Com	iments	Units	Unit Charge		Total
		ntrol Specialist	4		Clayton	1	\$ 11,500.00	_	11,500.00
	and the second se	rol Specialist ntrol Engineer	4	and the state of t	Kopecky y Walzel	1	\$ 10,000.00 \$ 11,500.00		10,000.00
51		specialist	4		Baggett	1	\$ 9,200.00		9,200.00
(	General D	aily Expense		D.C./ D.W.	. / J.K. / M.B.	4	\$ 325.00	\$	1,300.00
	н	otel		D.C./ D.W.	. / J.K. / M.B.	4	\$ 163.00		652.00
	Ron	tal Car				1	\$ 192.00	\$	192.00
		tal Car				1	\$ 103.00		103.00
								\$	2
								\$	14
				Ecti	mated Daily Total			\$	44,447.00
	-				Vell Summary			ų.	14,447.00
Hour 6:30 7:15 7:45 10:45 12:00 13:15 14:30 15:45 17:00	Hour 7;15 7;45 10:45 12:00 13:15 14:30 15:45 17:00 17:30	Rigged up return I Offloaded and spo Offloaded cab and Offloaded coiled to Offloaded coiled to (16:10) Well 25: Moved man lift to Attended end of th	erations meetir ine from 7" ann otted 1.5" coileo d injector. Well ubing power pa ubing BOP stac 11-3/4" pressu pad 25.	ulus to choke man tubing reel. 25: 2-7/8" - Shut ck, hydraulic tank k, goose neck, ge re decreased to 28	nifold. Installed panic in. 7" - 682 psi. 11- , and stripper . enerator, and two hose	25: 2-7/8" - Shut ii line. 3/4" - 638 psi, e baskets.	n. 7" - 686 psi. 11-3/4" ded tool house and hos		
17:30	18:00	Traveled to hotel.							
17:30	18:00	2. Wash through hy	resentative	1 25.		Name		Dat	
17:30	18:00	p. Wash through hy	resentative	1 25.	Approvals Print Print	Name		Dat	
17:30 ig up col	18:00	p. Wash through hy are Customer Repu	resentative	1 25.	Approvals Print Print Danny	Name Walzel	Hours on Location	Dat	
17:30 Ìig up coi	18:00	2. Wash through hy ure Customer Repr Boots and Coots R ame Hours	resentative Representative	1 25.	Approvals Print Print Danny	Name	Hours on Location	Dat	te
17:30	18:00	g. Wash through hy ure Customer Repr Boots and Coots R me Hours on el	resentative representative on Location 10.25 10.25	Il 25. Travel Hours 1.25 1.25	Approvals Print Print Danny	Name Walzel	Hours on Location	Dat	te
17:30 Rig up col	18:00	2. Wash through hy are Customer Repr Boots and Coots R ame Hours on el xy	resentative Representative on Location 10.25	Travel Hours 1.25	Approvals Print Print Danny	Name Walzel	Hours on Location	Dat	te



81-931-	Greens R , TX. 7706 8884						lis		an estimat n this she			
		Date:	3-Nov-2015		Well Name a	nd Number:	Standa	rd Sens	on 25	Repor	1#	10
	Custor	ner Name:	Southern Californ	and a second	νy	County:			Los Angele		1.1	
Custon	ner Billing	Address:	12801 Tampa Av Northridge, CA,			State: Country:			California USA	i		
-		AFE #:		51520	We	Il Location:	F	Aliso Ca	inyon Stora	ge Fac	ility	
		sentative:				Well Type:			Gas	1		
Re			Danny Walzel Standard Sensor	25		Job Type: Rig No:		-	Well Contr N/A	ol	_	_
D		of Charge			Comments	Units		Unit	Charge	-	Total	-
		ntrol Specia			Danny Clayton	1	3		11,500.00	\$		500.00
		ol Specialis			James Kopecky	1	4		10,000.00		1.0	000.00
S		ntrol Engine pecialist	eer 4 4		Danny Walzel Mike Baggett	1	9		9,200.00	\$		500.00 200.00
		aily Expens		D.C	C./ D.W. / J.K. / M.B.	4	\$		325.00	\$		300.00
		otel			C./ D.W. / J.K. / M.B.	4	\$		163.00	\$		652.00
	Deer	ol Cor			The Contract of the	-			100.00	\$	-	-
		al Car al Car				1	5		192.00	\$		192.00
						1				\$		-
										\$		÷.
			J	-	Estimated Daily Total				-	\$	44	447.00
					Well Summary					4	44,	447.00
andard	Senson 2	5 has broad	hed to surface wi	th several fissur			-					_
1-3/4" ca	asing to 99	0 ft. 7" cas	sing to 8,585 ft. 5	-1/2" slotted line	er to 8,745 ft. 2-7/8" tubing	to 8,510 ft. Pa	cker depth	8,468 f	t.			
Hour	Hour				Activity of	n Site			-			
5:45	6:00 6:30		from hotel to local		100%	E) laurela DE B		05	1.407			
0.00	0,30		2-7/8" shut in. 7"		well 25 cellar were 100%. L 4" - 599 psi	EL levels 25 h	from well	25 were	14%.	_		
6:30	7:00		morning safety/op									
7:00	7:15	and the second se	and a standard standard and a standard standard standard standards	the standard of the state of the state of the state of the	vels at cellar were 100%. L	and the second se	and the second	the second se				
7:15	12:00				generator. Began rigging u	p. Installed lin	e from tub	ing hea	d to choke	line.		
12:00	12:30	Lunch.	T400 pump truck									
12:00 12:30	12:30 17:00	Lunch. Continued	l rigging up coiled	tubing unit. (13	3:00) Well 25: 2-7/8" - Shu		si. 11-3/4"				vaco	-
		Lunch. Continued choke par	l rigging up coiled nel. Rigged up an	tubing unit. (13 d function tester	d. Function tested BOP's.	Nippled up 4-1	si. 11-3/4" /16" 10M ri	ser. Ni	ppled up Bo	OP's.	vaco	-
12:30	17:00	Lunch. Continued choke par Installed k	l rigging up coiled nel. Rigged up an till lines. Dressed	tubing unit. (13 d function tester coiled tubing ar	d. Function tested BOP's. nd installed connector. Deli	Nippled up 4-1. vered 490 bbls	si. 11-3/4" /16" 10M ri	ser. Ni	ppled up Bo	OP's.	vaco	
		Lunch. Continued choke par Installed k	l rigging up coiled nel. Rigged up an till lines. Dressed end of the day me	tubing unit. (13 d function tester coiled tubing ar	d. Function tested BOP's.	Nippled up 4-1. vered 490 bbls	si. 11-3/4" /16" 10M ri	ser. Ni	ppled up Bo	OP's.	vaco	
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12:30	17:00 17:30 18:00 Pressure	Lunch. Continuec choke par Installed k Attended Traveled f	I rigging up coiled hel. Rigged up an ill lines. Dressed end of the day me to hotel.	tubing unit. (13 d function tester coiled tubing ar seting. Will pull s. Kill well 25.	d. Function tested BOP's. nd installed connector. Deli test and pressure test in the Projected Operations Approvals	Nippled up 4-1. vered 490 bbls	si. 11-3/4" /16" 10M ri	ser. Ni	ppled up Bo	OP's.		
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			4-Nov-2015			Well Name an	d Number:	Stand	ard Se	enson 25	Repo	nt# 11
	Custor	ner Name:	Southern Califo		iny		County:	_		Los Angele		
Custon	ner Billing	Address:	12801 Tampa A Northridge, CA,				State: Country:			California USA	1	
		AFE #:					I Location:		Aliso	Canyon Stora	ige Fa	cility
		esentative:	Danny Walzel				Well Type: Job Type:	_	-	Gas Well Contr	nl	
1.0			Standard Senso	on 25			Rig No:		-	N/A	01	2000 C
		of Charge		- CO	Comme		Unit	S		it Charge		Total
	the second	ntrol Specia ol Specialis	and such as a second		Danny Cl James Ko		1		\$	11,500.00	\$	11,500.0
		ntrol Engine			Danny W	Caller an energy and the	1		\$	11,500.00		11,500.0
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(		aily Expens otel	e		.C./ D.W. / .		4		\$	325.00	\$	1,300.0
											\$	
		tal Car					1		\$	192.00	\$	192.0
	Ren	tal Car			_		1	-	\$	103.00	\$	103.0
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				1							\$	-
						ated Daily Total					\$	44,447.0
6:00	6:30	11-3/4" -		nt. LEL at Well 3	25 cellar - 4	4%. LEL 25 ft from	n well 25 0 - 5	%. 2-7/	8" - Sh	ut in 7" - 51	2 nei	
6:30 7:00 8:15 9:00 13:00 14:00 17:30 18:00	7:00 8:15 9:00 13:00 14:00 17:30 18:00 18:15	Pull tester Filled coll Held PJSI Filled state Continued BSR's to 3 Made up v Stabbed in high. Tro	k. Trouble shoo I pressure testing 300 psi low/4,000 wash assembly E njector. Tested I uble shoot leak ii end of the day m	15k lbs. bbls 10.8 ppg C ssure testing op It leak in kill line. g choke line. Ot D psi high. Teste 3HA. BOP's to 300 ps n choke manifol	aCl2. erations. Te . Tested ch bserved leal s good. ii low and 4,	ested reel to 300/6 oke line to 300/4,0 k from adapter flar 000 psi high. Tesi well for the night.	3,000 psi for 1 000 psi 5 mini nge on choke ted choke ma	0 minutes ites/test. manifold. nifold valv	s each Chang Tight /es to	test. Test go ge out two lo-t ened flange. 300 psi low a	od. orq va Teste nd 4,0	d both 00 psi
7:00 8:15 9:00 13:00 14:00 17:30 18:00	8:15 9:00 13:00 14:00 17:30 18:00 18:15 18:15	Pull tested Filled coll Held PJSI Filled state Continued BSR's to 3 Made up v Stabbed in high. Troi Attended Traveled to Traveled to testing. Wa	d coil tubing with tubing with 19.5 M to discuss pre- k. Trouble shood pressure testing 300 psi low/4,000 wash assembly E njector. Tested uble shoot leak ii end of the day m	15k lbs. bbls 10.8 ppg C ssure testing op it leak in kill line. g choke line. Ot D psi high. Tests 3HA. BOP's to 300 ps n choke manifol neeting. rates. Kill well 2 ive	Project	ested reel to 300/6 oke line to 300/4,0 k from adapter flar 000 psi high. Tesi well for the night. Ited Operations pprovals Print	3,000 psi for 1 000 psi 5 mini nge on choke ted choke ma	0 minutes ites/test. manifold. nifold valv	s each Chang Tight /es to	test. Test go ge out two lo-t ened flange. 300 psi low a	nd 4.0 nd 4.0 8/4" - 4	d both 00 psi 88 psi.
7:00 8:15 9:00 13:00 14:00 17:30 18:00 18:00	8:15 9:00 13:00 14:00 17:30 18:00 18:15 18:15 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Pull tested Filled coll Held PJSI Filled stac Continued BSR's to 3 Made up v Stabbed in high. Tron Attended Traveled 1 Traveled 1 Line Custom Boots and 0 Ime	d coil tubing with tubing with 19.5 M to discuss pre- k. Trouble shood pressure testing 300 psi low/4,000 wash assembly E njector. Tested I uble shoot leak in end of the day m to hotel.	15k lbs. bbls 10.8 ppg C ssure testing op it leak in kill line. g choke line. Ob D psi high. Tests 3HA. BOP's to 300 ps n choke manifol neeting. rates. Kill well 2 ive ntative ion Travel l	Project 5. Hours	ested reel to 300/6 oke line to 300/4,0 k from adapter flar 000 psi high. Tesi well for the night. ted Operations pprovals Print Danny	3,000 psi for 1 200 psi 5 minunge on choke ted choke ma Well 25: Tb Well 25: Tb t Name	0 minutes Ites/test. manifold. nifold valv g - Shut in	s each Chang Tight //es to 0. 7" -	test. Test go ge out two lo-t ened flange. 300 psi low a	od. orq va Teste nd 4,0 //4" - 4 Da	d both 00 psi 88 psi.
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7:00 8:15 9:00 13:00 14:00 17:30 18:00 18:00	8:15 9:00 13:00 14:00 17:30 18:00 18:15 18:15 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Pull tested Filled coll Held PJSI Filled stac Continued BSR's to 3 Made up v Stabbed in high. Tron Attended Traveled 1 Traveled 1 Line testing. Wa Boots and 0 Ime Dn el	d coil tubing with tubing with 19.5 M to discuss pre- k. Trouble shood pressure testing 300 psi low/4,000 wash assembly E njector. Tested I uble shoot leak in end of the day m to hotel.	15k lbs. bbls 10.8 ppg C ssure testing op it leak in kill line. g choke line. Ob D psi high. Tests 3HA. BOP's to 300 ps n choke manifol neeting. rates. Kill well 2 ive ntative ion Travel l	Project 5  Hours 5  Contemporate 5  Contemporate Contempo	ested reel to 300/6 oke line to 300/4,0 k from adapter flar 000 psi high. Tesi well for the night. ted Operations pprovals Print Danny	8,000 psi for 1 200 psi 5 mininge on choke ted choke ma Well 25: Tbj	0 minutes Ites/test. manifold. nifold valv g - Shut in	s each Chang Tight //es to 0. 7" -	test. Test go ge out two lo-t ened flange. 300 psi low at 523 psi. 11-3	od. orq va Teste nd 4,0 //4" - 4 Da	d both 00 psi 88 psi.
7:00 8:15 9:00 13:00 14:00 17:30 18:00 17:30 18:00 Si Si El	8:15 9:00 13:00 14:00 17:30 18:00 18:15 18:15 18:15 Signature E Signature E	Pull tested Filled coll Held PJSI Filled state Continued BSR's to 3 Made up v Stabbed in high. Tron Attended Traveled 1 Traveled 1 Lesting. Wa testing. Wa Boots and 0 Imme Dn el Xy	d coil tubing with tubing with 19.5 M to discuss pre- k. Trouble shood pressure testing 300 psi low/4,000 wash assembly E njector. Tested I uble shoot leak in end of the day m to hotel. ash through hydr her Representat Coots Represer Hours on Locat 11.5 11.5	15k lbs.         bbls 10.8 ppg C         ssure testing op         t leak in kill line.         g choke line. Ot         D psi high. Tests         3HA.         BOP's to 300 ps         n choke manifolmeeting.         rates. Kill well 2         ive         ive         ive         ion       Travel 1         0.7         0.7	Project 5  Hours 5  5	ested reel to 300/6 oke line to 300/4,0 k from adapter flar 000 psi high. Tesi well for the night. ted Operations pprovals Print Danny	8,000 psi for 1 200 psi 5 mininge on choke ted choke ma Well 25: Tbj	0 minutes Ites/test. manifold. nifold valv g - Shut in	s each Chang Tight //es to 0. 7" -	test. Test go ge out two lo-t ened flange. 300 psi low at 523 psi. 11-3	od. orq va Teste nd 4,0 //4" - 4 Da	d both 00 psi 88 psi.
7:00 8:15 9:00 13:00 14:00 17:30 18:00 17:30 18:00 Si En Si	8:15 9:00 13:00 14:00 17:30 18:00 18:15 18:15 18:15 Signature E Signature E Signature E	Pull tested Filled coll Held PJSI Filled state Continued BSR's to 3 Made up v Stabbed in high. Tron Attended Traveled 1 Traveled 1 Lesting. Wa testing. Wa Boots and 0 Imme Dn el Xy	ash through hydr ash through hydr toots Represent toots Represent to 15 toots Represent to 15 toots Represent to 15 to 1	15k lbs. bbls 10.8 ppg C ssure testing op it leak in kill line. g choke line. Ob D psi high. Tests 3HA. BOP's to 300 ps n choke manifolmeting. rates. Kill well 2 ive ntative 0n Travel 1 0.7 0.7	Project 5  Hours 5  5	ested reel to 300/6 oke line to 300/4,0 k from adapter flar 000 psi high. Tesi well for the night. ted Operations pprovals Print Danny	8,000 psi for 1 200 psi 5 mininge on choke ted choke ma Well 25: Tbj	0 minutes ites/test. manifold. g - Shut in	s each Chang Tight /es to 	test. Test go ge out two lo-t ened flange. 300 psi low at 523 psi. 11-3	od. orq va Teste nd 4,0 //4" - 4 Da	d both 00 psi 88 psi.

81-931-	Greens R , TX. 7706 8884					•	list				for the date is not ar
		Date:	5-Nov-2015		Well Name a	and Number:	Standar	d Sensor	n 25	Report #	# 12
	Custor	ner Name:	Southern Californi	the second s	any	County:			os Angele		
Custon	ner Billing	Address:	12801 Tampa Ave Northridge, CA, S			State: Country:			California USA	i	
-		AFE #:	Norminage, CA,	51520	w	ell Location:	A	liso Can	yon Stora	ge Facili	ity
		sentative:				Well Type:		100	Gas		
Re			Danny Walzel Standard Senson	25		Job Type: Rig No:		V	Vell Contr N/A	ol	
D		of Charge			Comments	Units		Unit Ch		-	Total
		ntrol Specia			Danny Clayton	1	\$	11	,500.00	\$	11,500.00
		ol Specialis		-	James Kopecky	1	\$		0,000.00		10,000.00
S		ntrol Engine	er 4		Danny Walzel Mike Baggett	1	\$		200.00	1.1.1	11,500.00
-		aily Expens		D	.C./ D.W. / J.K. / M.B.	4	\$		325.00	\$	1,300.00
	н	otel		D	.C./ D.W. / J.K. / M.B.	4	\$		163.00	\$	652.00
	Pan	tal Car		-		1	\$		192.00	\$	192.00
		tal Car		-		1 1	\$		103.00		103.00
										\$	
										\$ \$	
			1	1	Estimated Daily Total					\$	44,447.00
					Well Summary					1 •	41,411.66
landard	Senson 2	5 has broad	hed to surface with	n several fissu			-				
					ner to 8,745 ft. 2-7/8" tubing	to 8,510 ft. Pac	cker depth 8	8,468 ft.			
Hour	Hour				Activity of	on Site					
5:45	6:00 6:30	1 4 7 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7 1 4 7	from hotel to location		25 25% 151 25 4 6		0/ 2.7/08				
0.00	0,30	11-3/4" -	the second se	LEL at well	25 cellar - 25%. LEL 25 ft fi	rom well 25 0 - 5	%. 2-1/6	- Shut i	n. 7 - 50	n psi.	
6:30	7:00	and the second	morning safety/ope	arations meeti	ng.						
7:00	7:30	and the second se			Will continue trouble shootin	g choke manifold	d and retes	t coil tub	ing BOP	s	
7:30	8:00	Greased v	alve #2 on choke	manifold.							
	44.45	Dragating	insteal shales manif	fald unline to	200 mail laurand 4 000 mails	Take Makin #2 ali	J			_	
8:00	11:15				300 psi low and 4,000 psi h w and 4,000 psi high. Chan					_	
8:00 11:15 13:30	11:15 13:30 15:00	Pressure	tested lower BSR's	to 300 psi lo	300 psi low and 4,000 psi h w and 4,000 psi high. Chan and 4,000 psi high. Test g	ged out valve #2	2.	0 psi lov	v and 4,00	00 psi hig	gh.
11:15 13:30	13:30 15:00	Pressure 1 Shell teste Test good	tested lower BSR's ed choke manifold . 11-3/4" - 515 psi	to 300 psi lov to 300 psi low	w and 4,000 psi high. Chan and 4,000 psi high. Test g	ged out valve #2 ood. Tested val	2. ve #2 to 30				
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11:15 13:30 15:00 18:00	13:30 15:00 18:00 18:30 18:30 18:30 5 8 pressure Signatu ignature B Signatu ignature B Danny Clayti Danny Walz James Kopeo	Pressure f Shell teste Test good Made up v good. Test Traveled f Traveled f testing. Wa ure Custom Boots and C me on el *y	tested lower BSR's ad choke manifold . 11-3/4" - 515 psi wash assembly BH sted stripper to 300 to hotel. ash through hydrat ash through hydrat coots Representative Coots Representative 12 12 12	to 300 psi lo to 300 psi low A. Stabbed i D psi low and o psi low and o es. Kill well 2 e ttive	w and 4,000 psi high. Chan v and 4,000 psi high. Test g njector. Tested lower and u 4,000 psi high. Test good. Projected Operations 25. Approvals Pr Dar Hours 25. 5. 4. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	ged out valve #2 ood. Tested val pper pipe rams t Removed injecto int Name int Name int Name	2. ve #2 to 30 psi k pr and stood	ow and 4 d back.	,000 psi I Secured	nigh. Tei well. Date	sts
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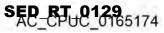


81-931-8	Greens R , TX. 7706 8884				Q			11		an estimat on this she		
		Date:	6-Nov-2015			Well Name ar	d Number:	Standa	rd Se	nson 25	Report #	# 13
	Custor	ner Name:	Southern Ca	the second se	the stand when the stand when the stand when	1	County:			Los Angele		
Custon	ner Billing	Address:	12801 Tamp Northridge, C				State: Country:			California USA	÷	
		AFE #:		. 01020		We	Location:	7	Aliso (	Canyon Stora	ge Facili	ty
		sentative:					Well Type:		1	Gas	100	
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D		of Charge		Level	Com	ments	Units		Uni	t Charge	1	Total
Sr	Well Co	ntrol Specia	alist	4	Danny	Clayton	1	3	6	11,500.00	\$	11,500.00
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(	and the second second	aily Expens	e		the second se	/ J.K. / M.B.	4		5	325.00	\$	1,300.0
	н	otel			D.C./ D.W.	. / J.K. / M.B.	4	1	5	163.00	\$	652.0
-	Par	tal Car					1 1		3	192.00	\$	192.00
		tal Car					1		5	103.00	\$	103.00
							1		-		\$	- 2
											\$	÷.
					Ecti	imated Daily Total	1				\$	44,447.00
						Vell Summary	-				14	44,447.00
andard	Senson 2	5 has broad	ched to surfac	e with seve	ral fissures on p							
-3/4" ca	asing to 99	90 ft. 7" cas	sing to 8,585	ft. 5-1/2" sl	otted liner to 8,7	45 ft. 2-7/8" tubing t	o 8,510 ft. Pad	ker depth	8,468	3 ft.		
Hour	Hour					Activity or	Site					
5:45	6:00 6:30	1	from hotel to I		at Wall 25 collar	- 44%. LEL 25 ft fro	m woll 25 0%	2 7/0"	Chidi	7" 560 0	ni .	
0.00	0.50	11-3/4" -		nentLEL	at well 25 cellar	- 44%. LEL 25 11 110	m well 25,0%.	2-110 -	Shut	n. 7 - 560 p	SI.	
6:30	7:00	and the second	morning safet	y/operation	s meeting.							
7:00	8:30					assembly BHA. Stat						
	1					BPV 300 psi low ar	d 4,000 psi hig	h. Test g	ood.	Broke circula	tion in ris	ier
8:30	9:00		of drill with ess		ick pressure with	споке.					-	
9:00	10:00					and displaced out	of the reel with	19 bbls 1	0.8 pp	g CaCl2.		
10:00	16:00					wab valve. Pressure	stabilized at 2					
			1g 2,900 psi w		Pump pressure i				to ES		5 bbls d	
-			aut af the co			6,500 psi. Tagged u						
					ols of 10.8 ppg C	aCl2. Shut down. A	pplied 3,300 p	si pressur	e. Wa	aited 10 minu	tes. Pres	ssure
		decreased	d to 2,800 psi	. Continue	ols of 10.8 ppg C d washing down a		pplied 3,300 p ,800 psi back p	si pressur ressure.	e. Wa Found	aited 10 minu bottom of h	tes. Pres ydrate pl	ssure ug
		decreased at 188 ft. returns. E	d to 2,800 psi Continued wa Experienced d	Continued ashing down	ols of 10.8 ppg C d washing down a n. At 482 ft chok nued pumping wi	aCl2. Shut down. A at 3/4 bpm holding 2 te pressure decrease thout returns. Pulled	pplied 3,300 p ,800 psi back p ed to 1,200 psi d coil tubing up	si pressur ressure. Unable t into riser	e. Wa Found o mai Bega	aited 10 minu d bottom of hy ntain back pro an pumping d	tes. Pres ydrate pli essure. Iown tubi	ssure ug Lost ng
		decreased at 188 ft. returns. E tubing hea	d to 2,800 psi Continued wa Experienced d	Continued ashing down	ols of 10.8 ppg C d washing down a n. At 482 ft chok nued pumping wi	aCl2. Shut down. A at 3/4 bpm holding 2 a pressure decrease	pplied 3,300 p ,800 psi back p ed to 1,200 psi d coil tubing up	si pressur ressure. Unable t into riser	e. Wa Found o mai Bega	aited 10 minu d bottom of hy ntain back pro an pumping d	tes. Pres ydrate pli essure. Iown tubi	ssure ug Lost ng
16:00	17:30	decreased at 188 ft. returns. E tubing hea pill.	d to 2,800 psi Continued wa Experienced d ad outlet. At 2	. Continued ashing down Irag. Contin 2 bpm PP -	ols of 10.8 ppg C d washing down a n. At 482 ft chok nued pumping wi 41 psi. At 4 bpn	aCl2. Shut down. A at 3/4 bpm holding 2 te pressure decrease thout returns. Pulle n PP - 120 psi. Com	pplied 3,300 p ,800 psi back p ad to 1,200 psi d coil tubing up tinued pumping	si pressure. pressure. Unable t into riser down tub	e. Wa Found o mai Bega ing at	aited 10 minu d bottom of hy ntain back pro an pumping d 1 bpm waitin	tes. Pres ydrate plo essure. Jown tubi ng on poly	ssure ug Lost ng ymer
16:00	17:30	decreased at 188 ft. returns. E tubing hea pill. Began put	d to 2,800 psi Continued wa Experienced d ad outlet. At 2 mping polyme	. Continued ashing down Irag. Contin 2 bpm PP - er pill 4 bpm	bls of 10.8 ppg C d washing down a n. At 482 ft chok hued pumping wi 41 psi. At 4 bpn n. Pump pressur	aCl2. Shut down. A at 3/4 bpm holding 2 te pressure decrease thout returns. Pulled	pplied 3,300 p ,800 psi back p ad to 1,200 psi d coil tubing up tinued pumping total of 62 bbls	si pressure. Unable t into riser down tub	e. Wa Found o mail Bega ing at	aited 10 minu I bottom of hy Intain back pro an pumping d 1 bpm waitin om fissures i	tes. Pres ydrate plu essure. Iown tubi ng on poly ncreased	ssure ug Lost ng ymer
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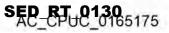
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Custon	ner Billing	Address:	12801 Tampa Av Northridge, CA,			State: Country:			California USA	1		
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Hour	Hour		ing to space in s	the states into the str	Activity on		errer separ	1 41 144				
5:45	6:00	Traveled f	rom hotel to locat	ion.								_
6:00	6:30			LEL at Well 25 cellar		m well 25 49%	. 2-7/8" -	940 p	si. 7" - 229 p	si.		
0.00	7.00			start equipment due Lt		<b>D</b>			a she was a but a s			
6:30	7:00	Slickline.	morning operation	s meeting. Discussed	bleeding off tubing.	Discussed ren	noving mu	ishrooi	n from stripp	er to n	gup	
7.00	0.45		ourse on tubing	Tubing pressure 1,100	nél							
7:00	8:45	Installed u	auge on lubing.		psi							
8:45	9:30	Monitored	well.								-	
1.000		Monitored Tubing pre	well. essure 1,146 psi.	7" - 228 psi. 11-3/4" -	59 psi. Bled tubing t		led gas a	nd fluid	I. Shut in. 7	" - 228	psi.	
8:45 9:30	9:30 10:00	Monitored Tubing pre 11-3/4" - 5	well. essure 1,146 psi. 59 psi. After 10 m	7" - 228 psi. 11-3/4" - inutes tubing pressure	59 psi. Bled tubing t increased to 1,161 p	si.						
8:45	9:30	Monitored Tubing pre 11-3/4" - 5 Tubing pre	well. essure 1,146 psi. 59 psi. After 10 m essure 1,170 psi.	7" - 228 psi. 11-3/4" -	59 psi. Bled tubing t increased to 1,161 p 60 psi. Bled tubing t	si. o 1,070 psi. B						
8:45 9:30 10:00 10:30	9:30 10:00 10:30 11:00	Monitored Tubing pre 11-3/4" - 5 Tubing pre 11-3/4" - 6 Attempted	well. essure 1,146 psi. 59 psi. After 10 m essure 1,170 psi. 50 psi. After 10 m I to shoot fluid levi	7" - 228 psi. 11-3/4" - inutes tubing pressure 7" - 231 psi. 11-3/4" - inutes tubing pressure els. Could not detect fl	59 psi. Bled tubing t increased to 1,161 p 60 psi. Bled tubing t increased to 1,226 p uid levels due to well	si. o 1,070 psi. B si. Inoise.	led gas a	nd fluid	I. Shut in. 7	" - 231	psi.	
8:45 9:30 10:00	9:30 10:00 10:30	Monitored Tubing pro 11-3/4" - 5 Tubing pro 11-3/4" - 6 Attempted Start equi	well. essure 1,146 psi. 59 psi. After 10 m essure 1,170 psi. 50 psi. After 10 m I to shoot fluid leve pment. Removed	7" - 228 psi. 11-3/4" - inutes tubing pressure 7" - 231 psi. 11-3/4" - inutes tubing pressure els. Could not detect fl mushroom from stippe	59 psi. Bled tubing t increased to 1,161 p 60 psi. Bled tubing t increased to 1,226 p uid levels due to well er. Spotted slickling t	si. o 1,070 psi. B si. noise. ınit and rigged	led gas a	nd fluid	I. Shut in. 7	" - 231	psi.	
8:45 9:30 10:00 10:30 11:00	9:30 10:00 10:30 11:00 14:00	Monitored Tubing pre 11-3/4" - 5 Tubing pre 11-3/4" - 6 Attempted Start equi 11-3/4" 60	well. essure 1,146 psi. 59 psi. After 10 m essure 1,170 psi. 50 psi. After 10 m 1 to shoot fluid leve pment. Removed 0 psi. (13:45) 2-7/	7" - 228 psi. 11-3/4" - inutes tubing pressure 7" - 231 psi. 11-3/4" - inutes tubing pressure els. Could not detect fl mushroom from stippe 8" - 1,407 psi. 7" - 227	59 psi. Bled tubing t increased to 1,161 p 60 psi. Bled tubing t increased to 1,226 p uid levels due to well er. Spotted slickling t 'psi. 11-3/4" - 60 psi	si. o 1,070 psi. B si. noise. ınit and rigged	led gas a	nd fluid	I. Shut in. 7	" - 231	psi.	
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	Custor	ner Name:	Southern Calif	and the set of the set	the state of the s		County:			Los Angele	es		
Custor	ner Billing	Address:	12801 Tampa		328		State:			California	i		
	-	AFE #:	Northridge, CA	A, 91326		Wa	Country:	1	Alien C	USA anyon Stora	na Facili	***	_
Custo	mer Repre	sentative:				we	Well Type:		1130.0	Gas	geraon	LY	-
R			Danny Walzel				Job Type:		1.1	Well Contr	ol		
			Standard Sens				Rig No:			N/A	_		
		of Charge ntrol Specia		evel 4		ments Clayton	Units 1		Unit \$	Charge 11,500.00		Total	00.00
		ol Specialis		4		Kopecky	1		р \$	10,000.00			00.00
		ntrol Engine		4		y Walzel	1		\$	11,500.00			00.0
	the second s	pecialist		4		Baggett	1		\$	9,200.00	\$		00.0
1.0		aily Expens	e			./ J.K. / M.B.	4		\$	325.00	\$		00.0
	Н	otel			D.C./ D.W.	. / J.K. / M.B.	4		\$	163.00	\$ \$	6	52.00
	Ren	al Car					1	4	\$	192.00	\$	1	92.00
		al Car					1		\$	103.00	\$		03.00
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			-		-	-	-		_		\$	-	2
			J	1	Esti	imated Daily Total					\$	44.4	47.00
						Vell Summary							
			hed to surface										
_		0 ft. 7" cas	sing to 8,585 ft.	. 5-1/2" slot	ted liner to 8,74	45 ft. 2-7/8" tubing t		ker depth	8,468	ft.			
Hour	Hour					Activity or	Site	_					
5:45	6:00		rom hotel to loo		Wall 25 callar	- 100%. LEL 25 ft fr	am wall 25 25	750/ 2	7/6/		-	-i	-
0.00	0.50			ent. LLL at						1 660 nci 7'	- 718 00		
		111-3/4 - 0	5 psi.		ven 20 cenar	- 100%. LEL 25 It II	om weir 25 55	1370. 2-	7/8 -	1,660 psi, 7'	- 218 ps		-
6:30	7:00	11-3/4" - 6 Attended	5 psi. morning safety/	operations		- 100%. LEL 25 It If	om weil 25 55	- 1570. 2-	//8" - "	1,660 psi. 7'	" - 218 ps		-
7:00	8;15	Attended Continued	morning safety	Lievels, Co	meeting. ommenced ope	erations.							_
10 4 M 1 M 4	1 M 1 M	Attended Continued Began ma	morning safety/ I monitoring LE king up slicklin	L levels. Cone tools. Too	meeting. ommenced ope ol string: Spinr								_
7:00 8:15	8:15 11:15	Attended i Continued Began ma 2-7/8" - 1,	morning safety/ I monitoring LE king up slicklin 681 psi. 7" - 19	L levels, Co ne tools, Too 92 psi, 11-3	meeting. ommenced ope ol string: Spinr 3/4" - 62 psi.	erations. ner, ITL CL, Temper	ature, Pressure	, and GR	. Stab	bed lubricato	or.		_
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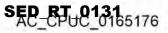
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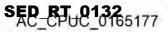
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Hour	Hour	<u> </u>			Ac	tivity on Site					
5:45											
	6:00		rom hotel to locatio			151.05.0.6		750/ 0 7	101 1 001		044
6:00	6:00 6:30	Performed	site assessment.		25 cellar: 75 - 100%.	LEL 25 ft from w	ell 25 25 -	75%. 2-7	7/8" - 1,624 psi	i. 7" -	211 psi.
6:00	6:30	Performed 11-3/4" - 7	l site assessment. 70 psi.	LEL at Well	25 cellar: 75 - 100%.	LEL 25 ft from w	ell 25 25 -	75%. 2-7	7/8" - 1,624 psi	i. 7" -	211 psi.
6:00 6:30	6:30 7:00	Performed 11-3/4" - 7 Attended	l site assessment. 70 psi. morning safety/ope	LEL at Well	25 cellar: 75 - 100%.	LEL 25 ft from w	ell 25 25 -	75%. 2-7	7/8" - 1,624 psi	i. 7" -	211 psi.
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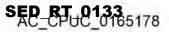
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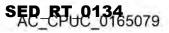
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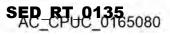
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		Date:	13-Nov-2015			Well Name a	and Number:	Stand	dard Se	enson 25	Repo	rt# 20
	Custon	ner Name:	Southern Califor	nia Gas Cor	mpany	1	County:			Los Angele	es	
Custom	ner Billing	Address:	12801 Tampa A	A DE LA DEL DE LA DEL CARA A DE LA DEL CARA	8		State:			California	ā	
	-	AFE #:	Northridge, CA,	91326		10/	Country: ell Location:		Alico	USA Canyon Stora	ac Fo	cility
Custon	ner Repre	sentative:	-				Well Type:		Aliso	Gas	ye ra	Ginty
			Danny Walzel				Job Type:			Well Contr	ol	
	Leas	e - Well #:	Standard Senso	n 25			Rig No:			N/A		
		of Charge				nents	Unit	s		nit Charge	-	Total
	And the second s	ntrol Specia	and stands in the second stands and stand and stands			Clayton	1		\$	11,500.00	and the second s	11,500.00
		ol Specialis ntrol Engine				Kopecky Walzel	1		\$	11,500.00		11,500.00
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0	General Da	aily Expense	e		D.C./ D.W.	/ J.K. / M.B.	4		\$	325.00	\$	1,300.00
	н	otel			D,C./ D.W.	/ J.K. / M.B.	4	_	\$	163.00	\$	652.00
_	Port	al Car		-			1		\$	192.00	\$	192.00
		al Car					1	_	\$	103.00	5	103.00
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				_		mated Daily Total	1			_	\$	44,447.00
2. 3. 2.	0		L			ell Summary						
			hed to surface w			5 ft. 2-7/8" tubing	10 8 510 # D	alkar dan	th 9 /6	0 A	_	
Hour	Hour		ang to 0,505 it	sioner		Activity o		acker uep	un 0,40	00 IL.		
5:45	6:00	Traveled f	rom hotel to loca	tion	_	Activity	An Site		_			
6:00	6:30											
				T LOOK LEL	readings C	leared location to	begin work 2-	7/8" - 1 2	02 psi	7" - 229 nsi		
				t. Took LEL	readings. C	leared location to	begin work. 2-	7/8" - 1,2	02 psi.	7" - 229 psi.		
6:30	7:00	11-3/4" - 8	19 psi.		10 C	leared location to issed perforating t			02 psi.	7" - 229 psi.		
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6:30	7:00	11-3/4" - 8 Attended r Installed ta 1,200 psi.	9 psi. morning safety/o argeted 90 on we Opened swab v	perations me	eeting. Discu ne. Stabbed	issed perforating t	ubing and pum d to 300/4,000 j	ping kill. psi. Test	good,	Equalized sw		
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Hour 5:45 6:00 6:30 7:30 8:30 16:30 18:00 18:00	6:00 6:30 7:30 8:30 16:30 18:00 18:15 18:15 18:15 18:15 18:15 18:15 18:15	Performed Checked 8-5/8" - 1. Bled Well Cleaned I barite pill. with good batch mix Filled frac Traveled I 	d site assessing pressures on 500 psi. 25 7" annulue ocation and e Gave to SC4 settling times er. Sucked o tank on Pad to hotel.	location. ment. Took Well 25A: is from 245 equipment. GC for revi s. (15:15) put Well 25 25 with 500 25 with 500 additional second seco	CLEL readings. C 2-7/8" - 680 psi. psi to 200 psi. B Discussed pump ew. Performed p Well 25: 2-7/8" - cellar. 11-3/4" ca 0 bbls 9.4 ppg bri bbls 9.4 ppg bri Proj	Cleared location to b 8-5/8" - 80 psi. Ch Bled gas. Shut in an bing barite pill with S bilot tests with chemi- 1.690 psi. 7" - 213 asing valve is cover ine. Modified pump Modified pump ine. Modified pump ine. Modified pump fiected Operations Approvals Prin	negin work. 2-7/8" - necked pressures o nd monitored. ICGC representative icals for 18.0 ppg p psi. 11-3/4" - 32 p ed with silt. Ordere line to pump junk s ine to pump junk s nt Name nt Name ny Walzel	n Well 25B es. Create il. Sample si. Moved d out Supe hots down	2-7/8" - 2,37 ad program for s proved to be in and rigged to er Sucker. 7" annulus.	pumpi pump up HAI	ng able L
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6:00 6:30 7:00 7:45 10:30 11:15 14:00		Performed Attended Cleaned k Began mo Began pui Increased After 170 PP - 220 p pressure Monitored 11-3/4" - 3 (15:00) 2-	A site assessment. T morning safety/oper- boation. wing chemicals for b mping 9.4 ppg CaCl pump rate to 8 bpm bbls pumped PP - 1 bosi. After displacing 1,250 psi. (11:15) S well. Flow from fise 35 psi. (13:00) 2-7/0 7/8" - 980 psi. 7" - 2 end of the day meet	ook LEL readings. (	Began mixing 22 bb sure - 1,645 psi. Sta ped PP - 1,305 psi. 9 bbls 18.0 ppg barit psi. After displacing psi. 7" - 107 psi. 1 and then began flow 0 psi. 11-3/4" - 38 ps psi. (16:00) 2-7/8" -	18.0 ppg baril ged pumps up Gas rate from e pill. Began o 45 bbls PP - 1 1-3/4" - 22 psi. v gas. (12:20) 2 si. (14:00) 2-7/ - 1159 psi. 7" -	e pill. Held to 5 bpm, fissures ind lisplacing v ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,251 psi.	d PJSM. After 50 bbls p creased followe vith 9.4 ppg Ca After displacing n increasing. i. 7" - 190 psi. 11-3/4" - 37 psi	ump ed by Cl2 : 150 7" - 1 11-	oed Pf y oil ar at 8.0 bbls p 205 ps	P - 83 psi. nd brine. bpm. bump si.
6:00 6:30 7:00 7:45 10:30 11:15 14:00 14:30	6:30 7:00 7:45 10:30 11:15 14:00 14:30 14:45	Performed Attended Cleaned k Began mo Began pui Increased After 170 PP - 220 p pressure Monitored 11-3/4" - 3 (15:00) 2- Attended	A site assessment. T morning safety/oper- boation. wing chemicals for b mping 9.4 ppg CaCl pump rate to 8 bpm bbls pumped PP - 1 bosi. After displacing 1,250 psi. (11:15) S well. Flow from fise 35 psi. (13:00) 2-7/0 7/8" - 980 psi. 7" - 2 end of the day meet	ook LEL readings. ( ations meeting. arite pill to pad 25. 2. Initial pump press 5. After 75 bbls pum 550 psi. Pumped 19 35 bbls PP - 1,367 hut down. 2-7/8" - 0 ures stopped briefly 3" - 220 psi. 7" - 190 20 psi. 11-3/4"- 39 ing. Discussed pum	Began mixing 22 bb sure - 1,645 psi. Sta ped PP - 1,305 psi. 9 bbls 18.0 ppg barit psi. After displacing psi. 7" - 107 psi. 1 and then began flow 0 psi. 11-3/4" - 38 ps psi. (16:00) 2-7/8" -	18.0 ppg baril ged pumps up Gas rate from e pill. Began o 45 bbls PP - 1 1-3/4" - 22 psi. v gas. (12:20) 2 si. (14:00) 2-7/ - 1159 psi. 7" -	e pill. Held to 5 bpm, fissures ind lisplacing v ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,251 psi.	d PJSM. After 50 bbls p creased followe vith 9.4 ppg Ca After displacing n increasing. i. 7" - 190 psi. 11-3/4" - 37 psi	ump ed by Cl2 : 150 7" - 1 11-	oed Pf y oil ar at 8.0 bbls p 205 ps	P - 83 psi. nd brine. bpm. bump si.
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6:00 6:30 7:00 7:45 10:30 11:15 14:00 14:30	6:30 7:00 7:45 10:30 11:15 14:00 14:30 14:45 14:45	Performed Attended Cleaned k Began mo Began pui Increased After 170 PP - 220 p pressure Monitored 11-3/4" - 3 (15:00) 2- Attended t Traveled t	A site assessment. T morning safety/oper- ocation. wing chemicals for t mping 9.4 ppg CaCl pump rate to 8 bpm bbls pumped PP - 1 osi. After displacing 1,250 psi. (11:15) S well. Flow from fiss 35 psi. (13:00) 2-7/1 7/8" - 980 psi. 7" - 2 end of the day meet o hotel.	ook LEL readings. ( ations meeting. arite pill to pad 25. 2. Initial pump press 5. After 75 bbls pum 35 bbls PP - 1,367 hut down. 2-7/8" - 0 ures stopped briefly 3" - 220 psi. 7" - 190 20 psi. 11-3/4"- 39 ing. Discussed pum Pro	Began mixing 22 bb sure - 1,645 psi. Sta ped PP - 1,305 psi. 9 bbls 18.0 ppg barit psi. After displacing psi. 7" - 107 psi. 1 and then began flov 0 psi. 11-3/4" - 38 ps psi. (16:00) 2-7/8" - ping another barite p jected Operations Approvals Prin	1 18.0 ppg barit ged pumps up Gas rate from e pill. Began 45 bbls PP - 1 1-3/4" - 22 psi. v gas. (12:20) 2 si. (14:00) 2-7/ - 1159 psi. 7" - nill. Will pump	e pill. Held to 5 bpm, fissures ind lisplacing v ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,500 psi. ,251 psi.	d PJSM. After 50 bbls p creased followe vith 9.4 ppg Ca After displacing n increasing. i. 7" - 190 psi. 11-3/4" - 37 psi	ump ed by Cl2 : 150 7" - 1 11-	ped PP y oil ar at 8.0 bbls p 205 ps -3/4" -	P - 83 psi. hd brine. bpm. bump si. 40 psi. 40 psi.
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6:00 6:30 7:00 7:45 10:30 11:15 14:00 14:30 14:30 Si Si En	6:30 7:00 7:45 10:30 11:15 14:00 14:30 14:45 14:45 14:45 Signatu gnature E mployee Na Danny Clayt	Performed Attended J Cleaned k Began mo Began pui Increased After 170 PP - 220 p pressure * Monitored 11-3/4" - 3 (15:00) 2- Attended i Traveled t Traveled t Boots and 0 me on el	A site assessment. T morning safety/oper- ocation. wing chemicals for t mping 9.4 ppg CaCl: pump rate to 8 bpm bbls pumped PP - 1 osi. After displacing 1,250 psi. (11:15) S well. Flow from fise 35 psi. (13:00) 2-7/1 7/8" - 980 psi. 7" - 2 end of the day meet o hotel. A stransform of the day meet o hotel.	ook LEL readings. ( ations meeting. parite pill to pad 25. 2. Initial pump press After 75 bbls pum 550 psi. Pumped 19 35 bbls PP - 1,367 hut down. 2-7/8" - 0 uures stopped briefly 3" - 220 psi. 7" - 190 20 psi. 11-3/4"- 39 ing. Discussed pum Pro Pro	Began mixing 22 bb sure - 1,645 psi. Sta ped PP - 1,305 psi. 9 bbls 18.0 ppg barit psi. After displacing psi. 7" - 107 psi. 1 and then began flov 0 psi. 11-3/4" - 38 ps psi. (16:00) 2-7/8" - ping another barite p jected Operations Approvals Prin	18.0 ppg barit ged pumps up Gas rate from e pill. Began of 45 bbls PP - 1 1-3/4" - 22 psi. v gas. (12:20) 2 si. (14:00) 2-7/ - 1159 psi. 7" - oill. Will pump ill. Will pump	e pill. Held to 5 bpm, fissures ind lisplacing v ,500 psi 2-7/8" bega 8" - 600 ps - 251 psi. 1 35 bbl 18.0	I PJSM. After 50 bbls p creased followe vith 9.4 ppg Ca After displacing in increasing. i. 7" - 190 psi. 11-3/4" - 37 psi ppg barite pill	2000 CI2 ( 150 7" - 2 11-	Ded Pf y oil at 8.0 bbls p 205 ps -3/4" -	P - 83 psi. nd brine. bpm. pump si. -40 psi. 
6:00 6:30 7:00 7:45 10:30 11:15 14:00 14:30 14:30 14:30 Si Si En	6:30 7:00 7:45 10:30 11:15 14:00 14:45 14:45 14:45 14:45 Signatu gnature B	Performed Attended I Cleaned k Began mo Began pui Increased After 170 PP - 220 p pressure * Monitored 11-3/4" - 3 (15:00) 2- Attended i Traveled t Traveled t Boots and 0 me on el ky	A site assessment. T morning safety/oper- ocation. wing chemicals for t mping 9.4 ppg CaCI: pump rate to 8 bpm bbls pumped PP - 1 osi. After displacing 1,250 psi. (11:15) S well. Flow from fise 35 psi. (13:00) 2-7/1 7/8" - 980 psi. 7" - 2 end of the day meet o hotel. A star displacing o hotel.	ook LEL readings. ( ations meeting. parite pill to pad 25. 2. Initial pump press After 75 bbls pum 550 psi. Pumped 19 35 bbls PP - 1,367 hut down. 2-7/8" - 0 ures stopped briefly 3" - 220 psi. 7" - 190 20 psi. 11-3/4"- 39 ing. Discussed pum Pro Pro Pro 0.5	Began mixing 22 bb sure - 1,645 psi. Sta ped PP - 1,305 psi. 9 bbls 18.0 ppg barit psi. After displacing psi. 7" - 107 psi. 1 and then began flov 0 psi. 11-3/4" - 38 ps psi. (16:00) 2-7/8" - ping another barite p jected Operations Approvals Prin	18.0 ppg barit ged pumps up Gas rate from e pill. Began of 45 bbls PP - 1 1-3/4" - 22 psi. v gas. (12:20) 2 si. (14:00) 2-7/ - 1159 psi. 7" - oill. Will pump ill. Will pump	e pill. Held to 5 bpm, fissures ind lisplacing v ,500 psi 2-7/8" bega 8" - 600 ps - 251 psi. 1 35 bbl 18.0	I PJSM. After 50 bbls p creased followe vith 9.4 ppg Ca After displacing in increasing. i. 7" - 190 psi. 11-3/4" - 37 psi ppg barite pill	2000 CI2 ( 150 7" - 2 11-	Ded Pf y oil at 8.0 bbls p 205 ps -3/4" -	P - 83 psi. nd brine. bpm. pump si. - 40 psi. - 40 psi. - 40 psi. - 40 psi.

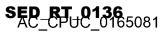


7047 W. Greens Rd. Houston, TX. 77066 281-<del>9</del>31-8884



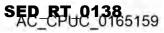
This is an estimate only for the date listed on this sheet. This is not an invoice.

General Daily Expense         D.C./ D.W. / J.K. / M.B.         4         \$ 325.00         \$ 1,300.00           Hotel         D.C./ D.W. / J.K. / M.B.         4         \$ 163.00         \$ 652.00           Rental Car         1         \$ 192.00         \$ 192.00           Rental Car         1         \$ 103.00         \$ 103.00           Rental Car         1         \$ 103.00         \$ 103.00           Sector         1         \$ 103.00         \$ 103.00								er i la companya da company Reference da companya da com					
Customer Billing Addres           Classification         Classification         Classification           Customer Representative         APE str         Vell Counton         Allo Caryon Strange preside         Gas           Report Generated By         Dank dotted Semon 25         Vell Counton         Allo Caryon Strange preside         Vell Control           Describator Table [Bandad Semon 25         Rip Mathematic Semon 25         Vell Control         Name Kopescept         1         S         10000 D         S         10000 D         S         10000 D         S         10000 D         S         100000 D         S         10000 D         S         10000 D         S         100000 D         S         100000 D         S			Date:	16-Nov-2015	5		Well N	lame and Number:	Stand	ard Sens	on 25	Repor	t# 23
Cutsom         Country:         UBA           Customer Representative:         Well Location:         Allos Caryon Storage Facility:           Customer Representative:         Well Type:         Sea           Report Generated By:         Storage Facility:         Note:           Description of Charges:         Level         Onis         Unition         Note:           Ser. Well of Charges:         Level         Comments:         Nois         Nois         1		Custom	er Name:										
AFE #         Mell Location:         Alloc Canyon Materia         Gase         Gase           Report Generated By, Damy Wateria         Job Type:         Well Control           Report Generated By, Damy Wateria         Job Type:         Well Control           Besterption of Charges:         Level         Comments         Units	Custom	her Billing /	Address:										
Customer Representative         Well Type: Jub Type: Jub Type: Jub Type: Jub Type: Well Control Rig No: Rig No: Not Control Speciality         Well Control Rig No: Not Control Speciality         Well Control Rig No: Not Control Speciality         Controments         Well Control Rig No: Not Control Speciality         Total St. Well Control Speciality         Controments         Well Control Rig No: Not Control Speciality         Total St. Well Control Rig No: Control Speciality         Total St. Not Control General Daty Expense Hele!         Control Do: // Well Control General Daty Expense Hele!         Total Do: // Well Control Rig No: Rental Car         Total St. Not Rental Car           Rental Car         Image St. Not Rig No: Rental Car         St.			AFF #		JA, 91326					Aliso Ca		de Fac	ility
Report Generated By:         Use Note:         Well Project         Well Project         Well Project         Well Project         NA           Description of Charges:         Level         Comments         Units         Unit S         Unit S         11.500.00         \$         11.500.00         \$         11.500.00         \$         10.500.00         \$	Custon	ner Repres								Aliso Ca		gerac	anty
Description of Charges:         Level         Comments         Unit Support         1         5         115000           Sr. Well Cortrol Specialist         4         James Kopedy         1         \$         100000 [\$         115000         115000         115000         115000         115000         1150000         115000					el			Job Type:			Well Contr	ol	
Sr. Weil Cartrol Specialist         4         Dammy Clayton         1         8         11.500.00         8         11.500.00         8         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00         10.000.00					nson 25			Rig No:					
Well Control Epochalist         4         James Kopekly         1         5         10,000 00         5         10,000 00           Sr. Well Control Engineer         4         Danry Watel         1         8         11,500 00         5         11,500 00         5         10,000 00			×										
Sr. Well Cantol Engineer         4         Dearny Watzel         1         5         11.500.00         5         11.600.00           General Daily Expense         D.C./ D.W. / J.K. / M.B.         4         \$         9.200.00         \$ <td></td> <td>,</td> <td></td> <td>,</td>											,		,
HSE Especialist         4         Mike Baggett         1         5         9,20000         \$         9,20000           General Dark Expense         D.C/DW./J.K /K M.B.         4         \$         32000         \$         1,3000         \$         1,30000         \$         1,30000         \$         1,30000         \$         1,30000         \$         1,30000         \$         1,30000         \$         1,30000         \$         1,30000         \$         1,30000         \$         1,300000         \$         1,300000         \$         1,3000000         \$         1,30000000         \$         1,3000000000         \$         1,30000000000000000         \$         1,3000000000000000000000000000000000000													, ,
General Daily Expense         D.C./ D.W./ J.K. / M.B.         4         \$         \$ 32500         \$         1.3000           Hotel         D.C./ D.W. / J.K. / M.B.         4         \$         16300         \$         6620           Rental Car         D.C./ D.W. / J.K. / M.B.         4         \$         16300         \$         162000			······										9,200.00
Rental Car         1         5         102.00         102.00	C	General Dai	ly Expens	e 🛛				. 4					1,300.00
Rental Car         1         §         103.00         §         102.00           Rental Car         1         \$         103.00         \$         102.00           Rental Car         1         \$         103.00         \$         102.00           Rental Car         1         \$         103.00         \$         103.00         \$           Implement Car         Implement Car         Implement Car         \$         \$         44.447.00           Well Summary           Implement Car         \$         \$         44.447.00           Well Summary           Implement Car         \$         44.447.00           Well Summary           Implement Car         \$         44.447.00           Well Summary           Implement Car         \$         44.447.00           Mediation of a State		Hot	tel			D.C./ D	.W. / J.K. / M.B	. 4		\$	163.00	\$	652.00
Rental Car         1         \$         103.00         103.00											100.00		-
Image: Second													
Image: Second		Rental Car						1		φ	103.00	· · · · · · · · · · · · · · · · · · ·	103.00
Estimated Daily Total         \$         4.4.47.01           Well Summary           Signature Customer Representative         Parter International Control         S         4.4.47.01           Well Summary           Signature Customer Representative         Signature Customer Representative         Signature Customer Representative         Projected Operations           Projected Operations           Projected Operations         Projected Operations           Signature Customer Representative         Projected Operations         Projected Operations           Signature Customer Representative         Projected Operations         Projected Operations           Contrinued from to Location         Contrinued from Sing Control (LEL sevels Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           Projected Operations           Projected Operations           Projected Operations           Contrinued from Sing Control (LEL sevels Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           Projected Operations           Projected Operations           Projected Operations           Projec													-
Well Summary           1-34 <sup>2</sup> casing to 990 ft. 7° casing to 8,565 ft. 5-12° slotted line to 8,746 ft. 2-76° tubing to 8,510 ft. Packer depth 8,468 ft.           Hour         Hour         Activity on Site           5-45         6.00         Faveled from hotel to location.         Activity on Site           6.00         6.30         Performed site assessment. Winds predominately out of the North. Took LEL readings. LEL level at the cellar - 100%.           EL level 25 from well to 100%. ELE annuel 20 from hotel to location.         For 218 psi. 11-34" - 33 psi.           6.30         Performed site assessment. Winds predominately out of the North. Took LEL readings to decrease before starting equipment.           7.00         Attended monitoring LEE around location. Cleaned -inte unit in preparation for logging operations. Filed batch mixer with 22           7.00         Attended monitoring LEE around location. Cleaned -inte unit in preparation for logging operations. Filed batch mixer with 22           7.00         13.00         Operations were shul down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           9         13.34'         Traveled to hotel.           9         11.34" - 33 psi.         Signature Customer Representative           Projected Operations           Projected Operations           Signature Customer Representative           P													-
Landard Senson 25 has broached to surface with several fissures on pad site.         1-34" casing to 900 ft. 7" casing to 8,585 ft. 5-1/2" slotted liner to 8,745 ft. 2-1/8" tubing to 8,510 ft. Packer depth 8,468 ft.         Mathematication of the several fissures on pad site.         5.456 6:00         Of Traveled from hote to location.         Calibrity on Site         5.456 1000000000000000000000000000000000000					l	E	stimated Daily	/ Total	I			\$	44,447.00
1-34* casing to 90 ft. 7** casing to 8,585 ft. 5-1/2* slotted liner to 8,745 ft. 2-7/8* tubing to 8,510 ft. Packer depth 8,468 ft.           Activity on Site           Activity on Site           6:30         Performed site assessment. Winds predominately out of the North. Took LEL readings. LEL level at the cellar - 100%.           LEL level 25 ft from well to 100%. LEL and und equipment 0.75%27/8* -1.688 psi. 7* -218 psi. 11-34* - 33 psi.           Continued monitoring LEL and und equipment 0.75%27/8* -7/8* -7/8* present barting equipment.           7.00         Attended monitoring LEL and galary meth 0.75%27/8* -7/8* -7/8* present barting equipment.         Continued monitoring LEL and galary meth 0.75%27/8* -7/8							Well Summa	iry					
Hour         Activity on Site           5:45         6:00         Traveled from hotel to location.           6:00         6:30         Performed site assessment. Winds predominately out of the North. Took LEL readings. LEL level at the cellar - 100%.           6:01         1:20         2:11         7:215 psi. 11:34" - 33 psi.           7:00         1:3:00         Continued monitoring safetyporations meeting. Will wait for LEL readings to decrease before starting equipment.           7:00         1:3:00         Continued monitoring LEUs around location. Cleaned e-line unit in preparation for logging operations. Filled batch miker with 22           1:3:00         1:3:30         Operations were shut down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2:7/8" - 1,896 psi. 7" - 211           1:3:00         1:3:44" - 33 psi.         1:3:44" - 33 psi.           1:3:30         1:3:45         Traveled to hotel.           1:3:30         1:3:45         Traveled to hotel.           1:3:30         1:3:45         Traveled to hotel.           1:3:30         1:3:46         Traveled to hotel.           1:3:30         1:3:45         Traveled to ho													
5:46         6:00         Traveled from hotel to location.           6:00         Ferformed site assessment. Winds predominately out of the North. Took LEL readings. LEL level at the cellar - 100%.           121         LEL level 25 from well to 100%. LEL around equipment 0 - 75%. 2-7/8" - 1,688 psi. 7" - 218 psi. 11-3/4" - 33 psi.           6:30         Continued monitoring LEL servel 25 from well to 100%. LEL around equipment 0 - 75%. 2-7/8" - 1,688 psi. 7" - 218 psi. 11-3/4" - 33 psi.           6:30         Continued monitoring LEL servel 25. Prepared barts pill program and submitted to SCGC for review.           Continued elenaing equipment and location.         Cleand - file unit in preparations friled batch mixer with 22           13:30         Deperations were shut down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           13:30         13:45         Traveled to hotel.           Projected Operations           P		ising to 990	) ft. 7" cas	sing to 8,585	ft. 5-1/2" sl	lotted liner to a		-	acker dept	h 8,468 f	t.		
6:00         6:30         Performed site assessment. Winds predominately out of the North. Took LEL readings. LEL level at the cellar - 100%.           6:30         7:00         Attended morning sately/operations meeting. Will wait for LEL readings to decrease before starting equipment.           7:00         Attended morning sately/operations meeting. Will wait for LEL readings to decrease before starting equipment.           7:00         Attended morning sately/operations meeting. Will wait for LEL readings to decrease before starting equipment.           7:00         Attended morning sately/operations meeting. Will wait for LEL readings to decrease before starting equipment.           7:00         Attended morning sately/operations meeting. Will wait for LEL readings to decrease before starting equipment.           7:00         Attended morning sately/operations meeting. Will wait for LEL readings to decrease before starting equipment.           7:00         Operations were shut down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           9:1         11-3/4" - 33 psi.           13:30         13:45           7:2         Traveled to hotel.           9:1         11-3/4" - 33 psi.           13:40         13:40           13:40         13:40           13:40         13:40           13:40         13:40           13:40         13:40 <td< td=""><td></td><td>L)L</td><td></td><td></td><td></td><td></td><td>Ac</td><td>tivity on Site</td><td></td><td></td><td></td><td></td><td></td></td<>		L)L					Ac	tivity on Site					
i         LEL level 25 ft from well 0 to 100%. LEL around equipment 0 - 75%. 2-78" - 128 psi. 7" - 218 psi. 11-34" - 33 psi.           6:30         7:00         Attended monining safety/operations meeting. Will wait for LEL readings to decrease before starting equipment.           0:300         Continued monitoring LEL's around location. Cleaned e-line unit in preparation for logging operations. Filed batch mixer with 22 bbits fresh water. Transported bartle pill materials to pad 25. Prepared bartle pill program and submitted to SCGC for review.           0:301         0:303         Operations were shul down for the day due to LEL levels. Assisted with DCGGR afternoon survey. 2-78" - 1,696 psi. 7" - 211 psi. 11-34". "33 psi.           13:30         13:45         Traveled to hotel.           13:40         Traveled to hotel.         Traveled to hotel.           13:40         Traveled to hotel.         Traveled to hotel.           13:40         Traveled to hotel.         Traveled to hotel.           13:41         Projected Operations         Date													
6:30         7:00         Attended morning astety/operations meeting. Will wint for LEL readings to decrease before starting equipment.           7:00         13:00         Continued monitoring LEL's around location. Cleaned e-line unit in preparation for logging operations. Filled batch mixe with 22 bils fresh water. Transported barite pill materials to pad 25. Prepared barite pill program and submitted to SGGC for review. Continued cleaning equipment and location.           13:00         13:30         Operations were shut down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           13:30         13:45         Traveled to hotel.           13:40         13:45         Traveled to hotel.           13:30         13:45         Traveled to hotel.           13:40         Traveled to hotel.         Traveled to hotel.           13:40	6:00												
13:00         Continued monitoring LEL's around location. Cleaned e-line unit in preparation for logging operations. Filled batch mixer with 22           bbb fresh water. Transported batte pill program and submitted to SCGC for review. Continued cleaning equipment and location.         13:00         Operations were shut down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2-7/8' - 1,696 psi. 7' - 211           13:00         13:45         Traveled to hotel.	6:30											psi.	
bits fresh water.         Transported barite pill materials to pad 25. Prepared barite pill program and submitted to SCGC for review.           13.00         13.30         Operations were shut down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           13.30         13.45         Traveled to hotel.           13.4         Traveled to hotel.         14.44           14.4         14.44         14.44           15.4         14.44         14.44           14.4         14.44         14.44           15.5         14.44         14.44												mixer	with 22
Image: Continued cleaning equipment and location.           13:00         Operations were shut down for the day due to LEL levels. Assisted with DOGGR afternoon survey. 2-7/8" - 1,696 psi. 7" - 211           13:00         13:45           13:00         Traveled to hotel.           13:00         13:45           14:00         14:50           14:00         14:50           14:00         14:50           15:00         14:50           14:00         15:50 <tr< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>													
nei       pei. 11-3/4" - 33 pei.         13:30       13:45         13:45       Traveled to hotel.         13:40       Traveled to hotel.         14       Traveled to hotel.         14       Traveled to hotel.         14       Traveled to hotel.         15:40       Traveled to hotel.         15:40       Traveled to hotel.         15:40       Traveled to hotel.         16:40       Traveled to hotel.         17:40       Traveled to hotel.         18:40       Traveled to hotel.         18:40       Traveled to hotel.         19:41       Traveled to hote							· · · · · · · · · · · ·	F	<u> </u>				
13:30     13:45     Traveled to hotel.       13:30     13:45       14:30     14:45       15:30     14:45       15:30     15:45       15:30     15:45       15:30     15:45       15:30     15:45       15:30     15:45       15:30     15:45       15:30     15:45	13:00	13:30	Operation	ns were shut d	lown for the	day due to L	EL levels. Assi	sted with DOGGR af	ternoon su	rvey. 2-7	7/8" - 1,696	psi. 7'	' - 211
Image: Signature Customer Representative     Print Name     Date       Signature Customer Representative     Print Name     Date       Signature Customer Representative     Print Name     Date       Signature Boots and Coots Representative     Print Name     Date       Signature Boots and Coots Representative     Print Name     Date       Imployee Name     Hours on Location     Travel Hours       Danny Waizel     7.5     0.5       James Kopedy     7.5     0.5       Mike Baggett     7.5     0.5													
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Signature Customer Representative     Print Name     Date       Signature Boots and Coots Representative     Print Name     Date       Signature Boots and Coots Representative     Print Name     Date       Danny Walzel     Travel Hours     Travel Hours     Travel Hours       Danny Clayton     7.5     0.5     Employee Name     Hours on Location     Travel Hours       James Kopecky     7.5     0.5     Image: Construction of the second							Approvale						
Signature Boots and Coots Representative     Print Name     Date       Danny Waizel       Employee Name     Hours on Location     Travel Hours       Danny Clayton     7.5     0.5       Danny Walzel     7.5     0.5       James Kopecky     7.5     0.5       Mike Baggett     7.5     0.5       Image: Colspan="3">Image: Colspan="3" Image: Colspan="3">Image: Colspan="3" Image: Colspan="3" I		Signatur	e Custom	ner Represer	ntative		Approvato				1	Da	te
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Employee Name     Hours on Location     Travel Hours       Danny Clayton     7.5     0.5       Danny Walzel     7.5     0.5       James Kopecky     7.5     0.5       Mike Baggett     7.5     0.5       Image: Clayton in the second sec	Si	anature Re	oots and	Coots Renze	sentative			Print Name			+	Dat	
Employee NameHours on LocationTravel HoursDanny Clayton7.50.5Danny Walzel7.50.5James Kopecky7.50.5Mike Baggett7.50.5LocationLocationLocationTravel HoursLocation </td <td></td> <td>gratare D</td> <td></td> <td>e sous riepie</td> <td>Semanye</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td>Da</td> <td></td>		gratare D		e sous riepie	Semanye						1	Da	
Danny Clayton         7.5         0.5           Danny Walzel         7.5         0.5           James Kopecky         7.5         0.5           Mike Baggett         7.5         0.5	-	mulares M.				Travellier		-	Т	Heres			aval U
Danny Walzel         7.5         0.5           James Kopecky         7.5         0.5           Mike Baggett         7.5         0.5					ocation			Employee Nam	ne	Hours o	n Location	T	ravel Hours
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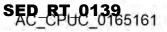


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		Date:	17-Nov-2015	5	_	Well Name a	nd Number:	Standard S	Senson 25	Repo	rt# 24
	Custor	ner Name:	Southern Ca	alifornia Ga	s Company		County:		Los Angele	tion and the state	
Custom	ner Billing	Address:	12801 Tamp				State:		California	ā	
		AFE #:	Northridge, C	CA, 91326	5	10/2	Country: ell Location:	Alice	USA Canyon Stora	an Fa	cility
Custon	ner Repre	sentative:				VVe	Well Type:	Alist	Gas	yera	Cinty
			Danny Walze	el			Job Type:		Well Contr	ol	
	Leas	e - Well #:	Standard Se	enson 25			Rig No:		N/A		
	A CONTRACTOR OF	of Charge		Level		mments	Units		nit Charge	-	Total
		ntrol Specia ol Specialis		4		ny Clayton es Kopecky	1	\$	11,500.00	-	11,500.00
		ntrol Engine		4		ny Walzel	1 1	\$	11,500.00		11,500.00
		pecialist		4		e Baggett	1	\$	9,200.00	_	9,200.00
0		aily Expens	e			N. / J.K. / M.B.	4	\$	325.00	\$	1,300.00
	н	otel			D.C./ D.V	N. / J.K. / M.B.	4	\$	163.00	\$	652.00
	D	al Cres			- C) ()	an an tach the state	4	-	400.00	\$	402.00
		al Car al Car					1	\$	192.00 103.00	\$	192.00
	Refi	al Gai		-				φ.	103,00	\$	103.00
										\$	
										\$	
					Es	stimated Daily Total	0			\$	44,447.00
_	-	-				Well Summary				_	
Hour 5:45 6:00	Hour 6:00 6:30 7:00	Performed LEL level 2-7/8" - 16	25 ft from we 68 psi. 7" - 2	ment. Wind all 0 to 100 204 psi. 1	% LEL around e 1-3/4" - 35 psi.	Activity o y out of the North. To equipment 0 - 77%. V	ook LEL readings. Winds out of the Ne	orth 40 - 50	) mph.		ment.
Hour 5:45 6:00 6:30 7:00 11:00 14:00 14:30	6:00	Performed LEL level 2-7/8" - 16 Attended Escorted Talked wit Escorted levels. 2-	I site assess 25 ft from we 368 psi. 7" - 2 morning safe HAL and T&T h B&C Houst DOGGR repro 7/8" - 1,688 p end of the da	ment. Wind all 0 to 1009 204 psi. 1 ty/operatio f crane per ton about r resentative psi. 7" - 20	% LEL around e 1-3/4" - 35 psi. ns meeting. De sonnel to wellsit elief well trajecto s to Well 25 for 9 psi. 11-3/4" -	y out of the North. To	ook LEL readings. Winds out of the Ne vait for LEL levels t nt. ce locations and V ecision was made t ation. Placed abso	orth 40 - 50 o subside l /ell 25 surv o end oper	) mph. before starting o vey data. ations for the d	equipr ay due	e to LEL
Hour 5:45 6:00 6:30 7:00 11:00 14:30 14:30 15:00	6:00 6:30 7:00 11:00 14:00 14:30 15:15 15:15 ite pill. Signature E	Performed LEL level 2-7/8" - 16 Attended Escorted Talked wit Escorted levels. 2- Attended Traveled 1 Traveled 1	I site assess 25 ft from we 368 psi. 7" - 2 morning safe HAL and T&T h B&C Houst DOGGR repre 7/8" - 1,688 p end of the dat o hotel.	ment. Wind ell 0 to 1009 204 psi. 1 ty/operatio r crane per ton about r esentative psi. 7" - 20 y meeting	% LEL around e 1-3/4" - 35 psi. ns meeting. De sonnel to wellsit elief well traject s to Well 25 for 9 psi. 11-3/4" - with state agend Pre- Pre-	y out of the North. To equipment 0 - 77%. V cision was made to w te to inspect equipme ories. Provided surfa afternoon survey. De 32 psi. Secured loc: cy representatives an ojected Operations Approvals Prin	nt Name ny Walzel	orth 40 - 50 o subside I /ell 25 surv o end oper irbent boor	0 mph. before starting ( rey data. ations for the d m across acces	equipr ay du s road	e to LEL 1.
Hour 5:45 6:00 6:30 7:00 11:00 14:00 14:30 15:00 14:30 15:00	6:00 6:30 7:00 11:00 14:00 14:30 15:00 15:15 15:15 15:15 15:15 15:15 15:15 15:15 15:15 15:15	Performed LEL level 2-7/8" - 16 Attended Escorted Talked wit Escorted levels. 2- Attended Traveled 1 Traveled 1	I site assess 25 ft from we 368 psi. 7" - 2 morning safe HAL and T&T h B&C Houst DOGGR repre 7/8" - 1,688 p end of the dat o hotel.	ment. Wind ell 0 to 1009 204 psi. 1 ty/operatio r crane per ton about r esentative psi. 7" - 20 y meeting	% LEL around e 1-3/4" - 35 psi. ns meeting. De sonnel to wellsit elief well trajects s to Well 25 for 9 psi. 11-3/4" - with state agend Pre- Pre- Travel Hours	y out of the North. To equipment 0 - 77%. V cision was made to w te to inspect equipme ories. Provided surfa afternoon survey. De 32 psi. Secured loc: cy representatives an ojected Operations Approvals Prin	nt Name	orth 40 - 50 o subside I /ell 25 surv o end oper irbent boor	) mph. before starting o vey data. ations for the d	equipr ay du s road	e to LEL 4.
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Hour 5:45 6:00 6:30 7:00 11:00 14:30 14:30 15:00 15:00	6:00 6:30 7:00 11:00 14:00 14:30 15:00 15:15 15:15 15:15 15:15 15:15 15:15 15:15 15:15 15:15	Performed LEL level 2-7/8" - 16 Attended Escorted Talked wit Escorted levels. 2- Attended Traveled 1 Traveled 1 	I site assess 25 ft from we 368 psi. 7" - 2 morning safe HAL and T&T h B&C Houst DOGGR repre 7/8" - 1,688 p end of the dat o hotel.	ment. Wind ell 0 to 1009 204 psi. 1 ty/operatio r crane per ton about r esentative psi. 7" - 20 y meeting	% LEL around e 1-3/4" - 35 psi. ns meeting. De sonnel to wellsit elief well trajects s to Well 25 for 9 psi. 11-3/4" - with state agend Pre- Pre- Travel Hours	y out of the North. To equipment 0 - 77%. V cision was made to w te to inspect equipme ories. Provided surfa afternoon survey. De 32 psi. Secured loc: cy representatives an ojected Operations Approvals Prin	nt Name ny Walzel	orth 40 - 50 o subside I /ell 25 surv o end oper irbent boor	0 mph. before starting ( rey data. ations for the d m across acces	equipr ay du s road	e to LEL 4.

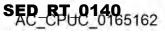
81-931-6	Greens Ro TX. 7706 3884				Q			lis		n estimati this she			
		Date:	18-Nov-2015	5		Well Name a	nd Number:	Standa	rd Senso	on 25	Report	#	25
	Custon	ner Name:	Southern Cal	the state of the second st	and the second		County:		-	Los Angele		÷	
Custon	ner Billing	Address:	12801 Tampa		9328		State:			California	4	_	
		AFE #:	Northridge, C	JA, 91326		We	Country:		Aliso Car	nyon Stora	ne Facil	ity	
Custor	mer Repre	sentative:					Well Type:			Gas	geraon	ity	
Re			Danny Walze				Job Type:			Well Contro	ol		
			Standard Ser				Rig No:			N/A	-	_	
		of Charge		4		nments / Clayton	Units 1	3		harge 1,500.00	\$	Total	500.00
	the second s	ol Specialis		4		Kopecky	1	1 1		0,000,00	1		00,000
		ntrol Engine		4	the second s	y Walzel	1	5		1,500.00	and a second sec		500.00
		pecialist		4		Baggett	1	\$		9,200.00	\$	9,3	200.00
	A set of the set of the set of the set of the	rol Enginee		1		HARGE	1	\$		4,000.00	\$		-
		aily Expension otel	e			. / J.K. / M.B.	4	4		325.00	\$		300.00
					D.0.7 D.W	CALMANNA WILLS.	+	4		100.00	\$		-
		al Car					1	\$		192.00	\$		192.00
	Rent	al Car					1	\$		103.00	\$		103.00
							-		-	-	\$	_	
			1	-	Fet	imated Daily Total		1			\$	44	447.00
						Well Summary	-				+		
tandard	Senson 2	5 has broac	hed to surfac	e with seve	ral fissures on p	A series and a series of the s						_	
1-3/4" ca	asing to 99					45 ft. 2-7/8" tubing		ker depth	8,468 ft				
Hour	Hour					Activity of	n Site						
5:45 6:00	6:00	1.0.0	from hotel to l								2000/	_	_
0.00	6:30			nent, winds	a new of contraction of the								
			25 feet from w			out of the North. To around equipment (						34 nei	
6:30	7:00			well - 0 to 10	00%. LEL level	out of the North. To around equipment o ussed pumping bari	- 100%. 2-7/8					34 psi.	-
6:30 7:00	7:00 8:00	Attended i	morning safet	well - 0 to 10 ty/operation	00%. LEL level s meeting. Disc	around equipment C	) - 100%. 2-7/8' te pill.	- 1,597 p	si. 7" - 1	199 psi. 11	1-3/4" - :		
7:00 8:00	8;00 9:00	Attended I Identified Continued	morning safet location north I monitoring L	well - 0 to 10 ty/operations of well pad .EL around v	00%. LEL level s meeting. Disc 25 to spot pum well pad 25.	around equipment C cussed pumping bari p, frac tanks, and ba	) - 100%. 2-7/8' te pill. atch mixer. Beg	- 1,597 p an prepar	si. 7" - ' ing locat	199 psi. 1 ion for equ	1-3/4" - : upment.		
7:00	8;00	Attended i Identified Continued Began mix	morning safet location north I monitoring L king 35 bbls 1	well - 0 to 10 ty/operations of well pad EL around v 8.0 ppg bar	00%. LEL level s meeting. Disc 25 to spot pum well pad 25. ite pill. Began p	around equipment C cussed pumping bari p, frac tanks, and ba pumping 9.4 ppg Ca	) - 100%. 2-7/8' te pill. atch mixer. Beg Cl2 down tubing	- 1,597 p an prepar . Began j	si. 7" - ' ing locat pumping	ion for equ at 0.5 bpn	1-3/4" - : uipment. n. Pump	>	
7:00 8:00	8;00 9:00	Attended i Identified Continued Began mix pressure -	morning safet location north I monitoring L king 35 bbls 1 - 1,650 psi. S	well - 0 to 10 ty/operations of well pad EL around v 8.0 ppg bar	00%. LEL level s meeting. Disc 25 to spot pum well pad 25. ite pill. Began p	around equipment C cussed pumping bari p, frac tanks, and ba	) - 100%. 2-7/8' te pill. atch mixer. Beg Cl2 down tubing	- 1,597 p an prepar . Began j	si. 7" - ' ing locat pumping	ion for equ at 0.5 bpn	1-3/4" - : uipment. n. Pump	>	
7:00 8:00 9:00	8;00 9:00	Attended i Identified I Continued Began mix pressure - unloaded Held PJSI	morning safet location north I monitoring L king 35 bbls 1 1,650 psi. S tubing. M.	well - 0 to 10 ty/operations of well pad .EL around v 18.0 ppg bar staged pump	00%. LEL level s meeting. Disc 25 to spot pum well pad 25. ite pill. Began p os to 5 bpm. Aft	around equipment C cussed pumping bari p, frac tanks, and ba pumping 9.4 ppg Ca ter 50 bbls pump pre	i - 100%. 2-7/8 te pill. atch mixer. Beg Cl2 down tubing sssure - 65 psi.	- 1,597 p an prepar . Began ( Shut dow	si. 7" ing locat pumping n. Perfo	199 psi. 1 ion for equ at 0.5 bpn rations cle	1-3/4" - : lipment. n. Pump ar. Wel	5 	
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7:00 8:00 9:00 10:00	8:00 9:00 10:00 10:15	Attended I Identified Continued Began mip pressure - unloaded Held PJSI Began put Observed increased 1,838 psi. with 13 bb	morning safet location north I monitoring L king 35 bbls 1 - 1,650 psi. S tubing. M. mping 9.4 ppg brine and oil to 987 psi. A At 230 bbls pls at 8.0 ppm	well - 0 to 10 ty/operations of well pad EL around v 8.0 ppg bar staged pump g CaCl2. St from fissure After 100 bbl pump PP - 1. PP - 1,33	00%. LEL level s meeting. Disc 25 to spot pum well pad 25. ite pill. Began p os to 5 bpm. Aft laged pumps up a. After 65 bbls. Is pumped PP - 1,830 psi. Winde 3 psi. Pumped	around equipment C sussed pumping bari p, frac tanks, and ba bumping 9.4 ppg Ca ter 50 bbls pump pre to 6.0 bpm. PP - 1: pumped increased p 1,116 psi. After 130 s began shifting out 17 bbls at 6.0 bpm.	<ul> <li>100%. 2-7/8' te pill.</li> <li>ttch mixer. Beg</li> <li>Cl2 down tubing</li> <li>cssure - 65 psi.</li> <li>25 psi. At 45 bt</li> <li>pump rate to 8 b</li> <li>bbls pumped ii</li> <li>of the North. Pi</li> <li>Pump pressure</li> </ul>	- 1,597 p an prepar . Began j Shut dow ls pumpe pm. PP - ncreased imped 35 123 psi.	si. 7" ing locat pumping n. Perfo d gas ind 225 psi. pump ra bbl 18.0 Pumped	199 psi. 1 ion for equ at 0.5 bpn rations cle creased fro At 70 bbl te to 9.0 bp ppg barite 1 10 bbls a	1-3/4" - : uipment. n. Pump ar. Wel bm fissui ls pumpe pm. PP e pill. Di t 4 bpm.	re. ed PP - splace	
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	Custor	ner Name:	Southern California C			County:		Los Angele	the set of the set	
Custon	ner Billing	Address:	12801 Tampa Ave., 4			State:		California	i	
		AFE #:	Northridge, CA, 913	326	We	Country: Il Location:	Alise	USA Canyon Stora	de Fa	cility
Custor	mer Repre	sentative:				Well Type:	7.000	Gas	gota	unity
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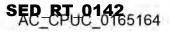
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		Date:	20-Nov-2015		Well Name ar	nd Number:	Standard S	enson 25	Repo	nt# 27
	Custor	and the second se	Southern California G	as Company		County:		Los Angele		4 W _ []
Custom	er Billing	Address:	12801 Tampa Ave., S	C 9328		State:		California		
ouston	ier Dinnig		Northridge, CA, 913	26	1	Country:		USA		
Pustan		AFE #:			We	Il Location:	Aliso	Canyon Stora	ige Fa	cility
		esentative:	Danny Walzel			Well Type: Job Type:	_	Gas Well Contr	ent.	
Ne			Standard Senson 25			Rig No:		N/A	01	
De		of Charge	the second s	Com	ments	Units	U	nit Charge	-	Total
		ntrol Specia			Clayton	1	\$	11,500.00	\$	11,500.00
v	Nell Contr	rol Specialis	st 4	James	Kopecky	1	\$	10,000.00	\$	10,000,00
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0	Conoral D	aily Expens		DCIDW	/ J.K. / M.B.		\$	325.00	\$	1,300.00
		otel		and the second sec	/ J.K. / M.B.	4	\$	163.00		652.00
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					mated Daily Total				\$	44,447.00
and a local state	C	E ho- h	had to see the second		Vell Summary		_		_	
			ched to surface with se sing to 8,585 ft. 5-1/2'			0.8510 ft Dankow	denth 9 4	68 ft	_	
Hour	Hour		sing to 0,000 it. 0°1/2	Slotted lifer to 0,74	Activity or		uepin 0,4	00 IL.	_	
5:45	6:00	Travelad	from hotel to location.		, with the second secon					
6:00	6:30	Performer	d site assessment. Wi	ods predominately o	ut of the North To	ok I EL readions	El level a	the cellar - 1	00%	
	C. C. C. C.		25 feet from well - 0 to							26 pai
0.00	7.00				around equipment o	- 100 /0. 2-1/0 -	,000 par.	7 - 200 pai. 1	1-0/4	- 20 pai.
6:30	7:00		morning safety/operat		Talas frame but roles	Link ( C) as ables		- 1	1.1	
7:00	7:30		rrier across road to pa manifold on well 25 to				across to	au		
11:30	12:00		ER team to pad 25 for		tubing to withdraw i	me.				_
12:00	13:00	and the second	pressure on Well 25A:	the second descent will reach be a second	5/0" 12 pci Cho					
	10.00					cked pressure on v	vell 25B: 2	2-7/8" - 2.300 p	si. 8-5	5/8" -
	1				-3/6 - 43 psi. One	cked pressure on v	vell 25B: 2	2-7/8" - 2,300 p	si. 8-8	5/8" -
13:00	17:00	1,850 psi.	2-7/8" pump line to we							
13:00	17:00	1,850 psi. Moved in		II 25. Continued pr	eparing SS-1 site fo	r pumping operation	ons. Filled	one 500 bbl fr	ac tan	
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13:00 17:00	17:00	1,850 psi. Moved in ppg CaCl	2-7/8" pump line to we 2. Filled one 500 bbl f polymer arrived. Con	II 25. Continued pro rac tank with fresh v	eparing SS-1 site fo vater. Spotted addi	r pumping operation	ons. Filled	one 500 bbl fr	ac tan	
		1,850 psi. Moved in ppg CaCl GEO Zan	2-7/8" pump line to we 2. Filled one 500 bbl f polymer arrived. Con	II 25. Continued pro rac tank with fresh v	eparing SS-1 site fo vater. Spotted addi	r pumping operation	ons. Filled	one 500 bbl fr	ac tan	
		1,850 psi. Moved in ppg CaCl GEO Zan	2-7/8" pump line to we 2. Filled one 500 bbl f polymer arrived. Con	II 25. Continued pro rac tank with fresh v	eparing SS-1 site fo vater. Spotted addi	r pumping operation	ons. Filled	one 500 bbl fr	ac tan	
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			21-Nov-2015		Well Name an	nd Number:	Standard S	Senson 25	Repo	rt# 28
	Custon	ner Name:	Southern California		1	County:		Los Angele		
Custom	ner Billing	Address:	12801 Tampa Ave., 4 Northridge, CA, 913			State: Country:		California USA	1	
		AFE #:	Nottinuge, CA, 912	520	We	Il Location:	Alis	o Canyon Stora	de Fa	cility
		sentative:	A sea door			Well Type:		Gas		
Re			Danny Walzel			Job Type:		Well Contr	ol	
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		of Charge ntrol Specia			ments Clayton	Units 1	\$	nit Charge 11,500.00	\$	Total 11,500.00
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andard	Senson 2	5 has bross	hed to surface with s						-	
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Hour	Hour				Activity or				-	
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6:00			Contraction and the second period of the		out of the North To	ok I EL readings	I EL level	at the cellar - 1	00%	
6:00	6:30	Performed	site assessment. W	inds predominately						29 pei
	6:30	Performed LEL level	d site assessment. W 25 feet from well - 0 t	inds predominately o 100%. LEL level						29 psi.
6:30	6:30 7:00	Performed LEL level Attended	d site assessment. W 25 feet from well - 0 t morning safety/operat	inds predominately o 100%. LEL level tions meeting.	around equipment 0	- 52%. 2-7/8" - 1	,628 psi. 7	" - 204 psi. 11	-3/4" -	
	6:30	Performed LEL level Attended Rigged up	d site assessment. W 25 feet from well - 0 t morning safety/operat b Batch Mixer and Pur	inds predominately o 100%. LEL level tions meeting.	around equipment 0	- 52%. 2-7/8" - 1	,628 psi. 7	" - 204 psi. 11	-3/4" -	
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6:30	6:30 7:00	Performed LEL level Attended Rigged up SS 25B w Installed u	d site assessment. W 25 feet from well - 0 t morning safety/opera 8 Batch Mixer and Pur ells. Ini-bolt adapters on S	inds predominately o 100%. LEL level tions meeting. mp Truck at SS-1. F S 25A and SS 25B.	around equipment 0 Reconfigured pump I Completed 2-7/8" p	- 52%. 2-7/8" - 1 line at SS 25 to p oump line tie in at	,628 psi. 7 ressure tes SS 25.	" - 204 psi. 11 t lubricator at S	-3/4" - S 25A	and
6:30 7:00	6:30 7:00 8:30	Performed LEL level Attended Rigged up SS 25B w Installed u	d site assessment. W 25 feet from well - 0 t morning safety/operal b Batch Mixer and Pur ells.	inds predominately o 100%. LEL level tions meeting. mp Truck at SS-1. F S 25A and SS 25B.	around equipment 0 Reconfigured pump I Completed 2-7/8" p	- 52%. 2-7/8" - 1 line at SS 25 to p oump line tie in at	,628 psi. 7 ressure tes SS 25.	" - 204 psi. 11 t lubricator at S	-3/4" - S 25A	and
6:30 7:00 8:30	6:30 7:00 8:30 9:30	Performed LEL level Attended Rigged up SS 25B w Installed u Moved ou Lunch.	d site assessment. W 25 feet from well - 0 t morning safety/opera 8 Batch Mixer and Pur ells. ini-bolt adapters on S t pump truck from 25	inds predominately o 100%. LEL level tions meeting. mp Truck at SS-1. I S 25A and SS 25B. pad. Sent to decon	around equipment 0 Reconfigured pump I Completed 2-7/8" p n. Removed pump Ii	- 52%. 2-7/8" - 1 line at SS 25 to p oump line tie in at ne from CT reel.	,628 psi. 7 ressure tes SS 25. Moved out	" - 204 psi. 11 t lubricator at S man lift. Sent	-3/4" - S 25A to dec	on.
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		AFE #:	Northridge, CA, 9	1320	Wel	Country: I Location:	Alis	Canyon Stora	de Fa	cility
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6:30 7:00 8:30 14:00 14:30 16:00 17:00 17:00 S E	6:30 7:00 8:30 14:00 14:00 16:00 17:00 17:15 17:15 Signature I signature I mployee Na Danny Clayt	Performed LEL level i Attended n Rigged up to 560 psi. Back load tool house Installed a Moved in n Pressure t Anchored Rigged do Traveled t John Hatte	I site assessment. W 25 feet from well - 0 t morning safety/operat slickline on well SS : Rigged down slickline ed slickline unit and e . Sent to decon. Rinchor chains around nitrogen truck and ble ested second HAL El 2-7/8" pump line. Se wn 100T crane and m o hotel. eberg continued work er Representative Coots Representative Hours on Location 11	inds predominately to 24%. LEL level a tions meeting. 25A. RIH with pron ne. Moved in secon- equipment. Sent to gged down 40T cra Well 25. Left loose ew out coil tubing. It lite pump line to 300 scured 2-7/6" pump noved out. Prepare ing on the data bas ging on the data bas Pro- Pro- Pro- te Travel Hours 0.5	around equipment 0%. Ig. Set in PX plug at 8 nd HAL Elite pump tru decon. Back loaded ine and moved out. S Back loaded reel and 1 0/5,000 psi. Test goo line at pad 25 with co ed location for kill. Se, relief well directions jected Operations Approvals Print Danny	2-7/8" - 1,62 3,144 ft. Pulled ick to SS-1 an injector, guide urvey crew too sent to decon. d. ncrete blocks. al plan. Discu al plan. Discu Name Name (Walzel	4 psi. 7" - d into lubrid d rigged up , control ca ok surveye ssed forwa	202 psi. 11-3/4" cator. Bled tubin p. ab, power pack, g d surface coordin	29 ps g from 5 generato nates fo Da Da	i. 580 psi or, and r SS-25.	
6:30 7:00 8:30 14:00 14:30 16:00 17:00	6:30 7:00 8:30 14:00 14:00 16:00 17:00 17:15 17:15 Signatu ignature I ignature I mployee Na Danny Clayt Danny Walz	Performed LEL level i Attended n Rigged up to 560 psi. Back load tool house Installed a Moved in 1 Pressure t Anchored Rigged do Traveled t John Hatte John Hatte Boots and C ame on tel cky	I site assessment. W 25 feet from well - 0 t morning safety/operat slickline on well SS : Rigged down slickline ed slickline unit and e . Sent to decon. Rinchor chains around nitrogen truck and ble ested second HAL El 2-7/8" pump line. Se wn 100T crane and m o hotel. eberg continued work er Representative Coots Representative Hours on Location 11 11	inds predominately to 24%. LEL level a tions meeting. 25A. RIH with pron ne. Moved in secon- equipment. Sent to gged down 40T cra Well 25. Left loose ew out coil tubing. It lite pump line to 300 scured 2-7/6" pump noved out. Prepare ing on the data bas proved out. Prepare Pro- Pro- Pro- Pro- Case Hours 0.5 0.5	around equipment 0%. Ig. Set in PX plug at 8 nd HAL Elite pump tru decon. Back loaded ine and moved out. S Back loaded reel and 1 0/5,000 psi. Test goo line at pad 25 with co ed location for kill. Se, relief well directions jected Operations Approvals Print Danny	2-7/8" - 1,62 3,144 ft. Pulled ick to SS-1 an injector, guide urvey crew too sent to decon. d. ncrete blocks. al plan. Discu al plan. Discu Name Name (Walzel	4 psi. 7" - d into lubrid d rigged up , control ca ok surveye ssed forwa	202 psi. 11-3/4" cator. Bled tubin p. ab, power pack, g d surface coordin	29 ps g from 5 generato nates fo Da Da	i. 580 psi or, and r SS-25.	

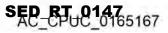
10uston, 181-931-1	Greens Ro , TX. 7706 8884				B			listed on this sh involce.	eel. Ti	his is not a
			24-Nov-2015		Well Name and		Stand	ard Senson 25	Repo	nt# 31
	1.011	1 10 5 m 5 1 1 1 2 1	Southern California 12801 Tampa Ave.			County: State:		Los Ange Californi		
Custon	ner Billing	Address:	Northridge, CA, 9			Country:		USA	d	
		AFE #:				Location:		Aliso Canyon Stor	age Fa	cility
		sentative:	Danny Walzel			Vell Type: Job Type:		Gas Well Cont	ral	
Re			Standard Senson 2	5		Rig No:		N/A	101	
	escription	of Charge	es: Level		mments	Unit	s	Unit Charge	1.	Total
		ntrol Specia			y Clayton	1		\$ 11,500.00		11,500.0
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(		aily Expens	e		J.K. / M.B. / J.H.	5		\$ 325.00		1,625.0
		otel			V. / J.K. / M.B. J.H.	4		\$ 163.00 \$ 188.40	-	652.0
		tal Car			2013	1		\$ 192.00	100.00	192.0
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	Ren	tal Car				1		\$ 192.00	\$	192.0
_				Fe	timated Daily Total	-			\$	50,902.4
	-				Well Summary				1.	20100214
tandard	Senson 2	5 has broad	ched to surface with	several fissures on	pad site.					
1-3/4" ca	asing to 99	90 ft. 7" cas	sing to 8,585 ft. 5-1	/2" slotted liner to 8,	745 ft. 2-7/8" tubing to		icker dept	h 8,468 ft.		
Hour	Hour				Activity on	Site	_			
5:45 6:00	6:00		from hotel to location		out of the South East.	Took I EL	andinge	Cleared location to	r norea	anol
0.00	0.50		638 psi. 7" - 199 ps		out of the South East.	TOOK LELT	eaungs.	Cleared location to	i perso	nnei.
6:30	7:00	Attended	morning safety/open	ations meeting.						
7:00	8:45		for pumping operation							
8:45	9:45				CM. Mixed 35 bbls 18			DM Duran analysis	- 1.04	4 mat
9:45	11:45			5 psi. Increased put	sh water. Began pump					
	-	I HEST SS R				- 1.0/U.DSI				
		10 BPM.			ed after 90 bbls pumpe				to 12	
	-	PP - 3,50	PP - 2,774 psi. Gas 2 psi. Increased put	s from crater increas mp rate to 13 BPM.	ed after 90 bbls pumpe PP - 4,167 psi. Opene	ed. After 138 d 7" choke a	5 bbls pun fter 850 b	nped increased rate bls pump. 7" casin	g press	BPM. sure
		PP - 3,50 decreased	PP - 2,774 psi. Gat 2 psi. Increased put d from 160 psi to 8 p	s from crater increas mp rate to 13 BPM. si. Pumped 950 bb	ed after 90 bbls pumpe	ed. After 138 d 7" choke a	5 bbls pun fter 850 b	nped increased rate bls pump. 7" casin	g press	BPM. sure
11:45	13:00	PP - 3,50 decreased with 56 bb	PP - 2,774 psi. Gat 2 psi. Increased put d from 160 psi to 8 p ols. Shut down. Put	s from crater increas mp rate to 13 BPM. si. Pumped 950 bb	ed after 90 bbls pumpe PP - 4,167 psi. Opene	ed. After 138 d 7" choke a	5 bbls pun fter 850 b	nped increased rate bls pump. 7" casin	g press	BPM. sure
11:45 13:00	13:00 17:15	PP - 3,50 decreased with 56 bb Monitored	PP - 2,774 psi. Gat 2 psi. Increased pur d from 160 psi to 8 p ols. Shut down. Pur I well.	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi.	ed after 90 bbls pumpe PP - 4,167 psi. Opene	ed. After 135 d 7" choke a si. Pumped 3	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced	g press out of t	BPM. sure the tubing
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pro At time of	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui I well. essure increased to report recovered 70	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi.	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps 11-3/4" - 27 psi. (17:	ed. After 135 d 7" choke a si. Pumped 3	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced	g press out of t	BPM. sure the tubing
and the second se		PP - 3,50 decreased with 56 bb Monitored Tubing pr	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui I well. essure increased to report recovered 70	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi.	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps 11-3/4" - 27 psi. (17:	ed. After 135 d 7" choke a si. Pumped 3	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced	g press out of t	BPM. sure the tubing
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pro At time of	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui I well. essure increased to report recovered 70	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi.	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps 11-3/4" - 27 psi. (17:	ed. After 135 d 7" choke a si. Pumped 3	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced	g press out of t	BPM. sure the tubing
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 10 bbls of fluid from I nning relief well. Up	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 10 bbls of fluid from I nning relief well. Up	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 10 bbls of fluid from I nning relief well. Up	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 10 bbls of fluid from I nning relief well. Up	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 10 bbls of fluid from I nning relief well. Up	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 10 bbls of fluid from I nning relief well. Up	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 0 bbls of fluid from I nning relief well. Up ort. Began working o	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location. Idated SHL's of offset v on final presentation.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 0 bbls of fluid from I nning relief well. Up ort. Began working o	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pri- At time of Traveled to John Hatt	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 0 bbls of fluid from I nning relief well. Up ort. Began working o	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: location. Idated SHL's of offset v on final presentation.	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM. sure the tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pr At time of Traveled 1 John Hatt wall plot a	PP - 2,774 psi. Gat 2 psi. Increased pur d from 160 psi to 8 p ols. Shut down. Pur I well. essure increased to report recovered 70 to hotel. eberg continued pla and anti collision rep	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 0 bbls of fluid from I nning relief well. Up ort. Began working o	Approvals	ed. After 135 d 7" choke a si. Pumped ( 15) 2-7/8" - 1 vells and targ	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26 vations	BPM, sure tubing psi.
13:00	17:15	PP - 3,50 decreased with 56 bb Monitored Tubing pr At time of Traveled 1 John Hatt wall plot a	PP - 2,774 psi. Gat 2 psi. Increased pui d from 160 psi to 8 p ols. Shut down. Pui well. essure increased to report recovered 70 to hotel. eberg continued pla	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbl mp pressure 0 psi. 76 psi. 7" - 188 psi. 0 bbls of fluid from I nning relief well. Up ort. Began working o	Approvals	ed. After 135 d 7" choke a si. Pumped 3 15) 2-7/8" - 1	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26	BPM, sure tubing psi.
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13:00 17:15	17:15 17:30 Signatu	PP - 3,50 decreased with 56 bb Monitored Tubing pr At time of Traveled 1 John Hatt wall plot a	PP - 2,774 psi. Gat 2 psi. Increased pur d from 160 psi to 8 p ols. Shut down. Pur I well. essure increased to report recovered 70 to hotel. eberg continued pla and anti collision rep	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbi mp pressure 0 psi. 76 psi. 7" - 188 psi. 0 bbls of fluid from 1 nning relief well. Up ort. Began working o Pro	Approvals Approvals Approvals PP - 4,167 psi. Opene Is water. PP - 4,067 psi . 11-3/4" - 27 psi. (17: ocation. Print	ed. After 135 d 7" choke a si, Pumped ( 15) 2-7/8" - 1 vells and targ	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/	g press out of t /4" - 26 vations	BPM. sure the tubing psi. , made
13:00 17:15 ump kill	17:15 17:30 Signatu	PP - 3,50 decreased with 56 bb Monitored Tubing pr At time of Traveled 1 John Hatt wall plot a	PP - 2,774 psi. Gat 2 psi. Increased pur d from 160 psi to 8 p ols. Shut down. Pur I well. essure increased to report recovered 70 to hotel. eberg continued pla and anti collision rep- ner Representative Coots Representat	s from crater increas mp rate to 13 BPM. Isi. Pumped 950 bbi mp pressure 0 psi. 76 psi. 7" - 188 psi. 10 bbls of fluid from 1 nning relief well. Up ort. Began working of Pro	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: ocation. dated SHL's of offset v on final presentation. bjected Operations Approvals Print Print	ed. After 135 d 7" choke a si, Pumped ( 15) 2-7/8" - 1 vells and targ Name Name Walzel	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/ prrected all well ele	g press out of t '4" - 26 vations Da Da	BPM. sure the tubing psi. , made , made tte
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13:00 17:15 ump kill S E	17:15 17:30 Signatu ignature E mployee Na Danny Clayto	PP - 3,50 decreased with 56 bb Monitored Tubing pr At time of Traveled 1 John Hatt wall plot a une Custom Boots and el %y	PP - 2,774 psi. Gat 2 psi. Increased pur d from 160 psi to 8 p ols. Shut down. Pur well. essure increased to report recovered 70 to hotel. eberg continued pla and anti collision rep- ner Representative Coots Representative Hours on Location 11.25	s from crater increas mp rate to 13 BPM. si. Pumped 950 bbi mp pressure 0 psi. 76 psi. 7" - 188 psi. 0 bbls of fluid from 1 nning relief well. Up ort. Began working of Pro	ed after 90 bbls pumpe PP - 4,167 psi. Opene Is water. PP - 4,067 ps . 11-3/4" - 27 psi. (17: ocation. dated SHL's of offset v on final presentation. bjected Operations Approvals Print Print	ed. After 135 d 7" choke a si, Pumped ( 15) 2-7/8" - 1 vells and targ Name Name Walzel	5 bbls pun fter 850 b 35 bbls ba	nped increased rate bls pump. 7" casin rite pill. Displaced 7" - 155 psi. 11-3/ prrected all well ele	g press out of t '4" - 26 vations Da Da	BPM. sure the tubing psi. , made , made tte



81-931-	Greens Ro , TX. 7706 8884				THE COURSE SERVICE			is an estimat on this she ce:		
		Date:	25-Nov-2015		Well Name an	d Number:	Standard S	Senson 25	Repo	rt# 32
	Custor	ner Name:	Southern California			County:		Los Angele	_	
Custon	ner Billing	Address:	12801 Tampa Ave.,		11	State:		California	i	
State of the	14 14 10 14 C	AFE #:	Northridge, CA, 913	326	Well	Country:	Alie	USA Canyon Stora	an Fo	nility
Custor	ner Repre	sentative:				Well Type:	Allst	Gas	iye ra	CIIILY
			Danny Walzel			Job Type:		Well Contr	ol	
	Leas	e - Well #:	Standard Senson 25		-	Rig No:		N/A		
D	escription	n of Charge	es: Level	Com	ments	Units	U	nit Charge	1	Total
		ntrol Specia	a section of the sect		Clayton	1	\$	11,500.00		11,500.0
		ol Specialis			Kopecky	1	\$	10,000.00		10,000.0
5		ntrol Engine pecialist	er 4 4		Walzel Baggett	1	\$	11,500.00 9,200.00		11,500.0 9,200.0
1		rol Enginee			J / Clients Office	1	\$	5,750.00		5,750.0
		aily Expens			.K. / M.B. / J.H.	5	\$	325.00		1,625.0
		otel			/ J.K. / M.B.	4	\$	163.00	\$	652.0
		otel		J.	.Н.	1	\$	188.40		188,4
		tal Car				1	\$	192.00		192.0
		tal Car				1	\$	103.00		103,0
	Ren	tal Car				1	\$	192.00	\$	192,0
		_		Feti	mated Daily Total	1			\$	50,902.4
		_			Vell Summary				Ψ	00,002.4
andard	Sansan 2	5 hos brook	hed to surface with s							
8:00	11:00		50 bbl GEO Zan pill lo	aded with LCM. Dis	A REAL A. M. CHARTER AND M. MICH. AND	ter down tubing	CARLEND AND A CONTRACT OF	A REAL PROPERTY AND ADDRESS OF A DECISION OF		
11:00 16:00 17:00	11:00 16:00 17:00 17:30 17:45	FPP - 280 4,173 psi. increased Pumped 1 displacem displacing Flowline fi extension Closed tul Attended Traveled f	D psi. Increased pump After 140 bbls pump . Continued pumping 100 bbls GEO Zan pill ent slowed pump rate 56 bbls shut down. rom 7" and tubing hea handles for tubing hea bing head valve and end of day meeting. to hotel.	aded with LCM. Dis o rate to 12 bpm. PF ed gas activity incre- at 13 BPM. PP - 4, loaded with LCM. E e to 2 BPM. PP - 20 2-7/8" - 0 psi. 7" - 0 ad broke. Nipple on ead valve and 7" casi 7" casing valves.	placed with fresh wa P - 3,496 psi. After 6 ased from crater. 7' 164 psi. Pumped 96 Began displacing with psi. After displacing I psi. 11-3/4" - 27 ps well head broke. Pu ing valves.	ter down tubing 0 bbls pumped - 40 psi. After 50 bbls of water 9 4 ppg CaCl2 9 40 bbls slowed i. mp line to 7" ca	increased p 700 bbls pur 77 - 17 psi at 4 bpm. I 1 pump to 1 sing head b	ump rate to 13 mp water flow f 11-3/4" - 27 p PP - 89. After 2 bpm. PP - 0 ps roke. Fabricate	bpm. rom cr osi. 20 bbls si. Afte	PP - ater s of e e
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81-931-8	Greens Rd TX. 7706 3884			Q	D			en estimate : heet. This is		the date list invoice.
-		Date:	26-Nov-2015		Well Name an	d Number:	Standard Sen	son 25	Report	# 33
	Custor		Southern California G			County:		Los Angele		
Custor	mer Billing	Address:	12801 Tampa Ave., S		-	State:		California	4	
10000	na brini		Northridge, CA, 913	26		Country:	Aller C	USA	- Frank	n
Custo	mer Renre	AFE #: esentative:			vve	Il Location: Well Type:	Aliso C	Canyon Stora Gas	ge Facil	lity
			Danny Walzel			Job Type:		Well Contr	ol	
			Standard Senson 25	•		Rig No:		N/A		
D	escription	of Charge	s: Level		nments	Units	Unit	Charge		Total
		ntrol Specia			y Clayton	1	\$	11,500.00		11,500.0
		ol Specialis			s Kopecky	1	\$	10,000.00		10,000.0
S		ntrol Engine pecialist	er 4 4		ny Walzel Baggett	1	\$	11,500.00 9,200.00	\$	11,500.0 9,200.0
		pecialist rol Engineer			teberg/Transit	1	5	4,000.00	\$	4,000.0
	Server and the reaction	aily Expense			J.K. / M.B. / J.H.	5	\$	325.00	\$	1,625.0
	and which consider the set	otel			V. / J.K. / M.B.	4	\$	163.00	\$	652.0
-					Real Property in the second second		A		\$	14
	- 22211	al Car				1	\$	192.00	\$	192.0
		al Car				1	\$	103.00	\$	103.0
	Ren	al Car				1	\$	192.00	\$	192.0
_				Eet	imated Daily Total				9	48,964.0
_					Well Summary				Ψ	40,904.0
andard	Senson 25	has broach	ned to surface with sev						_	
					ft. 2-7/8" tubing to 8,5	510 ft. Packer d	epth 8.468 ft			
Hour	Hour	1	0		Activity on		1			
5:45	6:00	Traveled f	rom hotel to location.							
6:00	6:30	and the second sec	site assessment. Clea	ared location for per	rsonnel to begin work.					
6:30	7:00		morning operations/sat							
7:00	15:45				stalled cables around	wellhead to stat	oilize. Performed	d site work.		
15:45	16:00		end of the day meeting	n						
16.00	16:15	Traveled to	p notel.							
	-	1							_	
		-								
				- S. A.						
_		John Hatte	eberg traveled to Hous	ton, Texas.						
-	-	-								
		+								
-										
-										
_		-								
-										
				Pro	ojected Operations					
				Pro	ojected Operations					
				Pro						
	Signat		er Representative	Pro	Approvals	t Name		Ť	Dat	e
	Signati	ure Custom	ner Representative	Pro	Approvals	t Name			Dat	e
					Approvals Prin					
s			er Representative Coots Representative		Approvals Prin Prin	t Name			Dat	
	Signature I	Boots and I		8	Approvals Prin Prin Dann	t Name y Walzei				
E	Signature I mployee Na	Boots and (	Coots Representative	e Travel Hours	Approvals Prin Prin Dann	t Name	Hours	on Location	Dat	
E	bignature l mployee Na Dariny Clayto	Boots and ( me	Coots Representative Hours on Location 10	e Travel Hours 0.5	Approvals Prin Prin Dann	t Name y Walzei	Hours	on Location	Dat	e
E	<b>mployee Na</b> Danny Clayto Danny Walzo	Boots and I me on el	Coots Representative Hours on Location 10 10	e Travel Hours 0.5 0.5	Approvals Prin Prin Dann	t Name y Walzei	Hours	on Location	Dat	e
E	<b>iignature l</b> <b>mployee Na</b> Danny Clayto Danny Walz James Kopec	Boots and I me on al	Coots Representative Hours on Location 10 10 10	e Travel Hours 0.5 0.5 0.5	Approvals Prin Prin Dann	t Name y Walzei	Hours	on Location	Dat	e
E	<b>mployee Na</b> Danny Clayto Danny Walzo	Boots and I me on al ky tt	Coots Representative Hours on Location 10 10	e Travel Hours 0.5 0.5	Approvals Prin Prin Dann	t Name y Walzei	Hours	on Location	Dat	e

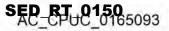
louston, 81-931-	Greens Ro TX. 7706 3884								listed involce	s an estimat on this she a.			not ai
			27-Nov-2015			Well Name a	nd Number:	Stand	lard Se	enson 25	Repo	rt#	34
Zana			Southern Ca 12801 Tamp				County: State:			Los Angele California		_	
Custon	ner Billing	Address:	Northridge, (			1	Country:			USA			
	-	AFE #:				We	ell Location:		Aliso	Canyon Stora	ige Fac	cility	
		esentative:	Danny Walz	el		-	Well Type: Job Type:			Gas Well Contr	al		
INC			Standard Se				Rig No:		-	N/A	U		
		n of Charge		Level		mments	Unit	s		it Charge		Tota	
		ntrol Specia rol Specialis		4		y Clayton s Kopecky	1		\$	11,500.00	· · · · · · · · · · · · · · · · · · ·		,500.00
	and the second second	ntrol Engine		4		ny Walzel	1		\$	11,500.00			,500.00
-		pecialist		4		Baggett	1		\$	9,200.00	\$		200.00
	Canada D	aller Ermann		-	DOVDU	LIL MA	-	-		225 00	\$		200.0
		aily Expens otel	se in the second se			V. / J.K. / M.B. V. / J.K. / M.B.	4		\$	325.00 163.00	\$	1	,300.00
									æ		\$		-
		tal Car					1		\$	192.00	-		192.00
	Ren	tal Car					1		\$	103.00	\$		103.00
											\$		- 2
					Es	timated Daily Total					\$	44	,447.00
	_		-	_		Well Summary							
					eral fissures on	pad site. 745 ft. 2-7/8" tubing							
6:30 7:00 12:00	6:30 7:00 12:00 12:30	Attended Met with c	morning oper crane operato	rations/safe or and discu	ety meeting. ussed location to	personnel to begin w spot 100T crane. N	loved in backh					lve	
6:30 7:00 12:00 12:30	7:00 12:00	Attended Met with o Lunch Delivered Tightened 1,600 psi.	morning oper crane operato 320 track ho I hand wheel Removed w end of the da	ment. Clean rations/safe or and discu- e to pad 25 on tree win whip check f	ety meeting. ussed location to 5. Began clearin ng valve, Installe		loved in backh oved in man lif n night cap. Cl	Installe	ed hand	d wheel on cro	own va		
12:30 16:45 17:15	7:00 12:00 12:30 16:45 17:15 17:30	Attended Met with o Lunch. Delivered Tightened 1,600 psi. Attended Traveled 1	morning oper crane operato 320 track ho I hand wheel Removed w end of the da to hotel.	ment. Clean rations/safe or and discu- e to pad 25 on tree win whip check f ay meeting.	ety meeting. ussed location to 5. Began clearin g valve. Installe from 2-1/16" 5M	g around well 25. M g around well 25. M ed pressure gauge or x 1502 adapter flang	loved in backh oved in man lif n night cap. Cl	Installe	ed hand	d wheel on cro	own va		
6:30 7:00 12:00 12:30 16:45 17:15	7:00 12:00 12:30 16:45 17:15 17:30	Attended Met with o Lunch. Delivered Tightened 1,600 psi. Attended Traveled 1	morning oper crane operato 320 track ho I hand wheel Removed w end of the da to hotel.	ment. Clean rations/safe or and discu- e to pad 25 on tree win whip check f ay meeting.	ety meeting. ussed location to 5. Began clearin g valve. Installe from 2-1/16" 5M	g around well 25. M g around well 25. M ed pressure gauge or x 1502 adapter flang	loved in backh oved in man lif n night cap. Cl	Installe	ed hand	d wheel on cro	own va		
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6:30 7:00 12:00 12:30 16:45 17:15	7:00 12:00 12:30 16:45 17:15 17:30	Attended Met with c Lunch. Delivered Tightened 1,600 psi. Attended Traveled 1	morning oper crane operato 320 track ho I hand wheel Removed w end of the da to hotel.	ment. Clean rations/safe or and discu- e to pad 25 on tree win whip check f ay meeting.	ety meeting. ussed location to 5. Began clearin g valve. Installe from 2-1/16" 5M	g around well 25. M ad pressure gauge or x 1502 adapter flang bjected Operations gyro.	loved in backh oved in man lif n night cap. Cl	Installe	ed hand	d wheel on cro	own va	essure	
6:30 7:00 12:00 12:30 16:45 17:15	7:00 12:00 12:30 16:45 17:15 17:30 flow tubing	Attended Met with of Lunch. Delivered Tightened 1,600 psi. Attended Traveled 1	morning oper crane operato 320 track ho I hand wheel Removed w end of the da to hotel.	ment. Clean rations/safe or and discu- e to pad 25 on tree win whip check f ay meeting.	ety meeting. ussed location to 5. Began clearin g valve. Installe from 2-1/16" 5M	e spot 100T crane. M g around well 25. M ed pressure gauge or x 1502 adapter flang sigested Operations gyro. Approvals Pri	loved in backh oved in man lif n night cap. Cl je.	Installe	ed hand	d wheel on cro	own va	te	
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6:30 7:00 12:00 12:30 16:45 17:15 g up to S E	7:00 12:00 12:30 16:45 17:15 17:30 flow tubing Signature E mployee Na Danny Clayto	Attended Met with of Lunch. Delivered Tightened 1,600 psi. Attended Traveled 1	morning oper crane operato 320 track ho I hand wheel Removed w end of the da to hotel. w line. Run r her Represer Coots Repre Hours on Lo 11.25	ment. Clean rations/safe or and discu- le to pad 25 on tree win /hip check f ay meeting.	Pro Attempt to run Travel Hours 0.5	a spot 100T crane. N ag around well 25. M ad pressure gauge or x 1502 adapter flang bjected Operations gyro. Approvals Pri Pri	loved in backh n night cap. Cl re.	. Installe lecked tu	ed hand bing pr	d wheel on cro ressure. Tub	Da	te	Duis
6:30 7:00 12:00 12:30 16:45 17:15	7:00 12:00 12:30 16:45 17:15 17:30 flow tubing flow tubing Signature E mployee Na Danny Clayto Danny Walz	Attended Met with of Lunch. Delivered Tightened 1,600 psi. Attended Traveled 1	morning oper crane operato 320 track ho I hand wheel Removed w end of the da to hotel. w line. Run r her Represer Coots Repre Hours on Lo 11.25 11.25	ment. Clean rations/safe or and discu- le to pad 25 on tree win /hip check f ay meeting.	Pro Attempt to run Travel Hours 0.5	a spot 100T crane. N ag around well 25. M ad pressure gauge or x 1502 adapter flang bjected Operations gyro. Approvals Pri Pri	loved in backh n night cap. Cl re.	. Installe lecked tu	ed hand bing pr	d wheel on cro ressure. Tub	Da	te	
6:30 7:00 12:00 12:30 16:45 17:15	7:00 12:00 12:30 16:45 17:15 17:30 flow tubing Signatu ignature E mployee Na Danny Clayto Danny Walz ames Koped	Attended Met with of Lunch. Delivered Tightened 1,600 psi. Attended Traveled 1	morning oper crane operato 320 track ho I hand wheel Removed w end of the da to hotel. we line. Run r her Represer Coots Repre Hours on Lo 11.25 11.25	ment. Clean rations/safe or and discu- le to pad 25 on tree win whip check f ay meeting.	Pro Attempt to run Travel Hours 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	a spot 100T crane. N ag around well 25. M ad pressure gauge or x 1502 adapter flang bjected Operations gyro. Approvals Pri Pri	loved in backh n night cap. Cl re.	. Installe lecked tu	ed hand bing pr	d wheel on cro ressure. Tub	Da	te	
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Customer Billing Customer Repre Report Gen Leas Description Sr. Well Contr Sr. Well Contr Sr. Well Contr Sr. Well Contr HSE S General D Herri Rem Standard Senson 2 1-3/4" casing to 99 Hour Hour 5:45 6:00 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15	AFE #: AFE #: esentative: erated By: erated By: e	Northridge, CA, 9132 t: :: Danny Walzel :: Standard Senson 25 ges: Level ialist 4 list 4 heer 4 4	C 9328 6 C 9328 6 Com Danny James Danny Mike I D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. des predominately ety meeting. and Weatherford. eparator with the o separator with the o separator with the o separator to open so withdraw line.	imated Daily Total Walzel Baggett ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. 	County: State: Country: I Location: Well Type: Job Type: Rig No: Units 1 1 1 1 1 4 4 4 4 5 6 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fte sed installing surfa- e for withdraw line.	Unit \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Los Angele California USA Canyon Storag Gas Well Contro N/A t Charge 11,500.00 10,000.00 11,500.00 9,200.00 325.00 163.00 192.00 103.00 192.00 103.00 192.00 103.00	ge Facility Total \$ 11,500 \$ 10,000 \$ 11,500 \$ 9,200 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 44,447 \$ 100 \$ 1,000 \$ 1,000 \$ 10,000 \$ 11,500 \$ 1,300 \$ 1,000 \$ 1,000 \$ 1,300 \$ 1,300 \$ 1,000 \$ 1,0000 \$ 1,0000 \$ 1,0000 \$ 1,0000 \$ 1,0000 \$ 1
Customer Billing Customer Repre Report Gen Leas Description Sr. Well Contr Sr. Well Contr Sr. Well Contr Sr. Well Contr Harris Control (19) General D Harris Control (19) Rem Rem Standard Senson 2 1-3/4" casing to 99 Hour Hour 5:45 6:00 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30 16:01 16:15 16:15 16:30 16:00 16:15 16:15 16:30 16:15 16:30 16:16 16:30 16:16 16:30 16:16 16:30 1	Address: AFE #: esentative: erated By: erated By:	12801 Tampa Ave., SG         Northridge, CA, 9132         R:         Image: Standard Senson 25         ges:       Level         Ialist       4         Ist       5         ist       6         ist       6         ist       5         ifrom hotel to location.	C 9328 6 C 9328 6 Com Danny James Danny Mike I D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. des predominately ety meeting. and Weatherford. eparator with the o separator with the o separator with the o separator to open so withdraw line.	imated Daily Total Walzel Baggett ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. 	State: Country: I Location: Well Type: Job Type: Rig No: Units 1 1 1 1 4 4 4 4 4 5 5 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-ft sed installing surfa- e for withdraw line.	Unit \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	California USA Canyon Storag Gas Well Contro N/A t Charge 11,500.00 10,000.00 9,200.00 11,500.00 9,200.00 11,500.00 103.00 163.00 192.00 103.00 192.00 103.00 192.00 103.00 192.00 103.00 200 103.00 200 103.00 200 103.00 200 200 200 200 200 200 200 200 200	ge Facility Total \$ 11,500 \$ 10,000 \$ 11,500 \$ 9,200 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 44,447 \$ 100 \$ 1,000 \$ 1,000 \$ 10,000 \$ 11,500 \$ 1,300 \$ 1,000 \$ 1,000 \$ 1,300 \$ 1,300 \$ 1,000 \$ 1,0000 \$ 1,0000 \$ 1,0000 \$ 1,0000 \$ 1,0000 \$ 1
Customer Repre Report Gen Leas Description Sr. Well Contr Sr. Well Contr Sr. Well Contr Sr. Well Contr HSE S General D HSE S HSE S General D HSE S HSE	AFE #: erated By: erated By: e - Well #: n of Chargo rol Specialist of Specialist aily Expension otel tal Car tal Car	Northridge, CA, 9132 Northridge, CA, 9132 Standard Senson 25 Standard Senson 25 Jes: Level ialist 4 heer 4 4 ached to surface with sev ached to surface with sev asing to 8,585 ft. 5-1/2" I from hotel to location. Ed site assessment. Win d morning operations/saff morning operations/saff the to the secondary test tatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	Com Danny James Danny Mike I D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. D.C./ D.W. description Esti W veral fissures on particular stotted liner to 8,74 mds predominately ety meeting. and Weatherford. eparator with the o separator with the o separator with the o separator to open to flow tubing to w e on withdraw line.	imated Daily Total Walzel Baggett ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. 	Country: I Location: Well Type: Job Type: Rig No: Units 1 1 1 1 4 4 4 4 5 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fte sed installing surfa- e for withdraw line.	Unit \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	USA Canyon Storag Gas Well Contro N/A t Charge 11,500.00 10,000.00 11,500.00 9,200.00 325.00 163.00 192.00 103.00 192.00 103.00 38 ft.	ge Facility DI Total \$ 11,500 \$ 10,000 \$ 11,500 \$ 9,200 \$ 9,200 \$ 3 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 1,300 \$ 44,447 \$ 10,000 \$ 0,000 \$ 0,000
Report Gen           Leas           Description           Sr. Well Contr           HSE S           General D           H           Ren           Ren           1-3/4" casing to 98           Hour           Hour           5:45           6:00           6:30           7:00           13:30           16:00           16:15           16:30           I	esentative: erated By: e - Well #: n of Charge ntrol Specialis rol Specialist aily Expension tal Car tal Car tal Car tal Car tal Car tal Car Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	k:	Com Danny James Danny Mike I D,C./ D.W. D,C./ D.W. D,C./ D.W. D,C./ D.W. D,C./ D.W. D,C./ D.W. Composite State Insures on particular State Insures on particular Veral fissures on particular Veral fissures on particular Veral fissures on particular State Insures on particular Veral fissures on particular V	imated Daily Total Walzel Baggett ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. 	I Location: Well Type: Job Type: Rig No: Units 1 1 1 4 4 4 4 5 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fte sed installing surfa- e for withdraw line.	Unit \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Canyon Storag Gas Well Contro N/A t Charge 11,500.00 10,000.00 11,500.00 9,200.00 325.00 163.00 192.00 103.00 192.00 103.00 3 ft.	Total \$ 11,500 \$ 10,000 \$ 11,500 \$ 9,200 \$ 9,200 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 192 \$ 103 \$ 0 \$ 192 \$ 103 \$ 5 \$ 105 \$ 105
Report Gen           Leas           Description           Sr. Well Contr           HSE S           General D           H           Ren           Ren           1-3/4" casing to 98           Hour           Hour           5:45           6:00           6:30           7:00           13:30           16:00           16:15           16:15           16:15           16:15           16:15           16:15           16:15           16:15	erated By: se - Well #: n of Charge ntrol Specialis ntrol Engine specialist aily Expension tal Car tal Car tal Car tal Car tal Car Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	Danny Walzel     Standard Senson 25 ges: Level ialist 4 iist 4 neer 4 iase      ached to surface with sev asing to 8,585 ft. 5-1/2" a i from hotel to location. ed site assessment. Wir d LEL's. Met with Onyx hydraulic choke to test se g through secondary test tatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	Danny James Danny Mike I D,C./ D.W. D,C./ D.W. D,C./ D.W. Esti Esti V veral fissures on pa slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator to open to flow tubing to w e on withdraw line.	imaents / Clayton Kopecky / Walzel Baggett / J.K. / M.B. / J.K. / M.B. / M.B. / J.K. / M.B.	Job Type: Rig No: Units 1 1 1 1 4 4 4 4 1 1 5 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fte sed installing surfa- e for withdraw line.	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Well Control           N/A           t Charge           11,500.00           10,000.00           11,500.00           9,200.00           325.00           163.00           192.00           103.00           103.00           192.00           103.00           192.00           103.00           192.00           103.00 <tr< td=""><td>Total \$ 11,500 \$ 10,000 \$ 11,500 \$ 9,200 \$ 9,200 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 192 \$ 103 \$ 5 \$ 192 \$ 103 \$ 5 \$ 44,447 \$ 100 \$ 000 \$ 000</td></tr<>	Total \$ 11,500 \$ 10,000 \$ 11,500 \$ 9,200 \$ 9,200 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 192 \$ 103 \$ 5 \$ 192 \$ 103 \$ 5 \$ 44,447 \$ 100 \$ 000 \$ 000
Leas Description Sr. Well Contr Rent Rent Rent Rent Rent Rent Rent Rent	e - Well #: n of Charge ntrol Specialist aily Expension pecialist aily Expension tal Car tal Car tal Car 5 has broad 90 ft. 7" cas 1 Traveled Monitored through h 7" casing represent Discussed Located s	E: Standard Senson 25         ges:       Level         ialist       4         ist       4         heer       4         ached to surface with sevants         asing to 8,585 ft.       5-1/2" of the sevents         ached to surface with sevents       1         ached to surface sets       1         ached to surface safety valve that       1         ached to s	Danny James Danny Mike I D,C./ D.W. D,C./ D.W. D,C./ D.W. Esti Esti V veral fissures on pa slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator to open to flow tubing to w e on withdraw line.	r Clayton Kopecky y Walzel Baggett ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. . J.K. / M.B. . J.K. / M.B.	Rig No:         Units         1         1         1         1         4         4         1	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	N/A t Charge 11,500.00 10,000.00 11,500.00 9,200.00 325.00 163.00 192.00 103.00 192.00 103.00 3 ft.	Total \$ 11,500 \$ 10,000 \$ 11,500 \$ 9,200 \$ 9,200 \$ 1,300 \$ 652 \$ 1,300 \$ 652 \$ 192 \$ 103 \$ 5 \$ 192 \$ 103 \$ 5 \$ 44,447 \$ 100 \$ 000 \$ 000
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HSE S General D. H Rem Rem Rem Rem 5:45 6:00 6:00 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30	Specialist aily Expension lotel tal Car tal Car tal Car 5 has broad 5 has broad 50 ft. 7" ca 00 ft. 7" ca 1 Performe Attended Monitored through h 7" casing represent Discussed Located s	4 ached to surface with sev asing to 8,585 ft. 5-1/2" a from hotel to location. ad site assessment. Win d morning operations/safi od LEL's. Met with Onyx hydraulic choke to test se g through secondary test itatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	Mike I D,C./ D.W. D,C./ D.W. D,C./ D.W. Esti Esti W veral fissures on pa slotted liner to 8,74 and spredominately ety meeting. and Weatherford. eparator with the o separator with the o separator to open to flow tubing to w e on withdraw line.	Baggett ./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. imated Daily Total Vell Summary ad site. 45 ft. 2-7/8" tubing to Activity on out of the North. LE Ordered out hoses i option to flow to withd top tank. Made up i ithdraw line. Discussi . Located relief valve m SS 25. Sent for be	1 4 4 1 1 1 2 5 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fte sed installing surfa- e for withdraw line.	\$ \$ \$ \$ depth 8,468 equipment. . Identified p tank. Ider ex hose. Me ce safety va	9,200.00 325.00 163.00 192.00 103.00 3 ft. 3 ft.	\$ 9,200 \$ 1,300 \$ 652 \$ 192 \$ 103 \$ 192 \$ 103 \$ 3 \$ 44,447 \$ 44,447 \$ 0,000 \$ 0,0000 \$ 0,0
General D. H Ren Ren tandard Senson 2 1-3/4" casing to 99 Hour Hour 5:45 6:00 6:30 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:15 16:30 16:15 16:30	aily Expension otel tal Car tal Car tal Car 5 has broad 20 ft. 7" ca 20 ft. 7" ca 2	ached to surface with sev asing to 8,585 ft. 5-1/2" a l from hotel to location. ed site assessment. Win d morning operations/safi ad LEL's. Met with Onyx hydraulic choke to test se g through secondary test natives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	D.C./ D.W. D.C./ D.W. D.C./ D.W. Esti Weral fissures on pa slotted liner to 8,74 and spredominately ety meeting. and Weatherford. eparator with the o separator with the o separator to open to flow tubing to w e on withdraw line. t was removed from	./ J.K. / M.B. ./ J.K. / M.B. ./ J.K. / M.B. 	4 4 1 1 1 2 5 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-ft sed installing surfa- e for withdraw line.	\$ \$ \$ depth 8,468 equipment. Identified p tank. Ider ex hose. Me ce safety va	325.00 163.00 192.00 103.00 3 ft. 3 ft. rig up to flow ntified rig up to et with SCGC alve on tree as	\$ 1,300 5,652 5 192 5 103 5 5 5 44,447 5 tubing to flow 5 ssembly.
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Ren tandard Senson 2: 1-3/4" casing to 96 Hour Hour 5:45 6:00 6:30 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30 16:00 16:15 16:15 16:30	tal Car 5 has broad 00 ft, 7" ca 1 Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	asing to 8,585 ft. 5-1/2" a I from hotel to location. ed site assessment. Wir d morning operations/safe d LEL's. Met with Onyx hydraulic choke to test se g through secondary test ntatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	W veral fissures on paral slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator to open to flow tubing to w e on withdraw line. t was removed from	Vell Summary ad site. 45 ft. 2-7/8" tubing to Activity on out of the North. LE Ordered out hoses i option to flow to withd top tank. Made up i vithdraw line. Discuss Located relief valve m SS 25. Sent for be	1 2 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fle sed installing surfa- e for withdraw line.	\$ depth 8,468 equipment. . Identified p tank. Ider ex hose. Me ce safety va	103.00 3 ft. rig up to flow ntified rig up t et with SCGC alve on tree as	\$ 192 \$ 103 \$
Ren tandard Senson 2: 1-3/4" casing to 96 Hour Hour 5:45 6:00 6:30 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30 16:00 16:15 16:15 16:30	tal Car 5 has broad 00 ft, 7" ca 1 Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	asing to 8,585 ft. 5-1/2" a I from hotel to location. ed site assessment. Wir d morning operations/safe d LEL's. Met with Onyx hydraulic choke to test se g through secondary test ntatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	W veral fissures on paral slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator to open to flow tubing to w e on withdraw line. t was removed from	Vell Summary ad site. 45 ft. 2-7/8" tubing to Activity on out of the North. LE Ordered out hoses i option to flow to withd top tank. Made up i vithdraw line. Discuss Located relief valve m SS 25. Sent for be	1 2 8,510 ft. Packer Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fle sed installing surfa- e for withdraw line.	\$ depth 8,468 equipment. . Identified p tank. Ider ex hose. Me ce safety va	103.00 3 ft. rig up to flow ntified rig up t et with SCGC alve on tree as	\$ 103 \$
1-3/4" casing to 96 Hour Hour 5:45 6:00 6:30 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30 16:15 16:30	90 ft. 7" ca Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	asing to 8,585 ft. 5-1/2" a I from hotel to location. ed site assessment. Wir d morning operations/safe d LEL's. Met with Onyx hydraulic choke to test se g through secondary test ntatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	W veral fissures on paral slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator to open to flow tubing to w e on withdraw line. t was removed from	Vell Summary ad site. 45 ft. 2-7/8" tubing to Activity on out of the North. LE Ordered out hoses i option to flow to withd top tank. Made up i vithdraw line. Discuss Located relief valve m SS 25. Sent for be	Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fle sed installing surfa e for withdraw line.	equipment. Identified p tank. Ider ex hose. Me ce safety va	rig up to flow ntified rig up t et with SCGC alve on tree as	\$ 44,447 \$ 44,447
1-3/4" casing to 96 Hour Hour 5:45 6:00 6:30 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30 16:15 16:30	90 ft. 7" ca Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	asing to 8,585 ft. 5-1/2" a I from hotel to location. ed site assessment. Wir d morning operations/safe d LEL's. Met with Onyx hydraulic choke to test se g through secondary test ntatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	W veral fissures on paral slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator with the o separator to open to flow tubing to w e on withdraw line. t was removed from	Vell Summary ad site. 45 ft. 2-7/8" tubing to Activity on out of the North. LE Ordered out hoses i option to flow to withd top tank. Made up i vithdraw line. Discuss Located relief valve m SS 25. Sent for be	Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fle sed installing surfa e for withdraw line.	equipment. Identified p tank. Ider ex hose. Me ce safety va	rig up to flow ntified rig up t et with SCGC alve on tree as	\$ 44,447
1-3/4" casing to 96 Hour Hour 5:45 6:00 6:30 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30 16:15 16:30	90 ft. 7" ca Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	asing to 8,585 ft. 5-1/2" a I from hotel to location. ed site assessment. Wir d morning operations/safe d LEL's. Met with Onyx hydraulic choke to test se g through secondary test ntatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	W veral fissures on paral slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator with the o separator to open to flow tubing to w e on withdraw line. t was removed from	Vell Summary ad site. 45 ft. 2-7/8" tubing to Activity on out of the North. LE Ordered out hoses i option to flow to withd top tank. Made up i vithdraw line. Discuss Located relief valve m SS 25. Sent for be	Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fle sed installing surfa e for withdraw line.	equipment. Identified p tank. Ider ex hose. Me ce safety va	rig up to flow ntified rig up t et with SCGC alve on tree as	tubing to flow ssembly.
I-3/4" casing to 96 Hour Hour 5:45 6:00 6:30 6:30 6:30 7:00 7:00 13:30 13:30 16:00 16:00 16:15 16:15 16:30 16:15 16:30	90 ft. 7" ca Traveled Performe Attended Monitored through h 7" casing represent Discussed Located s	asing to 8,585 ft. 5-1/2" a I from hotel to location. ed site assessment. Wir d morning operations/safe d LEL's. Met with Onyx hydraulic choke to test se g through secondary test ntatives to discuss rig up ed re-installing relief valv surface safety valve that ut of the North East. Mo	veral fissures on pa slotted liner to 8,74 nds predominately ety meeting. and Weatherford. eparator with the o separator with the o separator to open to flow tubing to w e on withdraw line. t was removed from	ad site. 45 ft. 2-7/8" tubing to Activity on out of the North. LE Ordered out hoses i option to flow to withd top tank. Made up i vithdraw line. Discuss Located relief valve m SS 25. Sent for be	Site L's too high to run for hydraulic choke raw line or open to 50 ft of 2" 5M co-fle sed installing surfa e for withdraw line.	equipment. Identified p tank. Ider ex hose. Me ce safety va	rig up to flow ntified rig up t et with SCGC alve on tree as	to flow ssembly.
16:15 16:30		ed site work.			the second se	Cleaned e	east side of lo	ocation.
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ig up to flow tubing	Traveled		•					
ig up to flow tubing								
	a to withdra	awline Pun poise/temr		ected Operations				
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Signati	ire Custon	mer Representative	1	Approvals	Name	_	111	Date
eignet		ner representative			( ) di la constante di la const		. ji	
Signature I	Boots and	Coots Representative			t Name			Date
Employee Na		Hours on Location	Travel Hours		y Walzel Employee Name	Hours	on Location	Travel Hours
Danny Clayl	me	10.25	0.6			inouta /	- A B S S S S S S S S S S S S S S S S S S	. Autor (Iouio
Danny Walz		10.25	0.5					
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		Date:	29-Nov-2015		Well Name an	d Number:	Standard S	enson 25	Report #	37
_	Custor	ner Name:	Southern Californ			County:		Los Angele		
Custor	ner Billing	Address:	12801 Tampa Av Northridge, CA,			State:		California USA		
_		AFE #:		91320	Wel	Country: I Location:	Alise	Canyon Stora	ne Facilit	v
Custo	mer Repre	esentative:				Well Type:		Gas	gerann	.,
R			Danny Walzel	alast.	11 I I	Job Type:		Well Contr	rol	
			Standard Senson			Rig No:	1 - 23	N/A	-	
	and a start of the second second	n of Charge ntrol Specia	a statute and a statute of the statu		mments ny Clayton	Units 1	5	nit Charge 11,500.00		Total 11,500.00
		rol Specialis			s Kopecky	1	\$	10,000.00		10,000.00
	and the second se	ntrol Engine			ny Walzel	1	\$	11,500.00		11,500.00
-	HSE S	pecialist	4	Mik	e Baggett	1. 1.	\$	9,200.00		9,200.00
	<b></b>							005 00	\$	1
		aily Expens otel	ie		V. / J.K. / M.B. V. / J.K. / M.B.	4	\$	325.00 163.00		1,300.0
	<u>i</u> n	0.01		D.G./ D.V	A PRIMAR MILDA	4	\$	103.00	5	652.00
	Rent	tal Car				1	\$	192.00		192.00
	and the second	tal Car				1	\$	103.00	\$	103,00
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					ALC: 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				\$	44 44 7 10
				Es	stimated Daily Total Well Summary	-			\$	44,447.0
andard	Sanson 2	5 has broad	had to curface wit	h several fissures on						
			A La Carte Carta a second a s		745 ft. 2-7/8" tubing to	0 8 510 ft Pac	er depth 8 4	68 ft	_	
Hour	Hour		anig to store it. e		Activity on		ion apparte, r	00 IA.		
5:45	6:00	Traveled	from hotel to locati	on						
6:00	6:30				ly out of the North. LE	L's too high to r	un equipmer	nt.		
6:30	7:00		morning operation							
7:00	12:30	withdraw exposed	d monitoring LEL's líne. Met with SCO pump in manifold.	Installed culvert on SC personnel to discu Installed additional line	NW corner of Pad 25. Iss required equipment ne to secure Well 25. crane. Repositioned E	. Replaced blo	ck valve in w	ithdraw line. D	out a	nd
		withdraw exposed j Moved in choke ma Excavated valve. Fu Instructed	d monitoring LEL's line. Met with SCC pump in manifold. man lift. Moved in nifold and test sep d around concrete inction tested, she	Installed culvert on SC personnel to discu- Installed additional lin and rigged up 100T parators. Made up no pad south of well 25. Il tested, and block ar	iss required equipment ne to secure Well 25.	E-line equipmen d down and mov Backfilled, Loca 5,000 psi, Test	ck valve in w t and cleaned red out 100T ted grease fi s good. Sen	ithdraw line. D d. Steam clear crane. Moved ttings for 2-1/10 t safety valve t	ned hydra ned hydra d in back   6" 5M saf to welder.	nd aulic hoe. fety
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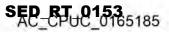
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81-931-	Greens Rd , TX. 7706 8884							an estimate sheet. This is		r the date liste invoice.
_		Date:	16-Dec-2015		Well N	ame and Number:	Standard Se	enson 25	Repo	t# 53
-	Custor	mer Name:	Southern California		ny	County:		Los Angele		
Custo	mer Billin	g Address:	12801 Tampa Ave.,			State:	_	California	1	
1. Contraction		AFE #:	Northridge, CA, 91	326		Country: Well Location:	Alico	USA Canyon Stora	an End	ality .
Custo	mer Renre	esentative:				Well Type:	Aliso	Gas	ige rat	anty
			Jim LaGrone			Job Type:		Well Contr	ol	
	Leas	se - Well #:	Standard Senson 25	5		Rig No:		N/A		
		n of Charge			Comments	Uni	ts Un	it Charge	1	Total
		ntrol Specia		1.1.	Richard Hatteberg	1	5	11,500.00		11,500.0
		ol Specialis		1	Travis Martel	1	\$	10,000.00		10,000.0 9,200.0
		Specialist Specialist	4		Mike Baggett Mike Patton	1	\$	9,200.00		4,600.0
		nrol Engine			Jim LaGrone	1	\$	11,500.00		11,500.0
		nrol Engine			Rolly Gomez	1	\$	11,500.00	\$	11,500.0
		ntrol Special			Danny Clayton	-1	\$	11,500.00		11,500.0
		ntrol Special			Bud Curtis	1	S	11,500.00	_	11,500.0
_		aily Expense lotel	e 1	-		7	\$	163.00		2,275.0
		or Modeling	1		Arash Haghshenas	1	5	4,600.00		4,600.0
		ipment	4 4	jj	unk Shot Manifold Stby	1	\$	530.00		530.0
	Rent	al Cars	1	ie -		3	\$	185.00	\$	555.0
				-	Estimated Daily T	otal			\$	90,401.0
					Well Summar	Y				
	10 - 41 - 21 - F F F F F F F F		ned to surface with se		CONTRACTOR CONTRACTOR	P. 572. (********				
-3/4" ca	asing to 99	0 ft. 7" casi	ng to 8,585 ft. 5-1/2"	slotted line	to 8,745 ft. 2-7/8" tubin	g to 8,510 ft. Packe	r depth 8,468 ft.			
Hour	Hour				Acti	vity on Site			_	
5:30		Depart Ho								
6:35	-		s Mtg w/all service co							
	-		cation. Clean eqpt a		ance. ud and debris from west	aide of leastion Co	a't ast to couthou	to due to post	a mind	
11:30		Lunch	I CHAILI II DIII WEST SIG	e lo clean n	du and debits norm west	side of location. Ca	int get to soduisi	te que to norti	T WITH	
12:00			come calmer and turr	ning to the w	est. Western Wireline in	spects its E-Line un	t			
	-		and a second s		ept of Oil & Gas). Opera	·				
13:30				and the set of the set of the	t and west side of tree.	Clean Swaco gauge	S			
		a second s	-Rider to de-contamin		r cleaning.	A.1A				
17:00		Depart for	check air compresso	ſ						
17.00	-	Depart for	noter						-	
	-	LaGrone &	Gomez attend mee	ting for Reg	ulators (Dept of Oil & Ga	s, US EPA, Ca. OSH	A; Sandia, Berkl	ey, & Lawrence	e-Līver	more Labs)
					ranging concepts of reli					
		Bridge wa	s revamped for large	rspan. Muo	mixing plant complete.	Receiving mud, sho	uld receive all by	Thursday.		
	1									
	1									
					Projected Operat	ions				
ut 2-7/8	" tubing if v	vind allows			Projected Operat	ions				
ut 2-7/8	" tubing if v	wind allows			Projected Operat	ions				
ut 2-7/8	-				Projected Operat	ions				
ut 2-7/8	-		ner Representative			ions Print Name			Da	te
ut 2-7/8	-		er Representative						Da	te
	Signati	ure Custom	ner Representative Coots Representati	ve						te
	Signati	ure Custom	1.4.	ve		Print Name Print Name				12. 4
	Signati Signature I	ure Custor Boots and	Coots Representati	1.1.1	Approvals	Print Name Print Name Jim LaGrone		S on [ section	Da	te
E	Signatu Signature I	ure Custom Boots and ( me	Coots Representati	Travel	Approvals	Print Name Print Name Jim LaGrone Employee Nam	e Hour	s on Location	Da	ite Travel Hours
E	Signati Signature I	ure Custom Boots and me perg	Coots Representati	Travel	Approvals	Print Name Print Name Jim LaGrone Employee Nam Jim LaGrone	e Hour	11.5	Da	te
E R	Signature   Signature   Employee Na lichard Hatteb	ure Custom Boots and o me parg	Coots Representati Hours on Location 11.5	Travel 0 0	Approvals Hours	Print Name Print Name Jim LaGrone Employee Nam	e Hour	And the second sec	Da	te Travel Hours 0,5
E	Signature I Signature I Employee Na lichard Hatteb Travis Marte Danny Clayte Bud Curtis	ure Custom Boots and ( me berg al on	Coots Representati Hours on Location 11.5 11.5 11.5 11.5 11.5	<b>Travel</b> 0 0 0 0 0	Approvals	Print Name Print Name Jim LaGrone Employee Nam Jim LaGrone	e Hour	11.5	Da	te Travel Hours 0,5
E	Signature I Signature I Employee Na tichard Hatteb Travis Marte Danny Clayto	ure Custom Boots and ( me berg al on	Hours on Location 11.5 11.5 11.5	<b>Travel</b> 0 0 0 0 0	Approvals Hours 5 5 5	Print Name Print Name Jim LaGrone Employee Nam Jim LaGrone	e Hour Total Man-hours	11.5 11.5	Da	te Travel Hours 0.5

ouston 81-931-	, TX										an estimate sheet. This is		
	-		Date:	17-Dec-2015		_	Well Name ar	d Number:	Stand	ard Ser	ison 25	Report	# 54
_		Custor		Southern Califor	nia Gas Comp	any	Tren Hume un	County:	oturia		Los Angele	A Real Provide States of the	*   04
Custo				12801 Tampa Av				State:			California		
Cusic	mer	Биши	g Address:	Northridge, CA,	91326			Country:			USA		
		-	AFE #:				We	Il Location:		Aliso (	Canyon Stora	ige Facili	ty
			esentative:	1-1-0				Well Type:			Gas		
	kepo			Jim LaGrone Standard Senso	n 25			Job Type: Rig No:		_	Well Contr N/A	rol	
-	Deco		of Charge			Com	ments	Units	- T	Uni	Charge	T	Total
	1		ntrol Specia	and the second sec		the second states of the	Hatteberg	1		\$	11,500.00		11,500.0
			ol Specialisi			the second se	Martel	1		\$	10,000.00		10,000.0
			pecialist	4			Baggett	1		\$	9,200.00		9,200.0
	-		nrol Enginee				aGrone	1		\$	11,500.00		11,500.0
	-	the star was	nrol Engine				Gomez	1		\$	11,500.00		11,500.0
		and the second second	trol Special trol Special		and the second s		Clayton Curtis	1		\$	11,500.00	\$	11,500.0
Å			aily Expense			Bud	Guille	7	_	\$	325.00	\$	2,275.0
	Jel		otel		-			T		\$	163.00	S	1,141.0
			7072					1		1		-	11.01.00
	-	Equi	pment			Junk Shot N	Aanifold Stby	1		\$	530.00	\$	530.0
		Rent	al Cars					3		\$	185.00	\$	555.00
						Estin	nated Daily Total					\$	81,201.0
			in the second			M	Vell Summary						
				ed to surface with									
-3/4" c	asing	g to 99	0 ft. 7" casii	ng to 8,585 ft. 5-	1/2" slotted line	er to 8,745 ft	t. 2-7/8" tubing to 8,	510 ft. Packer	depth 8,4	68 ft	-		
Hour		Hour					Activity or	Site					
5:30	1.0		Deneut				riotitity of						
			Depart Ho							_			
6:45	1		Arrive on S	SS25 location. C			on. Move in crane.	Held Tool Box s	afety mtg	. Used	man basket	5	
6:45	-		Arrive on S	SS25 location. C				Held Tool Box s	afety mtg	. Used	man basket		
6:45			Arrive on S and take 2 Close in u	SS25 location. C personnel to tre pper crown valve	e. Used long r and bleed off	each track h line, remove	on. Move in crane. I noe to assist and unc line. Insure that wi	Held Tool Box s lo pump lines. ng valve on nor	th side is	shut-in	and bleed of	f/remove	line
6:45			Arrive on S and take 2 Close in u Remove a	SS25 location. C personnel to tre pper crown valve Il pump lines on	e. Used long r and bleed off manifold. Repo	each track h line, remove osition 2-7/8	on, Move in crane, I noe to assist and uno line. Insure that win " pump lines from Lo	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built	th side is new dirt t	shut-in oridge o	and bleed of	f/remove es.	
			Arrive on 5 and take 2 Close in u Remove a Break dow	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica	e. Used long r and bleed off manifold. Repo itor. Remove p	each track h line, remove osition 2-7/8 oump iron ha	on, Move in crane. noe to assist and unc e line. Insure that wir "pump lines from Lo anging in cellar. Loa	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built	th side is new dirt t	shut-in oridge o	and bleed of	f/remove es.	
11:30			Arrive on S and take 2 Close in u Remove a Break dow Lunch in s	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica hifts while wirelin	e. Used long r and bleed off manifold. Repo tor. Remove p e is loaded out	each track h line, remove osition 2-7/8 oump iron ha t for DECON	on, Move in crane. noe to assist and unc e line. Insure that wir "pump lines from Lo anging in cellar. Loa	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built d out same to d	th side is new dirt t lecontami	shut-in oridge o	and bleed of	f/remove es.	
11:30 12:45			Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica hifts while wirelin ations to take gas	e. Used long r and bleed off manifold. Repo tor. Remove p is loaded out samples for L	each track h line, remove osition 2-7/8 oump iron ha t for DECON	on, Move in crane. noe to assist and unc e line. Insure that wir "pump lines from Lo anging in cellar. Loa	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built d out same to d	th side is new dirt t lecontami	shut-in oridge o	and bleed of	f/remove es.	
11:30 12:45 13:00			Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera WAIT ON	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO	e. Used long r and bleed off manifold. Reportor. Remove p is loaded out samples for L W	each track h line, remove osition 2-7/8 pump iron ha for DECON A COUNTY	on, Move in crane, noe to assist and unc line. Insure that wir " pump lines from Lo anging in cellar. Loa N HAZMAT AND FIRE	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built d out same to d	th side is new dirt t lecontami	shut-in oridge o	and bleed of	f/remove es.	
6:45 11:30 12:45 13:00 13:30 14:35			Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera WAIT ON Commence	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO e operations on	e. Used long r and bleed off manifold. Repo- tor. Remove p e is loaded out samples for L W cleaning south	each track h line, remove osition 2-7/8 pump iron ha for DECON A COUNTY side of wellt	on, Move in crane, noe to assist and unc line. Insure that wir " pump lines from Lo anging in cellar. Loa N HAZMAT AND FIRE	Held Tool Box s lo pump lines. ng valve on nor scation 1. Built d out same to o DEPARTMEN	th side is new dirt t lecontami TS	shut-in bridge o ination	and bleed off ver pump line site. Send wi	f/remove es.	
11:30 12:45 13:00 13:30 14:35			Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera WAIT ON Commence SUSPENE	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO e operations on OPERATIONS	e. Used long r and bleed off manifold. Repo- tor. Remove p e is loaded out samples for L W cleaning south DUE TO SMAL	each track h line, remove osition 2-7/8 pump iron ha t for DECON A COUNTY side of wellt L AIRCRAF	on, Move in crane, in noe to assist and unce line. Insure that win " pump lines from Lo anging in cellar. Loa V HAZMAT AND FIRE bore	Held Tool Box s lo pump lines. ng valve on nor scation 1. Built d out same to o DEPARTMEN IG FLY-BYS VE	th side is new dirt t lecontami TS	shut-in bridge o ination	and bleed off ver pump line site. Send wi	f/remove es.	
11:30 12:45 13:00 13:30 14:35 14:50			Arrive on 5 and take 2 Close in u Remove a Break dow Lunch in s Stop opera WAIT ON Commenc SUSPENE Flour Eng	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO OOPERATIONS and AE Eng repr	e. Used long r and bleed off manifold. Repo tor. Remove p is is loaded out samples for L W cleaning south DUE TO SMAL esentatives arr	each track h line, remove osition 2-7/8 bump iron ha t for DECON A COUNTY side of wellt L AIRCRAF ive and star	on, Move in crane, I noe to assist and unc line. Insure that win " pump lines from Lo anging in cellar. Loa HAZMAT AND FIRE bore T (Cesna 172) DOIN	Held Tool Box s lo pump lines. ng valve on nor ocation 1. Built d out same to o DEPARTMEN IG FLY-BYS VE res	th side is new dirt t lecontami TS RY CLO	shut-in pridge o ination	and bleed off ver pump lim site. Send wi	f/remove es. ireline eq	pt to DECOM
11:30 12:45 13:00 13:30 14:35 14:50 14:55 15:00			Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera WAIT ON Commenc SUSPEND Flour Eng B&C takes Clean on e	SS25 location. C personnel to tre pper crown valve Il pump lines on m wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO e operations on O OPERATIONS and AE Eng repr representatives east and south si	e. Used long r and bleed off manifold. Repo tor. Remove p is is loaded out samples for L W cleaning south DUE TO SMAL esentatives arr to inspect well	each track h line, remove osition 2-7/8 pump iron ha for DECON A COUNTY side of well L AIRCRAF ive and star and are loo	on. Move in crane. In noe to assist and unce line. Insure that win " pump lines from Lo anging in cellar. Loa HAZMAT AND FIRE bore T (Cesna 172) DOIN nd by until plane leav king at ideas to capt	Held Tool Box s lo pump lines. ng valve on nor ocation 1. Built d out same to o DEPARTMEN IG FLY-BYS VE res	th side is new dirt t lecontami TS RY CLO	shut-in pridge o ination	and bleed off ver pump lim site. Send wi	f/remove es. ireline eq	pt to DECOM
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11:30 12:45 13:00 13:30 14:35 14:55 15:00 16:30 17:30	Sign Emplo Richar Trav	Signation nature l oyee Na rd Hatteb vis Marte	Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera WAIT ON Commenc SUSPENE Flour Eng B&C takes Clean on e Secure sit Travel to H LaGrone, LaGrone, LaGrone, Caster Crater Boots and C me erg	SS25 location. C personnel to tre pper crown valve il pump lines on in m wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO o OPERATIONS and AE Eng repr representatives bast and south si e for evening fotel Gomes, Richard Gomes, Richard Richard, Clayton ere Representation coots Representation Hours on Locat 11.5 11.5	e. Used long r and bleed off I manifold. Reported tor. Remove p is is loaded out is samples for L W Cleaning south DUE TO SMAL esentatives arr to inspect well de of location, meet w/ Flour meet w/ Califor meet w/ Jim Flour meet w/ Jim Flour we tative	each track h line, remove position 2-7/8 pump iron ha for DECON A COUNTY side of wellt L AIRCRAF ive and star and are loo preparation Eng on build mia OSHA a bx, Shackelf Proje I Hours 0.5 0.5	on. Move in crane. In noe to assist and unce a line. Insure that win " pump lines from Lo anging in cellar. Loa HAZMAT AND FIRE to cesna 172) DOIN nd by until plane leav sking at ideas to capt for bridge ding a Sombrero & in and discuss safety is ford and SOCAL stat ford and SOCAL stat ected Operations Approvals Prin Jim I	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built d out same to o DEPARTMEN IG FLY-BYS VE res ure the gas cor stalling mist ex sues with placin f on alternative t Name t Name aGrone Employee Name	th side is new dirt t lecontam TS RY CLO ning out c tractors ng bridge	shut-in pridge o ination s SE TO ) of the cr and kill ntingen	and bleed off ver pump lim site. Send wi LOCATION ater (Operation plan cies	f/remove es. ireline eq ons stopp Date Date	pt to DECOM
11:30 12:45 13:00 13:30 14:35 14:50 14:55 15:00 16:30 17:30	Sign Emplo Richar Trav Danr	Signati nature I oyee Na rd Hatteb wis Marte ny Clayte	Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera WAIT ON Commenc SUSPEND Flour Eng B&C takes Clean on e Secure site Travel to h LaGrone, LaGrone, LaGrone, Crater Crater Boots and C me eerg	SS25 location. C personnel to tre pper crown valve il pump lines on in wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO OSHA, NO SHO OOFERATIONS and AE Eng reprisentatives bast and south si e for evening fotel Gomez, Richard Gomez, Richard Richard, Clayton er Representatives lotel Gomes, Richard Richard, Clayton Hours on Locat 11.5 11.5	e. Used long r and bleed off I manifold. Repo tor. Remove p e is loaded out s samples for L W cleaning south DUE TO SMAL esentatives arr to inspect well de of location, meet w/ Flour meet w/ Califor meet w/ Jim Fr ve tative	each track h line, remove osition 2-7/8 sump iron ha for DECON A COUNTY side of wellt L AIRCRAF ive and star and are loo preparation Eng on build mia OSHA a lox, Shackelf Proje I Hours 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	on. Move in crane. In noe to assist and unce a line. Insure that win " pump lines from Lo anging in cellar. Loa HAZMAT AND FIRE to cesna 172) DOIN nd by until plane leav sking at ideas to capt for bridge ding a Sombrero & in and discuss safety is ford and SOCAL stat ford and SOCAL stat ected Operations Approvals Prin Jim I	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built d out same to o DEPARTMEN IG FLY-BYS VE res ure the gas cor stalling mist ex sues with placin f on alternative t Name t Name LaGrone Employee Name Jim LaGrone	th side is new dirt t lecontam TS RY CLO ning out c tractors ng bridge	shut-in pridge o ination s SE TO ) of the cr and kill ntingen	and bleed off ver pump lim site. Send wi LOCATION ater (Operation plan cies	f/remove es. ireline eq ons stopp Date Date	pt to DECOM
11:30 12:45 13:00 13:30 14:35 14:50 14:55 15:00 16:30 17:30	Sign Emple Richar Trav Dann Bu	Signation nature l oyee Na rd Hatteb vis Marte	Arrive on S and take 2 Close in u Remove a Break dow Lunch in s Stop opera Stop opera SUSPENE Flour Eng B&C takes Clean on e Secure sit Travel to h LaGrone, LaGrone, LaGrone, Crater erg al on	SS25 location. C personnel to tre pper crown valve il pump lines on in m wireline lubrica hifts while wirelin ations to take gas OSHA, NO SHO o OPERATIONS and AE Eng repr representatives bast and south si e for evening fotel Gomes, Richard Gomes, Richard Richard, Clayton ere Representation coots Representation Hours on Locat 11.5 11.5	e. Used long r and bleed off I manifold. Reporter tor. Remove p is is loaded out is samples for L W cleaning south DUE TO SMAL esentatives arr to inspect well de of location, meet w/ Flour meet w/ Califor meet w/ Jim Fe ve tative	each track h line, remove position 2-7/8 pump iron ha for DECON A COUNTY side of wellt L AIRCRAF ive and star and are loo preparation Eng on build mia OSHA a bx, Shackelf Proje I Hours 0.5 0.5	on. Move in crane. In noe to assist and unce a line. Insure that win " pump lines from Lo anging in cellar. Loa HAZMAT AND FIRE to cesna 172) DOIN nd by until plane leav sking at ideas to capt for bridge ding a Sombrero & in and discuss safety is ford and SOCAL stat ford and SOCAL stat ected Operations Approvals Prin Jim I	Held Tool Box s to pump lines. ng valve on nor ocation 1. Built d out same to o DEPARTMEN IG FLY-BYS VE res ure the gas cor stalling mist ex sues with placin f on alternative t Name t Name LaGrone Employee Name Jim LaGrone	th side is new dirt t lecontam TS RY CLO ning out c tractors ng bridge	shut-in pridge o ination s SE TO ) of the cr and kill ntingen	and bleed off ver pump lim site. Send wi LOCATION ater (Operation plan cies	f/remove es. ireline eq ons stopp Date Date	pt to DECOM

81-931-8	Greens Rd TX. 7706 1884				Q					an estimate ( sheet. This is		
-		Date:	18-Dec-201	15		Well Name a	nd Number:	Standa	rd Se	nson 25	Report	# 55
	Custor	mer Name:		alifornia Gas			County:		1.1	Los Angele		
Custor	mer Billing	g Address;		pa Ave., SC 9	328		State:			California	+	
10000	a na fata na f	AFE #:	Northridge,	CA, 91326		1A/c	Country: Il Location:		Alico	USA Canyon Stora	no Facil	h.
Custor	mer Repre	esentative:		_		VVe	Well Type:		Aliso	Gas	geraci	ny
			Jim LaGron	ie		-	Job Type:			Well Contr	ol	
	Leas	se - Well #:	Standard S	enson 25			Rig No:			N/A		
		n of Charge		Level	0, 71 54 67	ments	Units		_	t Charge		Total
21		ntrol Specia		4		Hatteberg	1		\$	11,500.00	\$	11,500.
1		ol Specialis pecialist	6	4		Martel	1		\$	10,000.00 9,200.00	\$	10,000.
S	and the second s	nrol Engine	er	4		Baggett Grone	1		\$	11,500.00	Ф \$	11,500.
		nrol Engine		4		Gomez	1		\$	11,500.00	\$	11,500,
Sr	r. Well Con	ntrol Special	ist	4	Danny	Clayton	i i		\$	11,500.00	\$	11,500.
		ntrol Special		4	Bud (	Curtis	1		\$	11,500.00	\$	11,500.
(		aily Expense	e	1		A REAL PROPERTY OF	7		\$	325.00	\$	2,275.
	- 1.8	otel pment			Junk Shot M	anifold Stby	1		\$ \$	163.00 530.00	\$	1,141.
		al Cars			Junk Shot N	annow Groy	3		5	185.00	\$	555.
					Estin	nated Daily Total					\$	81,201.
			-			Vell Summary					÷	21149 D
andard s	Senson 25	has broach	ned to surfac	e with severa	fissures on pad s				_			
-3/4" ca	sing to 990	0 ft. 7" casi	ng to 8,585	ft. 5-1/2" slott	ed liner to 8,745 ft	. 2-7/8" tubing to 8	510 ft. Packer	lepth 8,46	8 ft			
Hour	Hour					Activity of	n Site					
5:30	1	Depart Ho	tel									
6:30		and the second second second	rning Ops m	neeting			0.000	- 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10				
16:00		sections fo	00 % comp or transport (	up the hill to lo	ocation. Installed	for Center of Gravity pad eyes for section options available to	n lift. Will be de	ivered to I	ocatio			
-		-									_	
		1			Proje	ected Operations						
stall brid	lge across			0.21	Proje	Approvals				ž. V		
	Signatu	ure Custom	er Represe		Proje	Approvals Prir	nt Name				Date	
	Signatu	ure Custom	er Represe Coots Repr		Proje	Approvals Prir	nt Name nt Name				Date	
	Signatu	ure Custom			Proje	Approvals Prir Prir						
S	Signatu	ure Custom Boots and I		esentative	Proje	Approvals Prir Prir	nt Name		Hours	on Location	Date	
S Ei Rin	Signature E mployee Nai chard Halteb	ure Custom Boots and I me parg	Coots Repr Hours on 1	esentative Location	Travel Hours 0,5	Approvals Prir Prir	nt Name LaGrone Employee Name Jim LaGrone		Hours	11.5	Date	e avel Hours 0,5
S El Rin	Signature I Signature I mployee Nai chard Hatteb Travis Marte	ure Custom Boots and I me perg	Coots Repr Hours on 1 11.4 11.4	esentative Location 5	Travel Hours 0,5 0,5	Approvals Prir Prir	nt Name LaGrone Employee Name		Hours		Date	e avel Hours
S Ei Rin	Signatu Signature I Signature	ure Custom Boots and I me perg al	Hours on 1 11.4 11.4 11.4 11.4 11.4 11.4	esentative Location 5 5 5	Travel Hours 0.5 0.5 0.5	Approvals Prir Prir	nt Name LaGrone Employee Name Jim LaGrone		Hours	11.5	Date	e avel Hours 0,5
S EI Rin I	Signatu Signature I Signature	ure Custom Boots and I me perg al 20	Coots Repr Hours on 1 11.3 11.3 11.3 11.3 11.3 11.3 11.3	esentative Location 5 5 5 5 5	Travel Hours 0.5 0.5 0.5 0.5 0.5	Approvals Prir Prir	nt Name LaGrone Employee Name Jim LaGrone		Hours	11.5	Date	e avel Hours 0,5
S El Rin I	Signatu Signature I Signature	ure Custom Boots and I me perg al 20	Hours on 1 11.4 11.4 11.4 11.4 11.4 11.4	esentative Location 5 5 5 5 5	Travel Hours 0.5 0.5 0.5	Approvals Prir Prir	nt Name LaGrone Employee Name Jim LaGrone	Total Mart		11.5	Date	avel Hours 0,5



1.11.12.12.1	Greens R , TX. 770 8884			Q		,		is an estim on this si e.		
-	-	Date:	19-Dec-2015		Well Name a	and Number:	Standard Se	nson 25	Report #	56
	Custo	omer Name:	Southern California Ga			County:		Los Ange		10. T
Custo	mer Billin	ng Address:	12801 Tampa Ave., SC Northridge, CA, 9132			State: Country:		Californ	a	
	-	AFE #:	Northinge, CA. 5152		w	ell Location:	Aliso	Canyon Stor	age Facilit	v
		resentative:	5			Well Type:		Gas	-	
R	1	A DOMESTIC AND A DOMESTICA AND A DOMESTIC AND A DOMESTICA AND A DOMESTIC AND A DOMESTIC AND A DOMESTIC AND A DOMESTIC AND A DOMESTICA AN	Jim LaGrone			Job Type:		Well Con	trol	
		ase - Well #: on of Charge	Standard Senson 25 s: Level	Cam	ments	Rig No:		N/A t Charge	T 7	otal
		ontrol Special		and the second se	Hatteberg	1	s Oni	11,500.00		11,500.
		trol Specialis		10 Aug	Martel	1	\$	10,000.00	1 m 1	10,000.
_		Specialist	4		Baggett	1	\$	9,200.00		9,200.
		onrol Enginee onrol Enginee			aGrone Gomez	1	\$ \$	11,500.00	\$	11,500. 11,500.
		ontrol Special			Clayton	1 1	5	11,500.00	\$	11,500.
S	r. Well Co	ontrol Special	ist 4	Bud	Curtis	1	\$	11,500.00	\$	11,500.
		gineering Sup		Arash Ha	ighshenas	1	\$	4,600.00		4,600.
	the second second	Daily Expense Hotel	e 1		-	7	\$	325.00 163.00	\$	2,275.
		uipment		Junk Shot M	Manifold Stby	1	\$	530.00	5	1,141.
		ntal Cars				3	\$	185.00	\$	555.
		-		Estim	ated Daily Total				\$	85,801.
				W	ell Summary					
andard	Senson 2	25 has broach	ed to surface with seve	ral fissures on pad	site	territe states				
6:30 6:45 8:40 9:40 10:25 11:00 11:30 12:30 13:00 14:00 15:00		Arrive on la Complete Move in 22 Tool box s 1/2 of bridg 2nd 1/2 of Move bridg Remove si Lunch Install add Rig down of Shut down Attend me	perations Mtg including ocation and monitor ga all dirt work to accept b 20T hydraulic crane w/ 2 afety meeting ge arrives and position bridge arrives and is as ge and "straddle" Well 2 lings from BOX of bridg itional grating onto brid crane and remov from 1 o operatons due to wind eting with California O8 ttoms w/ Western Wirel op	s and slight wind dir ridge (bury 7" kill/ch 200 ft stick. 25. No issues. Job e ge around tree to co ocation and rain G regulators discus	ection from the sou oke lines), which is ested w/ crane went smooth. Brid ongeal oil to fall bac esing merits/risks of	finished down the ge was weight @ k into crater and cutting tubing p	) 15,000 lbm keep out of air rior to jet cuttin l	tubing	s in 10-15 I	л#
17:30			ation and head to hotel.							
	1	1		Proje	cted Operations					
			ey on VVell 25B. This w Magnectic field could be	corrupted w/o proc	edure	I well in the drill	path. Last gyro	showed we	ll be 10 fee	t
	Signa	ture Custom	er Representative	1	Approvals Prin	t Name		-	Date	
	Signature	Boots and	Coots Representative		Prin	t Name		-	Date	
5					Jim I	LaGrone		1		
	mployee N	ame	Hours on Location	Travel Hours		Employee Name	Hours	on Location	Trave	Hours
	Inployee n		11.5	0.5	1	Jim LaGrone		11.5		0.5
E	ichard Hatt	everg								
ER	ichard Hatte Travis Mar	rtel	11.5	0.5		Rolly Gomez		11.5		05
ER	Travis Mar Danny Clay	rtel /ton	11,5	0.5		Rolly Gomez		11.5	-	05
ER	ichard Hatte Travis Mar	rtel /ton is				Rolly Gomez		11.5		0.5



7047 W. Gree Houston, TX 281-931-8884	. 77066						on this st		y for the da his is not a
	Date	20-Dec-2015		Well Name a	nd Number:	Standard Sen	son 25	Report	# 57
	Customer Name	: Southern California Ga			County:		Los Ange		
Customer	Billing Address	12801 Tampa Ave., SC Northridge, CA, 9132		-	State: Country:	_	Californi USA	a	
	AFE #			We	Il Location:	Aliso C	anyon Stor	age Fa	cility
	r Representative			1.0	Well Type:		Gas		
Repo	ort Generated By	: Jim LaGrone Standard Senson 25		-	Job Type: Rig No:		Well Cont N/A	trol	
Desc	cription of Charg		Cor	nments	Units	Unit	Charge		Total
	Vell Control Speci			Hatteberg	1	\$	11,500.00	\$	11,500.0
We	Il Control Speciali			is Martel	1		10,000.00	\$	10,000.0
e. 0	HSE Specialist Vell Conrol Engine	4 eer 4		Baggett aGrone	1	\$	9,200.00	\$	9,200.0
	Vell Conrol Engine		1702.110	Gomez	1		11,500.00	\$	11,500.0
Sr. W	Vell Control Specia	alist 4		y Clayton	Í Í		11,500.00	\$	11,500.0
	Vell Control Specia	947 F		Curtis	1		11,500.00	\$	11,500.0
	on Engineering Su neral Daily Expension		Arash H	laghshenas	1	\$	4,600.00	5	4,600.0
Ger	Hotel				7	\$	163.00	\$	1,141.0
	Equipment		Junk Shot	Manifold Stby	ì	\$	530.00	\$	530.0
	Rental Cars				3	\$	185.00	\$	555.0
				nated Daily Total				\$	85,801.0
	NE COL			Vell Summary				_	
		hed to surface with seve ing to 8,585 ft. 5-1/2" sl				1		_	
		ing to 6,565 ft. 5-1/2" si	otted liner to 6,/45			depth 8,468 π.		_	
	Hour			Activity on	Site				
5:30	Depart H							_	
6:30		orning Operations meeti							
6:45		SS25 pad, check LEL a			of SS25=1318 p	osig			
7:00		tested SSV (manumatic			("			_	
8:00		HOWCO pump iron and				ound Hatteberg's	crossing		
10:00		100T crane and set up for safe safe mono-conduted		same to bridge & ear	th		_		
12:00	Lunch	sale sale mono-conduct	or whethe unite						
12:35	Cont. RU	W/L.		1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.					
		run gauge ring and be							
13:30		/L unit, drive crane dowr			t thing in mornin	ng			
_	and the second se	ell w/ turnbuckles on no	rth side. Wellhead	is stable and secure					
14:00		reline unit w/ plastic eneral housekeeping. C	narations suspand	ed for evening				_	
15:00	the last designed	of grating section to pla	and the second sec	the state of the second s	llection			_	
		to be assiting in droplet							
					-				
	Relief we	Il appears to be 2 ft from	n target on high sid	e, running 4" gradient	tool to determin	ne exact distance	e to target.		
								_	
	1								
			Proi	ected Operations	_		_		_
av not requi	ite spinning mage	et survey of 25B (now d		and the second	2 ft away and	vill run gradient	tool (4") to	discern	exact distance
		ng cut on target well for I		and an ger and		3.444.411			
				Approvals					
4	Signature Custo	mer Representative			Name			Dat	e
							1		
	nature Boots and	Coots Representative		Print	Name			Dat	e
Sign				Jim La	aGrone		1		
Sigr	auto Manaza	Hours on Location	Travel Hours		Employee Name	Hours	on Location	T	ravel Hours
	ovee Name	the strategic state and a strategic and strategic and a	0.5	-	Jim LaGrone		11.5	-	0.5
Émpl	oyee Name rd Hatteberg	11.5							
Empl Richar Tra	rd Hatteberg vis Martel	11.5	0.5		Rolly Gomez		11.5	· · · · · · · · · · · · · · · · · · ·	0.5
Empl Richar Tra Dani	rd Hatteberg vis Martel ny Clayton	11.5 11.5	0.5 0:5		Rolly Gomez		11.5		0.5
Empl Richar Tra Dan Bi	rd Hatteberg vis Martel ny Clayton ud Curtis	11.5 11.5 11.5	0.5 0.5 0.5		Rolly Gomez	4	11.5		0.5
Empl Richar Tra Dan Bi	rd Hatteberg vis Martel ny Clayton	11.5 11.5	0.5 0:5	-		otal Man-hours for			0.5 84

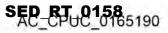


281-931-888	eens Rd. X. 77066 34		Q			list	is an estim ed on this si oice		
_	Date:	21-Dec-2015		Well Name a	nd Number:	Standard	Senson 25	Report	# 58
	Customer Name:	Southern California Ga			County:		Los Ange		-
Custome	er Billing Address:	12801 Tampa Ave., SC			State:		Californ	ia	
Co por Ardania	AFE #:	Northindge, CA, 9152	6	162	Country: ell Location:	AE	USA so Canyon Stor	ana Fa	ailita /
Custome	er Representative:			VV	Well Type:	Alls	Gas	aye ra	Cinty
	ort Generated By:				Job Type:		Well Con	trol	
		Standard Senson 25			Rig No:		N/A		
	cription of Charge		Comn		Unit		Jnit Charge	1	Total
	Well Control Specia ell Control Specialis		Richard F Travis	and the second sec	1	\$	11,500.00	\$	11,500.
VV	HSE Specialist	4	Mike B		1	\$		1	9,200.
	Well Conrol Engine	er 4	Jim La		1	\$	11,500.00	\$	11,500.
	Well Conrol Engine		Rolly C		1	\$	11,500.00	\$	11,500
	Nell Control Specia		Danny (		1	\$	11,500.00	\$	11,500.
	Well Control Specia on Engineering Sup		Bud C Arash Ha	D171175	1	\$	11,500.00	\$	11,500.
	eneral Daily Expens		miash na	Austicitas	7	\$		5	2,275.0
	Hotel				7	\$		\$	1,141.
	Equipment		Junk Shot M	lanifold Stby	1	\$	- CG 7 LL	\$	530.
	Rental Cars				3	\$	185.00	\$	555.
				ted Daily Total				\$	85,801.
				Il Summary				_	
		hed to surface with seve			FAD & Dealers	1	8	_	
		ing to 8,585 ft. 5-1/2" sl	otted liner to 8,745 ft	the second se		depth 0,460	π.	_	
Hour	Hour			Activity on	Site				
5:30	Depart Ho			.ac					
6:30 6:40		orning Operations meeti ressure on SS25 is 1285			ivalant			-	
7:00		rane & wireline eqpt	psi, est one is 155	i paror ala ppg eqi	avalent				
7:30	and the second se	ent blocks on choke line			-				
8:30		ator and test 400# low, 4		e to 1300#, open cr	own valve and	RIH w/ 2.133	"Gauge ring		
9:30	Tag up @	+/-100 ft. POH & remo	ve lubricator. Rig up	on 25B (offset well	I on same pad (	close to well :	25 downhole)		
		ng magnet survey. Resi		OT interferring with	Wellspot/Grad	ient Runs, bi	ut actually seein	ng 25	
14:30		t of hole w/ rotating mag			-15	1			
15:00		ditional grating on bridge k line eqpt and glycol pu				oil mist)		_	
10.00		and given pump tie in lines to g				ol into well	No "sealing" io	e niua	
16:30	reconigu		hycorinie. Equalize (	w 2000 paranu pu		or into wen.	No sealing lo	e piug	
16:30 17:15	Leave loc	ation			The Test of give				
	Leave loc	ation			mp i bbi oi giyo				
		ation Il is 13 ft away at TD an	d 18 deg left of high :		mp i bbi oi giye				
		and the	d 18 deg left of high		mp i obi or giyo				
		and the	d 18 deg left of high i		np i bbioi giyo				
		and the	d 18 deg left of high :		np i bbioi giyo				
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		and the	d 18 deg left of high :						
		and the	d 18 deg left of high :						
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		and the	d 18 deg left of high :						
		and the	d 18 deg left of high :						
		and the	d 18 deg left of high :						
		and the		side					
17:15	Target we	Il is 13 ft away at TD an	Projec	side					
17:15 Áll rig up to	Target we	and the	Projec	side		and nutplug		will main	ntain losses
17:15 Áll rig up to	Target we	Il is 13 ft away at TD an	Projec , the middle 100 bbl v	side ted Operations will be laced w/ diat		and nutplug		will main	ntain losses
17:15 All rig up to 4-1/2 BPM	Target we	Il is 13 ft away at TD an	Projec , the middle 100 bbl v	side side oted Operations will be laced w/ diat	omacious earth	and nutplug			
17:15 All rig up to 4-1/2 BPM	Target we	Il is 13 ft away at TD an	Projec , the middle 100 bbl v	side side oted Operations will be laced w/ diat		and nutplug		will main Dat	
17:15 All rig up to 4-1/2 BPM	Target we pump 300 bbl of 1: 1 of 15 ppg Signature Custon	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative	Projec , the middle 100 bbl v	side ited Operations will be laced w/ diat Approvals Print	omacious earth	and nutplug		Dat	e
17:15 All rig up to 4-1/2 BPM	Target we pump 300 bbl of 1: 1 of 15 ppg Signature Custon	Il is 13 ft away at TD an	Projec , the middle 100 bbl v	side ited Operations will be laced w/ diat Approvals Print	omacious earth	and nutplug			e
17:15 All rig up to 4-1/2 BPM	Target we pump 300 bbl of 1: 1 of 15 ppg Signature Custon	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative	Projec , the middle 100 bbl v	side nted Operations will be laced w/ diat Approvals Print Print	omacious earth	and nutplug		Dat	e
17:15 Áll rig up to 4-1/2 BPM Sig	Target we Target we pump 300 bbl of 1: 1 of 15 ppg Signature Custon inature Boots and	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative Coots Representative Hours on Location	Projec the middle 100 bbl v f Travel Hours	side nted Operations will be laced w/ diat Approvals Print Print	tomacious earth t Name t Name a Grone Employee Name		. If on losses, v	Dat Dat	e e ravel Hours
17:15 All rig up to 4-1/2 BPM Sig Emp Richa	Target we Target we pump 300 bbl of 1: of 15 ppg Signature Custom nature Boots and bloyee Name ard Hatteberg	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative Coots Representative Hours on Location 11.5	Projec the middle 100 bbl v A Travel Hours 0.5	side nted Operations will be laced w/ diat Approvals Print Print	ormacious earth I Name I Name .aGrone Employee Name Jim LaGrone		. If on losses, v	Dat Dat	e e avel Hours 0.5
17:15 All rig up to V4-1/2 BPM Sig Emp Richt	Target we Target we pump 300 bbl of 1: 1 of 15 ppg Signature Custon nature Boots and bloyee Name ard Hatteberg avis Martel	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative Coots Representative Hours on Location 11.5 11.5	Projec the middle 100 bbl v f Travel Hours 0.5 0.5	side nted Operations will be laced w/ diat Approvals Print Print	tomacious earth t Name t Name a Grone Employee Name		. If on losses, v	Dat Dat	e e ravel Hours
Vill rig up to /4-1/2 BPM Sig Emp Richt Tr Dat	Target we Target we pump 300 bbl of 1: of 15 ppg Signature Custon inature Boots and loyee Name ard Hatteberg avis Martel nny Clayton	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative Coots Representative Hours on Location 11.5 11.5	Projec the middle 100 bbl v Travel Hours 0.5 0.5 0.5	side nted Operations will be laced w/ diat Approvals Print Print	ormacious earth I Name I Name .aGrone Employee Name Jim LaGrone		. If on losses, v	Dat Dat	e e avel Hours 0.5
Vill rig up to Vill rig up to Vil-1/2 BPM Sig Emp Richa Tir Dar Emp	Target we Target we pump 300 bbi of 11 of 15 ppg Signature Custon inature Boots and ployee Name ard Hatteberg avis Martel nny Clayton Bud Curtis	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative Coots Representative Hours on Location 11.5 11.5 11.5 11.5	Projec the middle 100 bbl v Travel Hours 0.5 0.5 0.5	side nted Operations will be laced w/ diat Approvals Print Print	ormacious earth I Name I Name aGrone Employee Name Jim LaGrone		. If on losses, v	Dat Dat	e e avel Hours 0.5
Vill rig up to Vill rig up to Vil-1/2 BPM Sig Emp Richa Tir Dar Emp	Target we Target we pump 300 bbl of 1: of 15 ppg Signature Custon inature Boots and loyee Name ard Hatteberg avis Martel nny Clayton	Il is 13 ft away at TD an 5 ppg mud down tubing, ner Representative Coots Representative Hours on Location 11.5 11.5	Projec the middle 100 bbl v Travel Hours 0.5 0.5 0.5	side nted Operations will be laced w/ diat Approvals Print Print	omacious earth t Name a Grone Employee Name Jim LaGrone Rolly Gomez	Ho	. If on losses, v	Dat	e e avel Hours 0.5

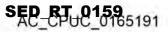


281-931-8	Greens Rd . TX. 7706 3884				D	-	lis		on this sl		for the dat is is not a
-		Date:	22-Dec-2015		Well Name an	d Number:	Standar	d Sen		Report #	59
1	Custor	mer Name:	Southern California		_	County:			Los Ange		
Custo	mer Billing	g Address:	12801 Tampa Ave., Northridge, CA, 91			State: Country:		_	Californ USA	la	_
	-	AFE #:	noranage, ort, o	1020	We	I Location:	A	liso C	anyon Stor	age Facil	lity
		esentative:	had been to			Well Type:			Gas		
R			Jim LaGrone Standard Senson 2	5		Job Type: Rig No:		-	Well Con N/A	trol	
D		of Charge			mments	Unit	s I	Unit	Charge		Total
S	r. Well Con	ntrol Special	list 4		d Hatteberg	1	-		11,500.00	\$	11,500.00
		ol Specialist			vis Martel	1	and the second s		10,000.00		10,000.0
s		pecialist nrol Enginee	4 er 4		e Baggett LaGrone	1		\$ \$	9,200.00	\$	9,200.00
		nrol Enginee			y Gomez	1			11,500.00	\$	11,500.00
		ntrol Speciali			ny Clayton	1		\$	11,500.00	\$	11,500.0
		trol Speciali			d Curtis	1		\$ \$	4,600.00	\$ \$	11,500.0
		neering Sup aily Expense		Arash Hagh	nshenas (arrīved)	7		\$	4,600.00	\$	2,275.00
-	н	otel			1	7		\$	163.00	\$	1,141.00
		pment		Junk Shol	t Manifold Stby	1		\$	530.00	\$	530.00
_	Rent	al Cars	-		mated Delle T-t-I	3		\$	185.00	\$	555.00
-	_				mated Daily Total Well Summary					\$	81,201.00
				everal fissures on par		510 ft. Packer	depth 8,46	58 ft.			
Hour	Hour	1			Activity on S	Site					
5:30		Depart Hol				Carrier			1		
6:30	1				south/west variable w/						
7:10					for Western Wireline to 5 bbl of glycol @ 7 gpr					51	
8:00					jection pump. Call HC					ne test pre	essure
9:00	1	Site safety			<i>z</i> - <i>r</i> -				2.01.22.1.2	10.12.0 Kr	
9:10				Hi/ 5000 psi low. Wh	ile bleeding back from	5M# high @ 1	200 psi, chi	icksan	o-ring leak	king on lo	cation
9:50			It loop/bale st 400/5000 with 5/1	O min test respective							
10:10	-				ALLOK						
10.10					IV. All OK PM (100 bbl of mud, 1)	00 bbl mud w/	125#/bbl m	ud &	30 ppb Nut	plug, 100	bbl of mud)
10:15		Began kill Pumping a	w/ 300 bbl of all WB at 5 BPM thru entire	M at 15.1 ppg at 5 B			125#/bbl m	nud &	30 ppb Nut	plug, 100	bbl of mud)
10:15 10:20		Began kill Pumping a 60 bbls pu	w/ 300 bbl of all WB at 5 BPM thru entire mped 200 psi	M at 15.1 ppg at 5 B job. 40 bbl gone, 150	PM (100 bbl of mud, 1		125#/bbl m	nud &	30 ppb Nut	plug, 100	bbl of mud)
10:15 10:20 10:22		Began kill Pumping a 60 bbls pu 70 bbs gor	w/ 300 bbl of all WB at 5 BPM thru entire mped 200 psi ne, 200 psi, mud/oil	M at 15,1 ppg at 5 B job. 40 bbl gone, 150 mist in crater	PM (100 bbl of mud, 1 0 psi on pump, 13 psi o	n wellhead					
10:15 10:20		Began kill Pumping a 60 bbls pu 70 bbs gon 300 bbl go	w/ 300 bbl of all WB at 5 BPM thru entire mped 200 psi ne, 200 psi, mud/oil me, pumps off, slow	M at 15.1 ppg at 5 B job. 40 bbl gone, 150 mist in crater rate via low torgque f	PM (100 bbl of mud, 1	n wellhead ure 400 psi, m	in 120 psi,	flat lin	ied at 260 p	osi on last	
10:15 10:20 10:22 11:05 11:20		Began kill Pumping a 60 bbls pur 70 bbs gor 300 bbl go shut down but w/ muc	w/ 300 bbl of all WB at 5 BPM thru entire mped 200 psi ne, 200 psi, mud/oil ne, pumps off, slow all pumping due to ch less fluid (mud) to	M at 15.1 ppg at 5 B job. 40 bbl gone, 150 mist in crater rate via low torgque f rocking of wellehad a b surface due to 15# r	PM (100 bbl of mud, 1 9 psi on pump, 13 psi o to 1/2 BPM (max press nd unloading mud fron mud weight	n wellhead ure 400 psi, m i crater, very li	iin 120 psi. Itle formatic	flat lin	ied at 260 p	osi on last	
10:15 10:20 10:22 11:05 11:20 13:28		Began kill Pumping a 60 bbls puu 70 bbs gor 300 bbl go shut down but w/ muc Tubing pre	w/ 300 bbl of all WB at 5 BPM thru entire mped 200 psi ne, 200 psi, mud/oil ne, pumps off, slow all pumping due to ch less fluid (mud) to sssure rose from zer	M at 15.1 ppg at 5 B job. 40 bbl gone, 150 mist in crater rate via low torgque I rocking of wellehad a o surface due to 15# r o to 248 psi, well con	PM (100 bbl of mud, 1 0 psi on pump, 13 psi o to 1/2 BPM (max press nd unloading mud fron mud weight tiuing to unload dehydi	n wellhead ure 400 psi, m crater, very li rated/clabbard	in 120 psi, ttle formatic ed mud	flat lin on. Si	ied at 260 p milar as be	osi on last fore	t 60 bbi)
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10:15 10:20 10:22 11:05 11:20 13:28		Began kill Pumping a 60 bbls pui 70 bbs gor 300 bbl go shut down but w/ muc Tubing pre Pump line Gather sar	w/ 300 bbl of all WB at 5 BPM thru entire mped 200 psi ne, 200 psi, mud/oil ne, pumps off, slow all pumping due to ch less fluid (mud) to rssure rose from zer to top TEE broke of	M at 15.1 ppg at 5 B job. 40 bbl gone, 150 mist in crater rate via low torgque I rocking of wellehad a o surface due to 15# r o to 248 psi, well con f due to movement of from crater. Well be	PM (100 bbl of mud, 1 0 psi on pump, 13 psi o to 1/2 BPM (max press nd unloading mud fron mud weight tiuing to unload dehydi	n wellhead ure 400 psi, m r crater, very li rated/clabbard Forque bale on	in 120 psi, ttle formatio ed mud pump line	flat lin on. Si to isol	ied at 260 p milar as be	osi on last fore	t 60 bbi)
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# **Final Report** HR Vertilog Inspection Survey

**Conducted for:** 

# Southern California Gas Company

Aliso Canyon Frew 2

Run date: October 20, 2014 Report date: October 22, 2014





Baker Hughes Wireline Systems 180 Childers Run Crossing Buckhannon, West Virginia 26201

District Manager: Thomas Dowell Tel. (304) 472 - 2460

Analysis Manager: Brian Lundy / Brent Harbstreit Tel. (713) 879 - 1506



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Attachments



#### Executive Summary

On October 20, 2014, BHI Wireline Services, operating from Buckhannon WV completed a HR Vertilog magnetic flux leakage (MFL) casing inspection survey on the Southern California Gas Company Aliso Canyon Frew 2.

A total of 91 individual joints of casing were identified during the inspection survey. Within this report, the term "casing" is intended to mean the downhole tubulars which are the subject of the survey, and which may include well casings, liners or production tubing.

A total of 1976 metal loss features exceeding the 15% reporting threshold were identified during the HR Vertilog survey. Of the 1976 total metal loss features, 14 were identified as internal features, and 1962 were identified as external features.

A total of 3 metal loss features exhibited predicted depths exceeding 80% of wall thickness. The maximum depth among all metal loss features was 87%. Any metal loss features of 80% or greater body wall loss will have a 0 PSI burst pressure rating and should be considered to have possible total or near total body wall penetration.

A total of 3 metal loss features exhibited ERF values exceeding 1.0. The maximum ERF among all metal loss features was 1.500.

This Final Report is intended to serve as an overall summary of the inspection results. The accompanying InSight Data CD contains a comprehensive Feature List which represents the complete findings of the HR Vertilog casing survey.

#### **Evaluation Comments**

-0.66 ft Hardware - External casing head response.

477.31 ft Hardware - Bottom of 13 3/8" external casing.

The well records provided were used for the determination of where there were casing weight and grade changes. However, the average axial background did not seem to change in the N-80 pipe grade sections and appear to be in the J-55 pipe grade. There could be some overstatement of the burst pressures if there is J-55 casing sections in the areas designated as N-80.

There were several features detected within the connections. The metal mass change of the connections could have an adverse effect on the metal loss calculations of these features.

The area around 2835 ft may have total penetration based upon the discriminator responses.

In addition to the features that classed and reported, there were a significant amount of features present below the threshold throughout the survey.



#### 1. Job Information

BHI Wireline Services completed a HR Vertilog casing inspection survey on the Southern California Gas Company Frew 2 on October 20, 2014. The job parameters are summarized in the following well, service and equipment data tables.

#### 1.1. Well Data

The following well data and casing records were provided by representatives of Southern California Gas Company.

		Wel	l Identi	ificatio	on			
Company	Southern C	alifornia Gas Co	ompany	1				
Well	Frew 2							
Field	Aliso Cany	on						
County/Parish	Los Angele	s						
State/Province	California		Cour	ntry				
API Number			Loca	ation				
Section	N/A	Township		N/A		Range	•	N/A
			Elevat	ions				
Kelly Bushing		0.00 feet						
Drilling Floor		0.00 feet						
Ground/Sea Floo	or	0.00 feet						
Permanent Datu	m Is	G.L.	1	Perma	anent Da	tum Elev	vation	2796.00 feet
Log Measured F	rom	G.L.	1	Heigh	t Above	Datum		0.00 feet
Drilling Measure	d From	G.L.	]	Heigh	t Above	Datum		0.00 feet
		Boreh	nole Inf	forma	tion			
Fluid	8.5 KCL	Wellhead P	ressur	e	0 psi	V	Vell Depth	8120.00 feet
		Ca	asing R	ecord	ł			
Size	Weight	Grade		F	rom		То	Length
7.000 in	26.0 lb/ft	N-80		0.	00 ft	47	.00 ft	47.00 ft
7.000 in	23.0 lb/ft	N-80		47	.00 ft	173	2.00 ft	1685.00 ft
7.000 in	23.0 lb/ft	J-55		173	2.00 ft	548	5.00 ft	3753.00 ft
7.000 in	28.0 lb/ft	J-55		548	5.00 ft	653	1.00 ft	1046.00 ft
7.000 in	30.0 lb/ft	J-55		653	1.00 ft	885	0.00 ft	2319.00 ft
13.375 in	48.0 lb/ft			0.	00 ft	501	1.00 ft	501.00 ft

#### Table 1. Well Data



#### 1.2. Service Data

The BHI Wireline Services field services are summarized in the table below.

#### Table 2. Service Data

	Service Information
Job Date	October 20, 2014
Service Order	US091691
Recorded By	Grant Riffle
Witnessed By	Tom Egbert
Service Location	Buckhannon WV
Service Unit Number	4225
	Logging Information
Service	
Bottom Logged Interval	8100.00 feet
Top Logged Interval	-5.00 feet
Additional Services	
Remarks:	

#### 1.3. Pressure Calculations

The following information was provided by Southern California Gas Company for use in pressure calculations.

Pressure Calculations:				
Burst Pressure Calculation	Modified B31G			
Interaction Criteria	RP0102 - Fixed BW Ratio 6.0T x 6.0T			

#### 1.4. Equipment Data

The following BHI Wireline Services equipment assets were utilized in the performance of the inspection services.

#### Table 3. Equipment Data

Equipment Data				
Tool Series Number	7 to 9-5/8 Inch HRVRT 96 FL + 96 DIS Tool			
Electronics Series Number	MuxDB			
Interface Panel Series Number	4921			
Calibration Reference Number				



Well	Discovery Date	Stop Date	Type	Depth, ft	Method of Mitigation	Method of Repair	Cause of Leak
P32	12/13/1973	8/6/1975 (		4510	Killed well	Innerstring installation	Unknown
FF32C	4/4/1974	6/17/1976 5	-	3738	Killed well	Casing patch installation	Stage collar port leaking
FF35E	12/14/1974		Stage collar	2344	Killed well	Innerstring installation	Stage collar port leaking
P12	4/30/1975		Casing	3634	Killed well	Cement squeeze, casing patch, and convert to tubing flow	Unknown
P45	2/26/1976		Casing	500	Killed well	Innerstring installation	Unknown
FF32E	3/15/1976		Casing shoe	7122	Killed well	Cement squeeze	Insufficient cement integrity
P47	8/27/1976		WSO perforations	7328	Closed sliding sleeve	Cement squeeze	Insufficient cement integrity
P32C	9/21/1976	10/6/1976 5		3165	Killed well	Cement squeeze & casing patch	Stage collar port leaking
SF1	11/24/1976		Casing	1378	Killed well	Innerstring installation	Unknown
SS44A	4/4/1977		Stage collar	8850	Set tubing plug at 8790'	Cement squeeze & casing patch installation	Stage collar port leaking
SS5	8/30/1977		Casing	1050	Killed well	Innerstring installation	Unknown
FF35B	10/14/1977		Casing patch	3978	Killed well	Casing patch replacement	Casing patch seal leaking
P44	12/9/1977		Casing paten	4000	Killed well	Cement squeeze & casing patch	Unknown
FF35	6/15/1978		Casing shoe	6900	Killed well	Cement squeeze, plugged and abandoned	Insufficient cement integrity
FF35A	6/15/1978		Casing shoe	6640	Killed well	Cement squeeze	Insufficient cement integrity
SS11	9/19/1978		-	8692	Killed well	· · · · ·	
SS11 SS4A	10/5/1978		Casing shoe	4291	Killed well	Cement squeeze	Insufficient cement integrity
SS4A SS10	11/8/1978		Casing	4291	Killed well	Cement squeeze and set straddle packers	Unknown
SS10 SS11			Casing Casing shop	8730		Casing patch installation	Unknown
	7/24/1979		Casing shoe		Set tubing plug at 8659'	Cement squeeze	Insufficient cement integrity
SS25B SS44A	8/3/1979		Casing shoe	8434 3977	Set tubing plug at 8395' Killed well	Cement squeeze	Insufficient cement integrity
	8/3/1979		Casing patch			Casing patch replacement	Casing patch seal leaking
P26C	8/27/1979		Casing	6586	Killed well	Cement squeeze and casing patch	Unknown
FF35B	2/27/1980		Casing patch	3978	Killed well	Cement squeeze & casing patch replacement	Casing patch seal leaking
P26C	5/13/1980		Casing shoe	7850	Killed well	Cement squeeze & casing patch	Insufficient cement integrity
FF32C	7/24/1980		Casing patch	3738	Killed well	Casing patch replacement	Casing patch seal leaking
FF35B	8/13/1980		Casing shoe	7200	Killed well	Cement squeeze & casing patch replacement	Insufficient cement integrity
P43	10/8/1980		Casing	2020	Killed well	Casing patch installation	Unknown
P26B	12/15/1980		Stage collar	2793	Killed well	Installed casing patch	Stage collar port leaking
P4	4/23/1981		Casing shoe	7600	Killed well	Cement squeeze, plugged and abandoned	Insufficient cement integrity
MA1B	5/8/1981		Casing patch	1594	Killed well	Casing patch replacement	Casing patch seal leaking
P69A	5/19/1981		Casing	4913	Killed well	Cement squeeze & casing patch installation	Unknown
P42	7/13/1981		Casing shoe	8020	Killed well	Cement squeeze, plugged and abandoned	Insufficient cement integrity
SS25A	9/22/1981		Stage collar	2990	Set tubing plug at 8190'	Casing patch installation	Stage collar port leaking
SS4	9/24/1981		Casing	8600	Killed well	Cement squeeze	Unknown
MA1B	10/7/1981		Casing patch	1594	Killed well	Cement squeeze & casing patch replacement	Casing patch seal leaking
SS6	2/7/1982		Casing shoe	8444	Killed well	Cement squeeze	Insufficient cement integrity
P26C	4/2/1982		Stage collar	6586	Killed well	Cement plug back	Stage collar port leaking
MA1B	4/30/1982		Casing patch	1594	Killed well	Innerstring installation	Casing patch seal leaking
MA1B	4/30/1982	11/18/1982		7200	Killed well	Cement squeeze	Insufficient cement integrity
P69A	6/18/1982		WSO perforations	7572	Killed well	Cement squeeze and innerstring installation	Insufficient cement integrity
SS2	6/25/1982		WSO perforations	8540	Killed well	Cement squeeze	Insufficient cement integrity
SS25A	10/18/1982		Casing patch	2990	Set tubing plug at 8190'	Convert to tubing flow	Casing patch seal leaking
P26E	12/3/1982	1/6/1983 (	-	7360	Killed well	Cement squeeze	Insufficient cement integrity
SS24	3/29/1984		Casing shoe	8750	Killed well	Cement squeeze	Insufficient cement integrity
P45	4/15/1984		Casing	3000	Killed well	Innerstring replacement	Unknown
F3	6/13/1984		Casing	3240	Killed well	Cement squeeze & innerstring installation	Unknown
P32E	7/6/1984	7/16/1984 9		3014	Set tubing plug at 7397'	Casing patch installation	Stage collar port leaking
FF32F	7/30/1984		Stage collar	2001	Set tubing plug at 7050'	Casing patch installation	Stage collar port leaking
FF32B	8/13/1984		Stage collar	2980	Set tubing plug at 7329'	Casing patch installation	Stage collar port leaking
SS25B	8/12/1986		Casing patch	2918	Set tubing plug at 8380'	Casing patch replacement	Casing patch seal leaking
FF32E	10/29/1986		Stage collar	3000	Closed sliding sleeve	Convert to tubing flow	Stage collar port leaking
SS29	9/24/1987	9/20/1991 (	Casing shoe	8330	Killed well	Cement squeeze	Insufficient cement integrity
F4	1/2/1988	1/29/1988 (	Casing	32	Set tubing plug at 8212'	Innerstring installation	Unknown
FF35C	9/15/1989	6/6/1990 S	Stage collar	1955	Killed well	Innerstring installation	Stage collar port leaking
FF34A	9/10/1990	9/11/1990 (	Casing	1580	Set tubing plug at 7489'	Cement squeeze, casing patch & innerstring installation	Memo in file indicates cause was corrosion
P26	7/21/1991	8/30/1991	Casing shoe	7513	Killed well	Cement squeeze and innerstring installation	Insufficient cement integrity
F 20							

SS11	7/28/1992	4/19/1993	Casing shoe	8700	Killed well	Cement squeeze	Insufficient cement integrity
FF32	9/10/1992	12/14/1992	Casing shoe	7040	Killed well		Insufficient cement integrity
FF33	7/28/1993	4/27/1994	Casing	115	Killed well	Casing patch installation	Unknown
SS14	4/30/1997	5/31/1997	Casing	622	Closed sliding sleeve	Replaced top section of casing	Unknown
FF32F	1/5/1999	1/6/1999	Casing patch	2001	Set tubing plug at 7050'	Casing patch replacement	Casing patch seal leaking
FF32C	7/25/2000	8/31/2010	Casing patch	3738	Set tubing plug at 7151'	Casing patch replacement	Casing patch seal leaking
SS8	11/17/2003	8/31/2006	Casing	8100	Set tubing plug at 8542'	Set straddle packer casing patch	Unknown
F9	7/10/2008	5/7/2009	Casing	1900	Killed well	Plugged and abandoned	Unknown
FF32F	9/23/2009	11/6/2009	Casing patch	2001	Set tubing plug at 7050'	Innerstring installation	Casing patch seal leaking
P26C	10/12/2009	11/6/2009	Casing patch	1684	Killed well	Casing patch replacement	Casing patch seal leaking
P50A	7/16/2010	7/16/2010	Casing	1020	Closed sliding sleeve	Cement squeeze & innerstring installation	Casing inspection log indicates corrosior
SS8	8/12/2010	10/29/2010	Casing patch	8100	Killed well	Cement plugback	Straddle packer leaking
P26E	8/1/2011	11/4/2013	Stage collar	2943	Killed well	Plugged and isolated, repair tbd	Stage collar port leaking
P26C	8/11/2011	9/29/2011	Casing shoe	7819	Killed well	Cement squeeze	Insufficient cement integrity
P32D	8/16/2011	6/26/2012	Stage collar	3011	Closed sliding sleeve	Convert to tubing flow	Stage collar port leaking
SS10	5/26/2012	6/26/2012	Casing patch	4492	Set tubing plug at 7916'	Casing patch replacement	Casing patch seal leaking
FF32C	10/8/2012	4/20/2016	Casing patch	3738	Killed well	Cemented innerstring installation	Casing patch seal leaking
MA5A	5/7/2013	5/7/2013	Casing patch	1880	Set tubing plug at 7176'	Plugged and abandoned	Straddle packer leaking
FF32D	10/14/2013	10/16/2013	Casing	6313	Set tubing plug at 7010'	Cement squeeze & plugback	Casing inspection log indicates corrosion
SS44A	10/15/2013	10/16/2013	Casing	17	Killed well	Plugged and isolated, repair tbd	TBD
P50A	5/3/2014	5/7/2014	Innerstring	1020	Set tubing plug at 6848'	Plugged and abandoned	Unknown
P42B	5/19/2014	6/19/2014	Casing	7200	Killed well	Patched by liner top extension	Unknown
SS25	10/23/2015	2/18/2016	TBD	TBD	Relief well	TBD	TBD
P42B	11/10/2015	1/21/2016	Casing	7200	Killed well	Plugged and isolated	Unknown

WSO - Water Shut Off

The table below is supplied by Southern California Gas Company on the first and third Friday of each month as required by Order No. 1109. This table contains additional information than is displayed on the Division's Tests Results of Aliso Canyon Wells Website.

Well Name	API Number		Noise/	Temp	DOGGR Approval		Ultrasonic	(USIT)	۰.	tagnetic Flu	(Csginsp)	c	ement Bon	d Log (CBL)	м	ulti-Arm Cal	iper (MAC)	Block Test	DOGGR Approval	Annulus / Tubing Test	DOGGR Approval	Other	Current Status
SIMP Wells Assessed	Number	Ran Date	Submittee	Submitted By	Approval Date	Ran Date	Submitted Date	Submitted By	Ran Date	Submitte d Date	Submitted By	Ran Date	Submitted Date	Submitted By	Ran Date	Submitted Date	Submitted By	Test Date	Approval Date	Test Date	Approval Date	Comments	Status
rnando Fee 32	03700686	03/08/16			03/18/16																		Taken Out of Operation (Plugged & Isolated)
nando Fee 32A	03721872	03/08/16	03/11/16		03/18/16	03/30/16	05/06/16	AJ Alshammasi	04/01/16	07/15/16	AJ Alshammasi	03/30/16	04/07/16	Jovy Kroh	09/01/16	09/08/16	AJ Alshammasi	04/04/16	09/16/16	09/07/16	09/16/16		Passed All Tests
hando Fee 328	03721358	03/09/16	03/11/16		05/09/16																		Taken Out of Operation (Plugged & Isolated)
hando Fee 32C	03721359	03/09/16	03/11/16	and the second se	Failed N/T	10/11/16	10/18/16	AJ Alshammasi	05/26/16	06/09/16	AJ Alshammasi	10/11/16	10/18/16	AJ Alshammasi	10/08/16	10/18/16	AJ Alshammasi	10/07/16		10/20/16	-	Rig	Pending Test Results
nando Fee 32D	03721356	03/10/16	03/11/16	Azra Kargar	05/10/16					<u> </u>			-						-				Taken Out of Operation (Plugged & Isolated
hando Fee 32E	03721321 03721313	09/22/16	10/04/16		10/07/16	03/10/10	07/21/16	AI Alshammasi		-	-	03/10/10	0.0100.040		030404	07/74/40		03/00/04	10/05/110	00/07/06	40.000.000	-	Taken Out of Operation (Plugged & Isolated
nando Fee 32F		09/22/16				07/19/16			02/20/20	00100100	AJ Alshammasi	07/19/16	07/26/16	AJ Alshammasi	07/21/16	07/21/16	AJ Alshammasi	07/22/16	10/05/16		10/05/16		Passed All Tests
hando Fee 32G	03730374 03730456	04/04/16	04/11/16		05/03/16 04/08/16	07/26/15	07/26/16 08/02/16	AJ Alshammasi AJ Alshammasi		08/09/16	Al Alshammasi	-	-						-		09/28/16 09/28/16	-	Passed All Tests Passed All Tests
nando Fee 32H nando Fee 33	03730456	04/04/16	04/07/16		04/08/16	07/26/15	08/02/16	AJ Alshammasi	07/26/16	08/09/16	AJ Alshammasi	-	-		-	-				08/03/16	09/28/16		Taken Out of Operation (Plugged & Isolated
	03700687			and the second se	05/03/16	-						-	-						-			024	
nando Fee 34A nando Fee 34BR	03722302	03/09/16	03/11/16	Azra Kargar	03/18/16		-						-		-						-	Rig	Taken Out of Operation (Plugged & Isolated
hando Fee 35A	03722302	03/21/16	03/22/16		03/18/16	09/19/16	08/24/16	A1 Alshammasi	08/12/16	08/24/16	Al Alshammasi	00/10/16	09/24/16	AJ Alshammasi	09/12/16	08/24/16	AJ Alshammasi	09/10/16	09/13/16	09/12/16	00/12/16	-	Taken Out of Operation (Plugged & Isolated
	03721457	03/22/16		AJ Alshammasi		00/10/10	00/24/10	AD AISHAITITIASI		08/02/16	AJ Alshammasi	00/10/10	06/24/10	AJ AJStartitiasi	00/15/10	00/24/10	AD AUSTIALISTICST	06/19/10	03/15/10	03/12/10	09/15/10		Takes Out of Operation (0) and 8 isolated
ando Fee 358 ando Fee 35C	03721458	03/22/16	03/23/16	AJ Alshammasi Azra Kargar	03/28/16 05/09/16				0//14/10	00/02/16	A Albrianniasi		-		-								Taken Out of Operation (Plugged & Isolated Taken Out of Operation (Plugged & Isolated
hando Fee 350	03721279	03/22/16	03/14/16	AJ Alshammasi	03/28/16		-			-			-							-	-		Taken Out of Operation (Plugged & Isolated
nando Fee 350 nando Fee 35E	03721453	03/22/16	03/24/16	AJ Alshammasi AJ Alshammasi	03/28/16					-		-	-		-							-	Taken Out of Operation (Plugged & Isolated Taken Out of Operation (Plugged & Isolated
nando Fee 38A	03724230	03/11/16	03/17/16	Azra Kargar	03/28/16	05/11/16	05/13/16	AJ Alshammasi	05/04/16	06/08/16	AJ Alshammasi	05/01/16	05/17/16	AJ Alshammasi	05/04/16	05/24/16	AJ Alshammasi	05/07/16	06/14/16	06/02/16	06/14/16		Passert All Tests
nando Fee 388	03724230	03/11/16	03/15/16		03/18/16	04/16/16		AJ Alshammasi	04/18/16		Al Alshammasi		04/16/16	AJ Alshammasi	04/18/16		AJ Alshammasi		06/14/16	04/28/16			Passed All Tests
nando Fee 38C	03724231	03/10/16	03/13/16		03/18/16		05/08/16	AJ Alshammasi		07/07/16	AJ Alshammasi		03/28/16	Jovy Kroh		06/21/16			07/08/16				Passed All Tests
w 2	03700665	06/10/16	06/14/16		06/20/16	03/24/10	00/03/10	Po Pasilonninasi	03/63/10	01/01/10	Au Priscial Integr	03/14/10	03/20/10	Jorg Right	03/23/10	00/21/10	Po Pasientinasi	03/23/10	07/00/10	04/14/10	01/00/10		Taken Out of Operation (Plugged & Isolated
w 4	03700667	04/08/16	04/13/16		04/19/16	-				<u> </u>										-		Rig	Taken Out of Operation (Plugged & Isolated
w 5	03700668	09/15/16	10/14/16	AJ Alshammasi	04/13/10						-	-	-									108	Taken Out of Operation (Plugged & Isolated
w 6	03700669	04/08/16	04/13/16	AJ Alshammasi	04/19/16					<u> </u>										-			Taken Out of Operation (Plugged & Isolated
w7	03700670	06/08/16			06/13/16	-					-	-	-				-						Taken Out of Operation (Plugged & Isolated
w 8	03700671	03/25/16			03/31/16					-	1 8				1								Taken Out of Operation (Plugged & Isolated
sion Adrian 1A	03721891	03/22/16	03/24/16	AJ Alshammasi	05/03/16								-				· · · · · ·						Taken Out of Operation (Plugged & Isolated
ssion Adrian 1B	03721892	09/19/16	10/05/16		10/07/16	-		-		-	1 6												Taken Out of Operation (Plugged & Isolated
ssion Adrian 3	03700693	03/05/16	04/07/16	AJ Alshammasi	04/08/16	08/17/16	09/08/16	AJ Alshammasi		<u> </u>		08/06/16	09/08/16	AJ Alshammasi									Taken Out of Operation (Plugged & Isolated
rter 12	03700701	09/28/16	10/14/16	AJ Alshammasi							1 6				-								Taken Out of Operation (Plugged & Isolated
rter 24A	03724143	03/23/16	03/24/16	AJ Alshammasi	05/03/16	09/23/16	10/03/16	AJ Alshammasi	09/21/16	10/03/16	AJ Alshammasi	09/23/16	10/03/16	AJ Alshammasi	09/21/16	10/03/16	AJ Alshammasi	09/17/16	10/13/16	10/11/16	10/13/16		Passed All Tests
rter 248	03724144	03/23/16	03/24/16	AJ Alshammasi	05/03/16	05/19/16	05/23/16	AJ Alshammasi	05/16/16	06/25/16	AJ Alshammasi	05/19/16	05/23/16	AJ Alshammasi	05/16/16	06/25/16	AJ Alshammasi	07/14/16	07/29/16	07/22/16	07/29/16		Passed All Tests
rter 25R	03700712	04/12/16	04/14/16	AJ Alshammasi	04/08/16	04/29/16	05/06/16	AJ Alshammasi	04/28/16	05/17/16	AJ Alshammasi	04/29/16	05/17/16	AJ Alshammasi	04/28/16	05/06/16	AJ Alshammasi	04/27/16	05/18/16		05/18/16	1	Passed All Tests
rter 26	03700713	03/17/16	03/21/16	AJ Alshammasi	05/03/16						1 S		· · · · · ·										Taken Out of Operation (Plugged & Isolated
rter 26A	03721362	10/03/16	10/14/16	AJ Alshammasi		08/10/16	08/24/16	AJ Alshammasi	08/05/16	08/24/16	AJ Alshammasi	08/10/16	08/24/16	AJ Alshammasi	08/31/16	09/08/16	AJ Alshammasi	08/19/16					Taken Out of Operation (Plugged & Isolated
rter 268	03721357	03/21/16	03/22/16	AJ Alshammasi	06/07/16						Q		E		· · · · · · · · · · · · · · · · · · ·		1						Taken Out of Operation (Plugged & Isolated
rter 26C	03721353	03/31/16	04/05/16	AJ Alshammasi	04/07/16				07/11/16	07/21/16	AJ Alshammasi				07/09/16	07/21/16	AJ Alshammasi	10/10/16				Rig	Pending Test Results
ter 26D	03721320	03/18/16	03/21/16	AJ Alshammasi	05/03/16						. S		E				1	1 I)			2		Taken Out of Operation (Plugged & Isolated
ter 26E	03721319	10/03/16	10/17/16	AJ Alshammasi					08/31/16						09/01/16								Taken Out of Operation (Plugged & Isolated
ter 30	03700717	03/29/16	03/30/16	AJ Alshammasi	04/01/16		· · · · · · · · · · · · · · · · · · ·						E										Taken Out of Operation (Plugged & Isolated
ter 32	03700719	03/23/16	03/24/16	AJ Alshammasi	05/03/16	10/18/16	10/20/16	AJ Alshammasi				10/18/16	10/20/16	AJ Alshammasi								Rig	Pending Test Results
ter 32A	03721277	03/23/16	03/24/16	AJ Alshammasi	05/03/16						1							1					Taken Out of Operation (Plugged & Isolated
ter 328	03721276	03/24/16	03/27/16		05/12/16																		Taken Out of Operation (Plugged & Isolated
ter 32C	03721360	03/25/16	03/28/16		05/12/16		2 N				1 S		1					1					Taken Out of Operation (Plugged & Isolated
ter 32D	03721355	03/28/16	03/30/16	AJ Alshammasi	05/19/16																		Taken Out of Operation (Plugged & Isolated
ter 32E	03721363	03/28/16	03/30/16		05/19/16	-				-		09/20/16	10/18/16	AJ Alshammasi	-					-	-	()	Taken Out of Operation (Plugged & Isolated
ter 32F	03721354	03/24/16	03/27/16	AJ Alshammasi	05/09/16																		Taken Out of Operation (Plugged & Isolated
ter 34	03700721	03/28/16	03/29/16	AJ Alshammasi	03/30/16																-	-	Taken Out of Operation (Plugged & Isolater
ter 35	03700722	04/07/16			05/23/16		03/08/16	Jovy Kroh	02/26/16	03/08/16	Jovy Kroh		03/08/16			06/21/16			-	03/01/16			Taken Out of Operation (Plugged & Isolater
er 36	03700723	06/01/16		1011001101111001	06/20/16	01/19/16	06/21/16	AJ Alshammasi		-		01/19/16	03/10/16	Jovy Kroh	01/25/16	06/21/16	AJ Alshammasi	01/21/16		02/01/16	-	1	Taken Out of Operation (Plugged & Isolate
er 37	03700724	03/29/16		AJ Alshammasi	06/07/16								-										Taken Out of Operation (Plugged & Isolate
er 37A	03722046	03/28/16	03/29/16	AJ Alshammasi	03/30/16	-				-		-	-		-					-	-	Rig	Pending Test Results
er 38	03700725	03/18/16	03/21/16	Azra Kargar	10/11/16					-			-						-				Taken Out of Operation (Plugged & Isolate
er 39	03700726	04/05/16	04/07/16	AJ Alshammasi	04/08/16					-			0.0 10.0 /		-					-	-	-	Taken Out of Operation (Plugged & Isolate
er 40	03700727	04/05/16	04/07/16	AJ Alshammasi	04/08/16					-			09/08/16	AJ Alshammasi	-				-				Taken Out of Operation (Plugged & Isolate
er 42A	03721876	03/24/16	03/28/16		03/31/16								10/18/16	AJ Alshammasi							-		Taken Out of Operation (Plugged & Isolate
er 428	03721877	03/31/16	04/05/16	AJ Alshammasi	04/07/16	05/20/16	06/21/16	AJ Alshammasi	05/25/20	06/13/16	AJ Alshammasi	05/26/16	06/05/16	AJ Alshammasi	05/25/16	06/13/12	AJ Alshammasi	05/27/16	-				Taken Out of Operation (Plugged & Isolate
er 42C	03721878	03/24/16	03/28/16	AJ Alshammasi	03/31/16		A. 19 7 1						A. 14							A		Rig	Taken Out of Operation (Plugged & Isolater
er 44	03700731	04/19/16	04/20/16	AJ Alshammasi	05/19/16	02/29/16	03/07/16	Jovy Kroh	02/15/16	03/07/16	Jovy Kroh	02/16/16	03/07/16	Jovy Kroh	02/25/16	03/07/16	Jovy Kroh	02/18/16	03/14/16	03/14/16	04/12/16		Passed All Tests
er 45	03700732	03/29/16	03/30/16	AJ Alshammasi	04/01/16	-				-			-					-				-	Taken Out of Operation (Plugged & Isolated
ter 46	03700733	04/12/16	04/15/16	AJ Alshammasi	05/23/16																		Taken Out of Operation (Plugged & Isolated

price 64         017121         NUALE         NUALE        NUALE         NUALE        <																								
Internation         Internation         Onlyma         <	Porter 508	03724336	03	/08/16 03/11/	16 Azra Kargar	05/03/16	04/14/16	05/06/16	AJ Alshammasi	04/16/16	05/17/16	AJ Alshammasi	04/14/16	05/17/16	AJ Alshammasi	04/15/16	05/06/16	AJ Alshammasi	04/18/16	06/09/16	04/29/16	06/09/16		Passed All Tests
Inters         Bitling         BitlingBitling         Bitling         <	Porter 50C	03724337	03	/08/16 03/11/	16 Azra Kargar	03/18/16	03/16/16	05/06/16	AJ Alshammasi	03/17/16	03/20/16	AJ Alshammasi	03/16/16	03/20/16	AJ Alshammasi	03/17/16	03/21/16	Jovy Kroh	03/20/16	04/20/16	04/06/16	04/20/16		Passed All Tests
Derive         Onlysis         Onlysis <t< td=""><td>Porter 68A</td><td>03722742</td><td>03</td><td>/10/16 03/11/</td><td>16 Azra Kargar</td><td>03/17/16</td><td>05/24/16</td><td>06/05/16</td><td>AJ Alshammasi</td><td>05/26/16</td><td>06/05/16</td><td>AJ Alshammasi</td><td>05/24/16</td><td>06/05/16</td><td>AJ Alshammasi</td><td>05/25/16</td><td>06/08/16</td><td>AJ Alshammasi</td><td>05/21/16</td><td>06/28/16</td><td>06/10/16</td><td>06/28/16</td><td></td><td>Passed All Tests</td></t<>	Porter 68A	03722742	03	/10/16 03/11/	16 Azra Kargar	03/17/16	05/24/16	06/05/16	AJ Alshammasi	05/26/16	06/05/16	AJ Alshammasi	05/24/16	06/05/16	AJ Alshammasi	05/25/16	06/08/16	AJ Alshammasi	05/21/16	06/28/16	06/10/16	06/28/16		Passed All Tests
Image         Particip         Particip <t< td=""><td></td><td>03724136</td><td>03</td><td>/31/16 04/05/</td><td>L6 AJ Alshammasi</td><td>04/07/16</td><td>04/13/16</td><td>05/06/16</td><td>AJ Alshammasi</td><td>04/14/16</td><td>05/17/16</td><td>AJ Alshammasi</td><td>04/16/16</td><td>05/17/16</td><td>AJ Alshammasi</td><td>04/14/16</td><td>05/06/16</td><td>AJ Alshammasi</td><td>04/15/16</td><td>06/02/16</td><td>04/25/16</td><td>06/02/16</td><td></td><td>Passed All Tests</td></t<>		03724136	03	/31/16 04/05/	L6 AJ Alshammasi	04/07/16	04/13/16	05/06/16	AJ Alshammasi	04/14/16	05/17/16	AJ Alshammasi	04/16/16	05/17/16	AJ Alshammasi	04/14/16	05/06/16	AJ Alshammasi	04/15/16	06/02/16	04/25/16	06/02/16		Passed All Tests
Detro         Optical         Optical         And Ange	Porter 69A	03722051			16 Azra Kargar	03/17/16					1													Taken Out of Operation (Plugged & Isolated)
Deter 65         G17323         G17324         G17324        G17324        G17324        G17324 </td <td>Porter 698</td> <td></td> <td></td> <td></td> <td></td> <td>03/17/16</td> <td>04/05/16</td> <td>05/06/16</td> <td>AJ Alshammasi</td> <td>04/04/16</td> <td>05/17/16</td> <td>Al Alshammasi</td> <td>04/05/16</td> <td>05/17/16</td> <td>Al Alshammasi</td> <td>04/04/16</td> <td>05/11/16</td> <td>Al Alshammasi</td> <td>04/06/16</td> <td>06/10/16</td> <td>04/19/16</td> <td>06/10/16</td> <td></td> <td></td>	Porter 698					03/17/16	04/05/16	05/06/16	AJ Alshammasi	04/04/16	05/17/16	Al Alshammasi	04/05/16	05/17/16	Al Alshammasi	04/04/16	05/11/16	Al Alshammasi	04/06/16	06/10/16	04/19/16	06/10/16		
Deep         Original         Original <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td></th<>																							-	
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Deter         OPT-200																								
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Drefe         Ortz         Value         Value         Older Sint         Salue         Older Sint         Albaneman         Older Sint																								
Direct Sect:         Opticity																							-	
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Ward 3	03700192
Ward 3A	03722306
N/T Total # Submittals=	113
N/T Total # Approved=	102
N/T Total # Ran=	114
N/T Total # Failure=	2
Failure due to Temp=	0
Failure due to Noise=	0
USIT Total # Submittals=	36
USIT Total # Ran=	36
Csginsp Total # Submittals=	33
Csginsp Total # Ran=	34
CBL Total # Submittals=	36
CBL Total # Ran=	37
Caliper Total # Submittals=	32
Caliper Total # Ran=	34
Block Test Total # Tests=	32
Block Test Total # Approvals=	26
A/T Test Total # Tests=	31
A/T Test Total # Approvals=	28
Total # Passed All Tests=	28
Total # Pending Test Results=	5
Total # Plugged and Abandoned=	0
Total # Taken Out of Operation=	81

Current Rig	Current Well	Next Well (Plan)	Move Date (Plan)
Ensign 333	Porter 50A	TBD	TBD
Ensign 334	Frew 4	Standard Sesnon 4-0	October 25, 2016
Ensign 335	Fernando Fee 32C	Fernando Fee 32B	October 22, 2016
Ensign 341	Standard Sesnon 5	Fernando Fee 35C	November 1, 2016
Ensign 342	Porter 26C	Porter 26A	October 30, 2016
Ensign 343	Fernando Fee 34A	Fernando Fee 34BR	November 15, 2016
Ensign 346	Porter 32	Porter 32B	November 7, 2016
Ensign 347	Porter 42C	TBD	December 1, 2016
Rival 6	Porter 37A	TBD	November 10, 2016
Rival 15	Ward 3	Ward 3A	December 15, 2016
Total # of Rigs	10		

## BLADE ENERGY PARTNERS REQUEST FOR INFORMATION DATED FEBRUARY 18, 2018

## SOCALGAS AMENDED RESPONSE DATED MARCH 22, 2019

SoCalGas provides this information in response to the request for information from Blade Energy Partners, dated February 18, 2018. This information is based upon the best available non-privileged information known at this time, and is subject to change and/or supplementation as SoCalGas' investigation continues, and additional information becomes available.

## DATA REQUESTS

This is a request for information collected as part of the SIMP casing/integrity program.

## **Question 2**:

Have there been instances of casing with longitudinal or circumferential through wall defects identified by logs or visual inspection? If so, please provide the well name, the description of the failure, casing size, casing weight, casing grade, casing connection, etc. Also provide all daily reports, failure reports and documentation related to the failure analysis.

Well	Casing Size,	Casing	%

**Response 2 (March 23, 2018):** 

Well Name	Casing Size, Weight, and Grade	Casing Connection Type	% Wall Loss	Description
Standard Sesnon 44A	8 5/8", 36#, K55/N80	BT&C	N/A	Caliper log indicates potential surface casing through-wall defects at 90' and 225'.
Standard Sesnon 44A	8 5/8", 36#, K55/N80	BT&C/LT&C	~100%	Visually identified a longitudinal split in the production casing.
Mission Adrian 1B	8 5/8", 36/40#, N80	BT&C	~100% at 1590'	Longitudinal through-wall defect in production casing at 1590'.
Porter 32	7", 23-29#, J55/N80	Speedtite	~100% at 5417'	Through-wall defect in production casing at 5417'.
Porter 44	7", 23-26#, N80/J55/S95	T&C	~100% at 4004'	Through-wall defect in production casing at 4004'
Porter 69A	9 5/8", 43.5- 53.5#, N80	BT&C + LT&C	~100% at 7414'	Through-wall defect in production casing at 7414'.

For reports and documentation related to the failure analysis, see the following electronic documents:

## BLADE ENERGY PARTNERS REQUEST FOR INFORMATION DATED FEBRUARY 18, 2018

## SOCALGAS AMENDED RESPONSE DATED MARCH 22, 2019

Well Name	Bates Range
Standard Sesnon 44A	AC BLD 0067777 - AC BLD 0067784
Mission Adrian 1B	AC_BLD_0067591 – AC_BLD_0067625
Porter 32	AC_BLD_0067626 - AC_BLD_0067674
Porter 44	AC_BLD_0067675 - AC_BLD_0067719
Porter 69A	AC BLD 0067720 - AC BLD 0067776

## Amended Response 2 (March 22, 2019):

Upon further review and analysis, the vendor determined it is unlikely there was a through-wall defect in the casing of Porter 69A at the time of logging in 2017. The vendor has provided a revised USIT log report dated (please see electronic documents with Bates Range AC\_BLD\_0124086 - AC BLD 0124122).

Well Name	Casing Size, Weight, and Grade	Casing Connection Type	% Wall Loss	Description
Standard Sesnon 44A	8 5/8", 36#, K55/N80	BT&C	N/A	Caliper log indicates potential surface casing through-wall defects at 90' and 225'.
Standard Sesnon 44A	8 5/8", 36#, K55/N80	BT&C/LT&C	~100%	Visually identified a longitudinal split in the production casing.
Mission Adrian 1B	8 5/8", 36/40#, N80	BT&C	~100% at 1590'	Longitudinal through-wall defect in production casing at 1590'.
Porter 32	7", 23-29#, J55/N80	Speedtite	~100% at 5417'	Through-wall defect in production casing at 5417'.
Porter 44	7", 23-26#, N80/J55/S95	T&C	~100% at 4004'	Through-wall defect in production casing at 4004'

For reports and documentation related to the failure analysis, see the following electronic documents:

Well Name	Bates Range
Standard Sesnon 44A	AC BLD 0067777 - AC BLD 0067784
Mission Adrian 1B	AC_BLD_0067591 - AC_BLD_0067625
Porter 32	AC_BLD_0067626 - AC_BLD_0067674
Porter 44	AC_BLD_0067675 - AC_BLD_0067719

#### CPUC-SAFETY AND ENFORCEMENT DIVISION AND DEPARTMENT OF CONSERVATION- DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES DATED JANUARY 26, 2016

## **General Response:**

The information provided herein and in the enclosed electronic document production is provided in response to the January 26, 2016 data requests of the CPUC-SED and DOGGR. The information provided is based upon the best available information known at this time, and is subject to change as investigation continues and new information becomes available. SoCalGas reserves the right to amend or supplement this information as its investigation continues. Please note that this is a partial production, and additional documents and information will provided on a rolling basis as our investigation continues. All requests not specifically responded to below will be supplemented on a rolling basis. We reserve the right to request confidential treatment for any document inadvertently produced herein that should be treated as confidential under applicable CPUC rules.

As set out more specifically below, this production includes documents responsive to the following data requests:

- All "A" requests (Detailed Well Data for SS-25)
- All "B" requests (Abnormal Conditions Data for SS-25)
- All "C" requests (Construction SS-25, 25A, and 25B)
- D1
- D2 (to the extent applicable to 25-A and B)
- D4
- D5
- D6
- E1
- All "H" requests (Operations and Maintenance)

## Detailed Well Data - "Standard Sesnon" 25 (SS-25) (API 037-00776)

Question 1:

All well records.

## Response 1:

Please see enclosed electronic document production set for copies of all documents comprising the active SS-25 well file, documents Bates range AC\_CPUC\_0000023 - AC\_CPUC\_0000759

## **Question 2:**

Complete history of well SS-25 from drilling to the date of the well failure; including, but not limited to, all permanent and non-permanent alteration of casing, all tubing, packer, subsurface safety valves, plugs, sliding sleeve, perforations, cementing and remedial operations, logs.

### CPUC-SAFETY AND ENFORCEMENT DIVISION AND DEPARTMENT OF CONSERVATION- DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES DATED JANUARY 26, 2016

## Response 2:

Please see response to A1.

## **Question 3:**

A description of all remedial operations, when conducted, and for what purpose. (include all non-permitted and permitted operations.) Provide copies of the daily report of well operations (engineer's log) for each well operation.

## Response 3:

Please see response to A1.

## **Question 4:**

Information on the current subsurface safety valve (SSSV) installed in the well.

a. Depth and date the current SSSV was installed. If the SSSV was installed in 1979, provide the history. If a SSSV was required, please provide documentation.b. A recorded description of the purpose and function of the current SSSV.

Document description of the current SSSV.

c. Manufacturers specification/design sheet of all SSSVs assemblies used historically on SS-25

d. The narrative reason for installation of a SSSV in SS-25.

e. Manufacturer's specifications of the SSSV currently in the well.

## Response 4:

## **Question 5:**

Historical operational narrative overview of ALL SSSVs

a. Include original SSSVs installed or removed, decommissioned in place, replaced, and repaired.

b. Why are SSSVs installed in SS-25?

c. Manufacture specifications All SSSVs installed or removed, decommissioned in place, replaced, and repaired.

d. maintenance history and issues

e. Functionality or improvements needed

## Response 5:

## **Question 6:**

The operational history of the current SSSV, including maintenance history and any problems.

### CPUC-SAFETY AND ENFORCEMENT DIVISION AND DEPARTMENT OF CONSERVATION- DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES DATED JANUARY 26, 2016

a. Whether or not the SSSV was functioning as designed prior to the well failure. If not, reason why.

b. Provide all correspondence between SoCalGas and DOGGR related to the SSSV since 1977.

## Response 6:

See response to A1.

## **Question 7:**

Describe the operational design of injection and withdrawal mechanisms for well SS-25.

a. What was the injection/withdrawal plan for the past 10 years?

b. Was gas injected through tubing and packer?

c. Was gas injected through tubing and tubing/casing annulus simultaneously?

d. Describe the mechanism for gas withdrawal in well SS-25. Was gas withdrawn through tubing and casing?

e. Provide technical analysis for injection and withdrawal through the tubing/casing annulus. Why is this injection and withdrawal method used instead of tubing only? Was this method approved for injection? If so, provide documentation. f. Describe the stress on the casing of annual cycles of injection and withdrawal through casing?

## Response 7:

## **Question 8:**

Casing diagram detailing the physical condition of the well at the time of the well failure (October 23, 2015) including all subsurface equipment, tubing, packers, subsurface safety valves (SSSV), sleeves, etc.

a. Details should include, and not limited to: size and depth of holes, casing, tubing, packer, perforations, casing centralizers, cement ports, cement, fish, stubs, plugs, etc. Casing diagram shall include the location of corrosion, well failures, repairs, remedial cementing operations, base of fresh water, base of USDW, lost circulation zones, tops of formations, markers, faults, etc.

b. All data shall be clearly marked on the wellbore drawing and at a scale that is proportional and easy to read. The wellbore diagram shall be in pdf format no less than 300dpi.

c. Detailed information should be listed in a column next to the wellbore schematic.

## Response 8:

See response to A1.

## **Question 9:**

#### CPUC-SAFETY AND ENFORCEMENT DIVISION AND DEPARTMENT OF CONSERVATION- DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES DATED JANUARY 26, 2016

Details of surface wellhead, pressure gauges, and valves, and their function. Include:

- a. Wellhead equipment schematics, include manufacture's specifications.
- b. Recent, within 3 years, wellhead equipment changes
- c. Type and purpose of safety valves. Their testing schedule and results of tests.

## Response 9:

See response to A1.

## **Question 10:**

History of all well leaks, surface and subsurface, since SS-25 was placed on production and later on injection/withdrawal.

- a. Provide depth of casing collars, and problems with casing threads.
- b. Documentation of the location of the leak on the 7" casing and cause.

## Response 10:

See response to A1.

## B. Abnormal Conditions Data – "Standard Sesnon" 25 (SS-25) (API 037-00776)

## **Question 1:**

A narrative identifying, describing and analyzing any problems encountered during operational history of the well.

## **Response 1:**

## **Question 2:**

Any casing failures, ruptures, holes, corrosion and their location on the well.

## **Response 2:**

Insofar as this request seeks production of documents, see A1.

## **Question 3:**

History of all well leaks, surface and subsurface, since SS-25 was placed on production

## Response 3:

## SED\_RT\_0177

#### CPUC-SAFETY AND ENFORCEMENT DIVISION AND DEPARTMENT OF CONSERVATION- DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES DATED JANUARY 26, 2016

Insofar as this request seeks production of documents, see A1.

## **Question 4:**

Records of history of safety concerns, near misses, upset conditions, outside forces near misses, incidents, failures or any concerns for the operational safety and integrity of SS-25.

#### **Response 4:**

See response to A1.

## C. Construction - SS-25, S-25A, SS-25B

#### **Question 1:**

For well sites SS-25, S-25A, SS-25B, provide any and all design and construction records for since well inception.

#### Response 1:

See response to A1.

As to well SS-25A, please see enclosed electronic document production set for the active well file associated with well SS-25A, Bates range AC\_CPUC\_0000001 - AC\_CPUC\_00000011 and AC\_CPUC\_0000760 - AC\_CPUC\_0001198.

As to well SS-25B, please see enclosed electronic document production set for the active well file associated with well SS-25B, Bates Range AC\_CPUC\_0000012 - AC\_CPUC\_0000022 and AC\_CPUC\_0001199 - AC\_CPUC\_0001587.

#### **Question 2:**

SS-25, S-25A, SS-25B: Provide any and all well drilling logs since well inception

#### Response 2:

Please see responses to A1 and C1.

#### **Question 3:**

SS-25: Provide any and all well packer seating and unseating(s), changes, reworks, replacements, etc., whether required for DOGGR inspection or not.

#### Response 3:

#### CPUC-SAFETY AND ENFORCEMENT DIVISION AND DEPARTMENT OF CONSERVATION- DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES DATED JANUARY 26, 2016

Please see responses to A1 and C1. **D. Tests** 

# **Question 1:**

All mechanical integrity tests run on well SS-25 since 1976, including, but not limited to, casing pressure test, noise logs, temperature logs and radioactive tracer surveys. Include whether or not each test was required by DOGGR.

a. Provide the date of each MIT run and results of the test. Include all Temperature and noise logs for SS-25; include an explanation of all acronyms used. Include the smoothing and sample rate of each log. If available, provide the temperature logs in ASCII/LAS files.

b. Provide records of MIT evaluations for SS-25.

c. Provide all documentation of monitoring from 1979 to October 2015. (Refer to remarks on the 1989 temperature survey.)

d. In the 1989 temperature log there is an anomaly. Provide information on the anomaly and steps taken to identify the cause. Describe the relationship between the anomaly and the SSSV in the well at the time.

e. In 1991 noise log there is reading. Provide record information on the anomaly and record of steps taken to identify the cause and further investigation and/or mitigation. Describe the relationship between the anomaly and the SSSV in the well at the time.

# Response 1:

Please see response to A1.

# **Question 2:**

All mechanical integrity tests run on gas storage wells, including idle and abandoned, located within 1/4 mile of well SS-25, and the results of the tests. If available, provide the tests in ASCII/LAS files.

a. What was the required frequency for conducting temperature surveys and other MITs?

b. What were the reasons for running a particular type of survey?

c. What is the frequency for measuring annulus pressure? Provide a history of annulus pressures.

d. What is the requirement for running noise logs and radioactive tracer (RA) surveys? Provide a history of noise logs and RA surveys.

e. What is the required frequency of reservoir shut-in periods to measure static bottom-hole pressure? Provide a history of reservoir shut-in period and static bottom-hole pressure measurements.

f. Who runs and provides oversight of the MIT field test? What are their qualifications?

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g. How MITs were evaluated during and after the field test (provide any written report).

h. For failed or questionable MITs, at what depth and date were anomalies determined?

i. Were wells remediated if the MIT failed? If DOGGR was notified, please provide date, contact person, and type of communications.

j. Most recent fluid levels for wells within <sup>1</sup>/<sub>4</sub> mile of SS-25. Include the method used to determine fluid level.

k. Data detailing pressure communication between wells.

1. Any data collected or study conducted by SoCalGas on the effects of wells subject to expansion and contraction during gas cycling in Aliso Canyon Gas Storage project. Provide findings and recommendations for evaluating integrity of wells in the project and risks of long term use of wells.

# Response 2:

Please see responses to A1 and C1.

## **Question 3:**

Tests for corrosion potential of all fluids encountered in well SS-25 and corrosion management plan incorporated into the design and operation of wells in the GS projects with 1 mile of well SS25.

# **Response 3:**

Please see responses to A1 and C1.

#### **Question 4:**

SS-25, S-25A, SS-25B: Provide any and all well water noise logs in scale readable format (1"=200)

# Response 4:

#### **Question 5:**

SS-25, S-25A, SS-25B: Provide any and all well water temperature logs in scale readable format (1"=200)

#### Response 5:

Please see responses to A1 and C1.

# Question 6:

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SS-25, S-25A, SS-25B: Provide any and all well ion logs in scale readable format (1"=200)

# Response 6

Please see responses to A1 and C1.

## **E. Injection Pressure**

#### **Question 1:**

Surface injection pressure (preferably daily) and flow rate for well SS-25 for the past 10 years.

- a. Wellbore deviation angle (from directional survey)
- b. Pipe inside diameter
- c. Temperature of the gas injected at the surface
- d. Reservoir temperature and depth
- e. Gas gravity

## **Response 1:**

Please see response to A1

#### **Question 2:**

For SS-25, is the pressure gauge permanently installed or portable type? Please provide calibration schedule and any calibration documentation.

#### **Response 2:**

#### **Question 3:**

Did SS-25 well ever inject above MASP? What is the design pressure limit of the reservoir, wells, and wellhead?

#### Response 3:

#### **Question 4:**

For the monthly surface injection pressure data for gas storage wells, submitted to DOGGR:

- a. How is the rate calculated? Is it based on 30-day average?
- b. Is the Tubing or Casing pressure?

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## Response 4:

## **Question 5:**

Provide daily and monthly injection tubing and casing pressure and rate for SS-25 since initial injection.

## Response 5

Please see response to A1

## F. Gas Storage Monitoring Program:

## Question 1:

Provide a copy of the gas storage project well monitoring program.

#### **Response 1:**

## **Question 2:**

Has the monitoring program changed over time? If so, describe the changes.

#### **Response 2:**

#### **Question 3:**

SS-25: Provide any and all well pumping logs for life of well

#### **Response 3:**

Please see response to A1

# **<u>G. Communication History:</u>**

#### **Question 1:**

All correspondence between SoCalGas and the DOGGR Ventura district office, related to Aliso Canyon GS project, including, but not limited to, field inspections, well integrity testing, rework operations, notices, permits, removal and installation of the SSSV and the sliding sleeve.

#### **Response 1:**

# **Question 2:**

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Provide dates MIT survey results were submitted to the DOGGR Ventura office since 1989.

## Response 2:

## **Question 3:**

How did SoCalGas communicate with DOGGR before, during, and after running MITs for GS wells? If DOGGR was notified, please provide date, contact person, subject, and type of communications (e-mails, letters, phone-calls, etc.).

## **Response 3:**

## **Question 4:**

Provide list of communications (e-mails, letters, and phone calls) made by SoCalGas to the DOGGR Ventura district office specific to the SS-25 well failure, prior to start of remedial operations. Include the date, time, subject, contacts and message.

#### **Response 4:**

# **H. Operations and Maintenance:**

#### **Question 1:**

SS-25, S-25A, SS-25B: Provide any and all maintenance, repair and improvement records since well inception

#### **Response 1:**

Please see responses to A1 and C1.

#### **Question 2:**

SS-25, S-25A, SS-25B: Provide any and all well Operations and Maintenance records since well inception

#### **Response 2:**

Please see responses to A1 and C1.

#### **Question 3:**

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SS-25, S-25A, SS-25B: Provide any and all well related management directives, analysis, investigations

# **Response 3:**

Please see responses to A1 and C1.

#### **Question 4:**

SS-25, S-25A, and SS-25B: Provide any and all well water circulation, fluid levels, and annular reading records for life of each well.

#### Response 4:

Please see responses to A1 and C1.

#### **Question 5:**

SS-25: Provide any and all well records cathodic, sacrificial plan and corrosion monitoring records of life of well.

## **Response 5:**

Please see response to A1.

#### **Question 6:**

SS-25: Provide any and all well cathodic, sacrificial plan and monitoring records of life of well.

#### **Response 6:**

Please see response to A1.

#### **Question 7:**

SS-25: Provide any and all well fluid compatibility records of life of well

#### **Response 7:**

Please see response to A1.

#### **Question 8:**

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SS-25: Provide any and all well fluids, formation fluids, corrosion due to fluid monitoring records of life of well

# Response 8:

Please see response to A1

# I. Materials

## **Question 1:**

Explain and show historical documents that convey procedures for:

a. Provide record of review for integrity of SS-25 casing, concrete casing for well surface casing and production casing as inherited by SoCalGas circa 1973.

b. Provide record of review for inherited surface casing, circa 1973 forward, establishing set elevation as functionally sound set at approximately 990'.

c. When setting casing, what determines the set depth? Provide a specific example sourced from records you provide to us as requested elsewhere, herein.

d. How does the depth depend on the loss of circulation?

e. Explain difference between casing material

f. What is grade(s) of steel are presently used for outer casing?

g. If different from aged wells, when did the industry change and why (cite all factors, technology/reference new codes and regulations/new standards of practice)?

# Response 1

Please see response to A1

# **Question 2:**

Explain the historical mixing and setting of casing mix. [DR] SS-25, S-25A, SS-25B

a. 1 dry sack of Diamix(or equal) cement = (equals) how many cf wet (casing) cement mix.

b. Neat cement same?

c. Installation/pumping records

d. Specify equipment used, hose size to install casing cement

e. Hole fill methodology; how is the cement mixture installed based on casing depth?

# Response 2:

# **Question 3:**

Provide narrative identifying, analyzing and describing "sidetracking a hole" in gas and

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oil terms? Provide records referenced to complete narrative.

a. Identify historical narrative of events of this occurring in SoCalGas drilling operations on SS-25, SS-25A, SS-25B since inception of these wells.

- b. Identify elevations of occurrence.
- c. What corrective actions took place?

## J. Well Life

#### **Question 1:**

SS-25 historical decommission plans and monitoring

a. Prior to October of 2015, provide records of how well was to be permanently inoperable and sealed.

b. Provide narrative and records of projected well abandonment plan.

#### **Response 1:**

Please see response to A1

#### **Question 2:**

Provide evaluation records of well facility as inherited. What expected lifespan was given based on the age of well, former operation as an oil well.

#### **Response 2:**

Please see response to A1

#### **Question 3:**

Provide record of well diagnostics at time of SoCalGas conversion. Condition of casings, concrete, corrosion, etc.

#### **Response 3:**

Please see response to A1

#### **Question 4:**

Provide monitoring, cleaning and pumping records of storage sands, tag sands, fill sands, etc.

- a. Provide diagnostics and analysis of sand draw
- b. Provide critical events signaling beginning well decommissioning phase.

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## Response 4:

Please see response to A1

# K. Geology-Topography

## **Question 1:**

Provide all recorded seismic event records at Site SS-25, SS-25A, SS-25B since inception

#### Response 1:

Please see responses to A1 and C1

#### **Question 2:**

Provide all seismic event related inspections at Site SS-25, SS-25A, SS-25B.

- a. Standard SoCalGas inspections
- b. Third party inspections
- c. Contractors tools used, contracts, scope of
- d. Expert consultants scope, reports

#### Response 2:

Please see responses to A1 and C1

#### **Question 3:**

Provide records for all seismic repairs and replacements

#### Response 3:

Please see responses to A1 and C1

#### **Question 4:**

Provide all topographic surveys at SS-25, SS-25A, SS-25B.

#### Response 4:

Please see responses to A1 and C1

#### **Question 5:**

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A type log showing the character and depth of the formations, formation tops, marker beds, correlations, fault picks, other geologic features.

a. Preferably on an SP and resistivity curve.

b. Include Gamma Ray, density, neutron, and sonic curves, if available.

# Response 5:

# **Question 6:**

All logs, including but not limited to, e-logs (SP and resistivity), gamma, and density neutron, in pdf (300dpi). If available, log data in LAS format on an excel spreadsheet, of any e-log and gamma ray logs run on the SS-25 well or any wells in the vicinity. All logs shall have elevation references, preferably in mean sea level.

## **Response 6:**

Please see responses to A1 and C1

## **Question 7:**

Geologic structure map of the area within a 1 mile radius of well SS-25, including faults, and other geologic features.

#### Response 7

#### **Question 8:**

Geologic cross-section clearly detailing the geology, formations, structure, faults, and identifying base of freshwater, base of USDWs, all oil and gas bearing zones, and wells. The cross-section shall be drawn incorporating the SS-25 well and include the gamma or elog traces used for correlation.

#### **Response 8:**

#### **Question 9:**

Contour map (1 mile radius of well SS-25) of the top of the gas storage reservoir (Sesnon Frew formation).

#### **Response 9:**

#### **Question 10:**

Isopach map of the gas storage reservoir extending in a 1 mile radius of well SS-25.

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## Response 10:

# **Question 11:**

A surface map identifying all (active and inactive) wells within a 1 mile radius of well SS-25, labeled with the API number and current operational status, such as: OG (oil/gas producer), GS (Gas storage), idle, abandoned, OB (observation), WF (water flood), WD (water disposal). Including any other wells types not listed.

#### Response 11:

## **Question 12:**

Was SS-25 affected by the Northridge earthquake? What analysis was conducted to evaluate whether the earthquake affected the well. Were any wells in the area affected?

#### Response 12:

#### **Question 13:**

All maps and cross-sections shall include direction, scale, elevation and references clearly marked. Submitted in electronic pdf format (300dpi) so it can be expanded without blurring details. Most useful scale must show locations and distances accurately and small enough to read data for the purpose it was intended.

#### Response 13:

#### **Question 14:**

Provide reports of all Geotechnical studies conducted in the Aliso Storage Reservoir

#### Response 14:

#### **Question 15:**

Provide SCG analysis of the study and subsequent actions

#### Response 15:

#### **Question 16:**

Provide any and all water level/circulation log records for SS-25, SS-25A, SS-25B

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# **Response 16:**

Please see responses to A1 and C1.

# SOUTHERN CALIFORNIA GAS COMPANY CPUC-SAFETY AND ENFORCEMENT DIVISION DATA REQUEST DATED AUGUST 21, 2018

# SOCALGAS RESPONSE DATED OCTOBER 5, 2018

SoCalGas provides the following responses to the California Public Utilities Commission–Safety and Enforcement Division's August 21, 2018 request for information. These responses are based upon the best available non-privileged information known at this time and are subject to change and/or supplementation as SoCalGas' investigation continues, and additional information becomes available.

SoCalGas submits these responses, while generally objecting to any request that fails to provide a defined time period to which SoCalGas may tailor its response, and to the extent that any request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these responses without conceding the relevance of the subject matter of any request or response. SoCalGas reserves the right to object to use of these responses, or information contained therein, in any dispute, matter or legal proceeding before any court, action. Finally, at the time of this response, there are no pending oral data requests from the CPUC-SED to SoCalGas.

#### **Question 1**:

Please identify all of the various maximum pressures that apply to Southern California Gas Company natural gas storage facilities and/or wells. This should include, but not be limited to:

- a. Design pressure
- b. Maximum shut in tubing pressure
- c. Reservoir pressure

#### **Response 1:**

SoCalGas interprets this request as seeking the following maximum pressures that apply to belowground gas storage infrastructure and/or wells at SoCalGas' current natural gas storage fields – Aliso Canyon, Honor Rancho, Playa del Rey, and La Goleta. Please note, other than wellhead pressure information, the response does not include pressure information for the above-ground facilities at SoCalGas' natural gas storage fields.

- a. <u>Design Pressure</u>: Gas storage wells are connected to the gas storage reservoir. As a result, each well operates under the same "maximum reservoir pressure." SoCalGas designs new casing and tubing strings for wells in accordance with American Petroleum Institute (API) Technical Report 5C3 and utilizes a minimum safety factor of 1.15 for internal yield pressure for new casing and tubing. Gas storage wellheads are designed with pressure ratings based on the maximum operating pressure of a well.
- b. <u>Maximum Shut-In Tubing Pressure</u>: The maximum shut-in tubing pressure for the SoCalGas storage fields, are as follow:
  - i. Aliso Canyon 3050 psi. Please note, this maximum surface pressure is based on the original maximum reservoir pressure of 3600 psi. The current maximum

reservoir pressure of 2,926 psi corresponds to a maximum surface pressure of 2,476 psi.

- ii. Honor Rancho 3600 psi.
- iii. Playa del Rey –1491 psi.
- iv. La Goleta 1861 psi.
- c. <u>Reservoir Pressure</u>: The maximum reservoir pressure for the SoCalGas storage fields are as follows:
  - i. Aliso Canyon 3600 psi. Please note, this maximum reservoir pressure is the original maximum reservoir pressure for the Aliso Canyon storage field. The current maximum reservoir pressure per DOGGR is 2,926 psi.
  - ii. Honor Rancho 4400 psi.
  - iii. Playa del Rey 1700 psi.
  - iv. La Goleta 2050 psi.

## **Question 2**:

Please provide the formulas SoCalGas uses to determine each of the pressures provided in response to question 1.

## Response 2:

- a. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000001 AC CPUC SED DR 27 0000022.
- b. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000023 AC\_CPUC\_SED\_DR\_27\_0000045.
- c. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000046 AC\_CPUC\_SED\_DR\_27\_0000064.

# **Question 3**:

Please list all SoCalGas Company documents that talk about or reference the pressures referenced in question 1, and the formulas provided in response to question 2 with regards to SoCalGas natural gas storage facility wells. These documents should include, but not be limited to, requirements, standards, practices, programs, and anything else that sets for instructions or requirements for determining these maximum pressures on SoCalGas natural gas storage facility wells.

#### Response 3:

SoCalGas interprets this request as seeking SoCalGas' current written requirements, standards, programs, and procedures that set forth the instructions or requirements for determining the maximum pressures provided in Response 1 and the formulas provided in Response 2. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000001 - AC\_CPUC\_SED\_DR\_27\_0000064.

# **Question 4**:

Please provide the terms Southern California Gas Company uses that relate to:

- a. The limits on reservoir pressure at a Southern California Gas Company natural gas storage facility?
- b. The reservoir pressure beyond which a Southern California Gas Company natural gas storage facility reservoir should not operate?
- c. The design pressure at a Southern California natural gas storage facility well.
- d. The Maximum shut in tubing pressure at a Southern California natural gas storage facility well.

#### Response 4:

- a. Minimum Reservoir Pressure and Maximum Reservoir Pressure.
- b. Maximum Reservoir Pressure.
- c. Please see Response 1.a.
- d. Maximum Surface Pressure.

#### **Question 5**:

Please provide all Southern California Gas Company documents that talk about or reference to the terms SoCalGas has provided in response to question 4. These documents should include, but not be limited to requirements, standards, practices, programs, and anything else that sets forth instructions or requirements for determining the pressure limits on Southern California Gas Company's natural gas storage field reservoirs.

#### Response 5:

SoCalGas objects to this request as overly broad and unduly burdensome. SoCalGas interprets this request as seeking SoCalGas' current written requirements, standards, programs, and procedures that set forth the instructions or requirements for the pressures listed in Response 4. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000001 - AC CPUC SED DR 27 0000064.

#### **Question 6**:

Of those documents provided in response to question 5, please list all documents that apply or applied Southern California Gas Company's Aliso Canyon natural gas storage facility.

#### Response 6:

The following documents provided in response to question 5 apply to SoCalGas' Aliso Canyon storage field: Bates range AC\_CPUC\_SED\_DR\_27\_0000065 - AC\_CPUC\_SED\_DR\_27\_0000115.

# **Question 7**:

Of those documents provided in response to question 5, please list all documents that applied as of October 23, 2015.

#### Response 7:

The following documents applied as of October 23, 2015: Bates range AC\_CPUC\_SED\_DR\_27\_0000117 -AC\_CPUC\_SED\_DR\_27\_0000131. On October 23, 2015, there was a prior version of Gas Standard 224.070. For the version of Gas Standard 224.070 that existed on October 23, 2015 please see the electronic document with Bates Range AC\_CPUC\_SED\_DR\_27\_0000116.

#### **Question 8**:

Of those documents provided in response to question 5, please list all documents that applied prior to October 23, 2015.

#### Response 8:

The following documents applied prior to October 23, 2015: Bates range AC\_CPUC\_SED\_DR\_27\_0000153 -AC\_CPUC\_SED\_DR\_27\_0000168. Prior to October 23, 2015, there were earlier versions of Gas Standard 224.070. For the earlier versions of Gas Standard 224.070 that existed prior to October 23, 2015, please see electronic document with Bates range AC\_CPUC\_SED\_DR\_27\_0000132 -AC\_CPUC\_SED\_DR\_27\_0000151.

#### **Question 9**:

Of those documents requested in questions 3 and 5, are there any that were in existence, but that Southern California Gas Company no longer has?

#### Response 9:

No.

#### Question 10:

If the answer to question 9 is yes, please list all such documents.

#### Response 10:

N/A.

# Question 11:

Based upon the documents provided in response to question 5, did SoCalGas use a formula or formulas to calculate the maximum pressures identified in response to question 2 for the reservoirs at Aliso Canyon on October 23, 2015?

#### Response 11:

Yes.

#### **Question 12:**

If the answer to question 11 is yes, please provide the formula or formulas.

- a. Please be sure to identify each variable in the formula;
- b. Provide a definition of each variable in the formula;
- c. Refer to the document and page of the document provided in response to question 4 that is the basis for each formula provided.

#### Response 12:

Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000001 - AC CPUC SED DR 27 0000064.

#### **Question 13:**

As of October 23, 2015, please identify each reservoir in Aliso that had its reservoir pressure (or concept identified in response to question 4) kept below the results of the required formula or formulas identified in response to question 12.

#### Response 13:

There is only one gas storage reservoir at Aliso Canyon – the Sesnon-Frew Gas Storage Zone. On October 23, 2015, the reservoir pressure of the Sesnon-Frew Gas Storage Zone was below the maximum reservoir pressure of 3600 psi.

#### **Question 14:**

For the Standard Sesnon reservoir at Aliso Canyon as of October 22, 2015, please identify each variable in the formulas used to calculate the concepts identified in response to question 2, and provide the definition of each variable.

## Response 14:

There is no "Standard Sesnon" reservoir at Aliso Canyon. There is only one gas storage reservoir at Aliso Canyon – the Sesnon-Frew Gas Storage Zone.

#### **Question 15:**

Please identify the impact of the most recently installed compressors at Aliso Canyon on the overall reservoir pressure (or term SoCalGas uses to refer to reservoir pressure). Please include the minimum and maximum reservoir pressures for each reservoir at Aliso since the installation of those compressors, as well as the date of each such reservoir pressure.

#### Response 15:

The recently installed compressors do not affect the maximum and minimum reservoir pressures of the Sesnon-Frew Zone storage reservoir at Aliso Canyon.

#### **Question 16:**

What is the impact of the overall storage volume of each Aliso Canyon reservoir on the reservoir pressure of that reservoir? If this impact can be expressed in a formula, please include that formula, the reference and page number for that formula, and an explanation for how that formula was derived.

#### Response 16:

Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000023 - AC\_CPUC\_SED\_DR\_27\_0000045.

#### **Question 17:**

Has SoCalGas used reservoir pressure (or term SoCalGas uses to refer to reservoir pressure) in order to determine which wellhead to place on each well at its storage facilities? If so, please provide all such wells that have received wellheads that account for reservoir pressure.

#### Response 17:

Yes, the maximum reservoir pressure is used to determine which wellhead to place on each well. All wells have received wellheads with a pressure rating above the maximum reservoir pressure.

#### **Question 18:**

Are wellheads components of well facilities?

## Response 18:

The wellhead is a component of a gas storage well. Components of a gas storage well include, but are not limited to, the wellhead, tubing, casing, packers and valves.

#### **Question 19:**

Do wellheads have restrictions with regards to pressure they can withstand from injection and withdrawal?

#### **Response 19:**

Wellheads are designed for pressure that exceeds reservoir pressure, thus wellheads are able to withstand withdrawal and injection pressure.

#### **Question 20:**

With regards to wellheads discussed in response to questions 19-21, did the wellhead on SS25 in any way impair the ability to kill SS25? Please explain.

#### Response 20:

No, the wellhead did not impair the ability to kill SS25. SoCalGas had access to all the wellhead valves and connected to the wellhead in the first attempt to kill the well. The wellhead functioned as expected.

Prior to pumping any kill fluid, SoCalGas had Cameron West Coast service the primary seals in the wellhead by injecting plastic sealant to re-energize the primary and secondary seals around the 7" casing inside the wellhead.

#### **Question 21:**

It is SED's understanding that SoCalGas used the tubing and the casing on SS25 to inject and withdraw gas prior to October 23, 2015. Is this understanding correct? If so:

- a. When did SoCalGas start this practice of injecting and withdrawing gas through the casing on SS25?
- b. Why did SoCalGas decide to inject and withdraw gas through the casing on SS25?
- c. When SoCalGas started the practice of injecting and withdrawing gas through the casing on SS25, did SoCalGas do any safety related studies or analyses with regards to withdrawing or injecting gas into the casing?
- d. Specifically, when SoCalGas started the practice of injecting and withdrawing gas through the casing on SS25, did SoCalGas study the conditions under which the casing would leak?
  - i. If so, please provide all such studies.
  - ii. If not, why not?

# Response 21:

For SS25, SoCalGas withdrew gas through both the tubing and the tubing-casing annulus, and injected gas through the tubing-casing annulus.

- a. Gas was moved through the casing in SS25 since SoCalGas first began operating the well. SoCalGas previously provided CPUC-SED with a data response listing the month/time range of initial withdrawal/injection for all wells. Please see electronic documents with Bates range Please see electronic documents with Bates range Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000169 -AC\_CPUC\_SED\_DR\_27\_0000174.
- b. Prior to October 23, 2015, withdrawal and injection through the casing was industry practice. Please see electronic documents with Bates range
   AC CPUC SED DR 27 0000175 -AC CPUC SED DR 27 0000350.
- c. At Aliso Canyon prior to the conversion of wells to tubing flow only, in general, high structure wells were operated as casing flow and lower structure wells were operated as tubing flow. For more information, please see the electronic document with Bates range AC CPUC SED DR 27 0000351-AC CPUC SED DR 27 0000411.
- d. See Response 21.c.

## **Question 22:**

Please provide a list of all wells within SoCalGas storage facilities for which SoCalGas has injected and/or withdrawn gas through well casing.

#### Response 22:

SoCalGas interprets this request as seeking information about SoCalGas' Aliso Canyon storage field. SoCalGas previously provided CPUC-SED with a data response that lists the month/time range of initial withdrawal/injection for all wells. Please see electronic documents with Bates range AC CPUC SED DR 27 0000412 -AC CPUC SED DR 27 0000417.

#### **Question 23:**

Please answer questions 21 a-d again, but this time for the entire list of wells provided in response to question 22.

#### Response 23:

For the Aliso Canyon wells within SoCalGas for which SoCalGas has injected and/or withdrawn gas through the well casing:

a. Gas was moved through the casing in these wells since SoCalGas first began operating the well. SoCalGas previously provided CPUC-SED with a data response listing the month or time range of initial withdrawal/injection for all wells. Please see

electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000169 - AC\_CPUC\_SED\_DR\_27\_0000174.

- b. Prior to October 23, 2015, withdrawal and injection through the casing was industry practice. Please see electronic documents with Bates range
   AC CPUC SED DR 27 0000175 -AC CPUC SED DR 27 0000350.
- c. At Aliso Canyon, prior to the conversion of wells to tubing flow only, in general, high structure wells were operated as casing flow and lower structure wells were operated as tubing flow. For more information, please see the electronic document with Bates range AC\_CPUC\_SED\_DR\_27\_0000351 -AC\_CPUC\_SED\_DR\_27\_0000411.
- d. See Response 21.c.

# **Question 24:**

Did SoCalGas provide notice to any agencies when it decided to move gas through the casing on well SS25? If so:

- a. Which agencies?
- b. Please provide all documentation showing such notice for each well.

# Response 24:

- a. SoCalGas moved gas through the casing in SS25 since the initiation of gas storage operations in the 1970s. There was no requirement to provide formal notice. However, SoCalGas understands that the Division of Oil, Gas and Geothermal Resources (DOGGR) was aware that gas was moved through the casing in SS25.
- b. N/A.

# **Question 25:**

If the answer to question 24 is no, please explain.

# Response 25:

N/A.

# **Question 26:**

Please list the titles of, and provide, all industry practices and standards that support and/or allow injecting and withdrawing gas through well casings.

# Response 26:

A representative listing of industry practices and standards that support and/or allow injecting and withdrawing gas through well casings include:

- American Petroleum Institute, American Gas Association, Interstate Natural Gas Association of America, *Underground Natural Gas Storage Integrity & Safe Operations*, July 6, 2016, pp. 55-56.
- Final Report of the Interagency Task Force on Natural Gas Storage Safety, *Ensuring Safe and Reliable Underground Natural Gas Storage*, October 2016, p. 54.

# **Question 27:**

Please list the titles of, and provide, all SoCalGas requirements, standards, practices, memoranda, internal reports, and other documentation that supports and/or allows injecting and withdrawing gas through well casings.

#### Response 27:

N/A.

#### **Question 28:**

How many active wells did SoCalGas have in its existing natural gas storage facilities prior to October 23, 2015?

#### Response 28:

For a list of SoCalGas wells at SoCalGas' natural gas storage facilities on or around 10/23/15, please see electronic document with Bates range AC\_CPUC\_SED\_DR\_27\_0000418.

#### **Question 29:**

Of the number of wells provided in response to question 28, how many injected and/or withdrew gas through casing?

#### **Response 29:**

Please see electronic document with Bates range AC\_CPUC\_SED\_DR\_27\_0000419.

#### **Question 30:**

How many active wells does SoCalGas have in its existing natural storage facilities as of the date of this data request?

#### Response 30:

For a list of active wells at the Aliso Canyon storage field please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000421 -AC\_CPUC\_SED\_DR\_27\_0000423. For a list of active wells at the non-Aliso storage fields (Playa del Rey, Honor Rancho, and La Goleta), please see electronic document with Bates range AC\_CPUC\_SED\_DR\_27\_0000420.

# **Question 31:**

Of the number of wells provided in response to question 30, how many inject and/or withdraw gas through casing?

#### Response 31:

None.

#### **Question 32:**

How many of the number of wells provided in response to question 31 are at SoCalGas's Aliso Canyon natural gas storage facility?

#### **Response 32:**

N/A.

#### **Question 33:**

What was the maximum pressure for each of the pressures identified in response to question 1 for wells at SoCalGas natural gas storage facilities as of October 23, 2015?

a. Please provide the supporting document, including reference to page number, for the maximum pressure provided in response to question 34.

#### **Response 33:**

Please see Response 1.

#### **Question 34:**

What is maximum pressure for each of the pressures identified in response to question 1 for wells at SoCalGas natural gas storage facilities based upon as of the date of this data request?

#### Response 34:

Please see Response 1.

#### **Question 35:**

How has the basis for calculating the maximum pressures identified in response to question 1 for wells at SoCalGas natural gas storage facilities changed from October 23, 2015 to the date of this data request?

## Response 35:

Please see Response 1.

#### **Question 36:**

Provide a spreadsheet showing:

- a. All SoCalGas storage facility wells that currently have subsurface safety valves.
- b. All SoCalGas storage facility wells that no longer have subsurface safety valves.
- c. The date of installation of each subsurface safety valve.
- d. The date of removal of each subsurface safety valve that was removed.
- e. Whether the subsurface safety valve isolates/isolated tubing?
- f. Whether the subsurface safety valve isolates/isolated casing?
- g. Depth of the subsurface safety valve.
- h. If the subsurface safety valve was removed, reason for removal.

#### **Response 36:**

- a. For a list of current active wells with shallow set SSSVs, please see electronic document with Bates range AC\_CPUC\_SED\_DR\_27\_0000424.
- b.-h.:

SoCalGas objects to requests 36 b-h as overly broad and unduly burdensome. Notwithstanding this objection, SoCalGas responds as follows: SoCalGas previously prepared and provided this information to CPUC-SED for the Aliso Canyon storage field. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000426 -AC\_CPUC\_SED\_DR\_27\_0000430. In addition, SoCalGas previously provided the CPUC with a copy of a data request response to DOGGR. That data request response included a narrative regarding SoCalGas' experience with deep-set SSSVs at SoCalGas' storage fields, and correspondence that SoCalGas had in its records regarding SSSVs. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0000431 -AC\_CPUC\_SED\_DR\_27\_0003343.

# Questions 37-40 – On September 6, 2018, counsel for SED provided clarification on Questions 37-40 as follows: "items 37-40 of DR 27 should reference both "job history file" and "well history file"."

#### **Question 37:**

Please provide SoCalGas's definition of job history and well history files as of October 23, 2015.

#### Response 37:

As of October 23, 2015, SoCalGas' well file had four components -(1) well history file, (2) log file, (3) survey file, and (4) invoice file. There was no "job history file." However, the "well history

file" included DOGGR Form OG-103 (History of Oil and Gas) which details the rig work performed on a well during drilling, abandonment, and workover operations.

## **Question 38:**

Please identify all records that must be kept in SoCalGas's job history and well history files as of October 23, 2015.

## Response 38:

Please see Response 37. SoCalGas' practice is to include the following types of documents in the "well history file": DOGGR Form OG-103 (Well History Report), DOGGR Form OG-100 (Well Summary), Notices of Intent (NOI), Permits to Drill/Rework, and Workover Programs. Operators are required to submit OG-103 and OG-100 to DOGGR within 60 days after the drilling completion, suspension, or abandonment of a well.

#### **Question 39:**

Please provide all SoCalGas requirements, standards, practices, memoranda, internal reports, and other documentation that show the types of records that were required to be kept in SoCalGas's job history files as of October 23, 2015.

#### Response 39:

SoCalGas interprets this request as seeking SoCalGas' formal written requirements, standards, practices, memoranda, internal reports, and other formal written documents that show the types of records required to be kept for a well. For SoCalGas Records Management and Retention Schedule as of and prior to October 23, 2015, please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0003344 -AC\_CPUC\_SED\_DR\_27\_0004205.

#### **Question 40:**

Please provide the job history file for SS25 as it looked on October 23, 2015.

#### Response 40:

Please see Response 37. For the "well history file" for SS25, please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0004206 -AC\_CPUC\_SED\_DR\_27\_0004430.

#### **Question 41:**

Please list the titles of, and provide, all SoCalGas requirements, standards, practices, memoranda, internal reports, and other documentation that relate to creating, maintaining, keeping, retaining, modifying and deleting job history files between the point in time at which SoCalGas acquired Aliso Canyon natural gas storage facility and October 23, 2015.

# Response 41:

SoCalGas interprets this request as seeking SoCalGas' formal written requirements, standards, practices, memoranda, internal reports, and other formal written documents that relate to creating, maintaining, modifying and deleting well file information from the point in time at which SoCalGas acquired the Aliso Canyon storage field and October 23, 2015. SoCalGas objects to this request as overly broad and unduly burdensome. Notwithstanding this objection, SoCalGas responds as follows: For SoCalGas' Records Management and Retention Schedules as of and prior to October 23, 2015, please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_27\_0003344 -AC\_CPUC\_SED\_DR\_27\_0004205.

11/2/2019	Э	GAS TRAN	SMISSION WORK	ORDER	SEU	WOR	KORDER	
PA	RENT WO #		LL INSPECTIONS	_	1: <b>AC-OPSC</b> WO	2		
REMAR	KS: Comple	eted.						
TARGET START DATE: 11/1/2009 TARGET COMP DATE: 11/30/2009 SCHEDULE START: SCHEDULE FINISH:				ROUTE NUMBER: STATUS: CLOSE REQUESTED BY: BAGATES REPORT DATE: 11/4/2009 PM ACTIVITY CLASS: SURVEY				
LOC.		ION: I ID: AC-WEST FI ION: WEST FIELD						
F	RESPONSIB	LE SUPERVISOR	/ OWNER		<u>(TYPE</u>	PRIORITY	ACCOUNT INFO	
		OPERTNS /			Μ	3	832.020 C7	
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EST. L	abor HRS:	0.00	<u>Labor C</u> <u>Craf</u>		<u>Quantity</u>	Planned Hours	5	
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11/2/2019	GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
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PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WOR	RK ORDER	SEU	WORKORDER
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SS-25				
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22-25B				
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SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
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WORK ORDER #: 3839816	PMNUM: AC-OPSC2
PARENT WO #:	

DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO

SS-44B

SS-3

LOG:

11/2/2019	GAS TRANSMISS	SION WORK ORDE	R SEU	WOR	KORDER	
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	ION: N ID: AC-WEST FIELD ION: WEST FIELD					
RESPONSIB	LE SUPERVISOR / OWI	NER W	ORK TYPE	PRIORITY	ACCOUNT INFO	
	OPERTNS / 0: 11/23/2009			3	832.020 C7	
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11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
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PS-42				
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SS-9				

11/2/2019	GAS TRANSMISSION WOR	K ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #		PMNUM: AC	C-OPSC2	
DESCRIPTION	I: MONTHLY WELL INSPECTIONS	5 - CREW TWO		
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SS-5				
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SS-44B

SS-3

LOG:

11/2/2019	9	GAS TRANSMIS	SION WORK O	RDER	SEU	WOR	KORDER
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REMARKS: COMPLETED TARGET START DATE: 1/1/2010 TARGET COMP DATE: 1/31/2010 SCHEDULE START: SCHEDULE FINISH:			)	ROUTE NUMBER: STATUS: CLOSE REQUESTED BY: BAGATES REPORT DATE: 11/4/2009 PM ACTIVITY CLASS: SURVEY			
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		OPERTNS /		PM		3	832.020 C7
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		TP1RXL	STATECH		3.00	0.00	02/03/2010
JOB PLAN	N DESCRIPT RATIONS:	AC-OPS TON: MONTHLY WE	LL INSPECTION	IS			
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11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
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P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
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SS-1				
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SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 3839832	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019 GAS TRANS	MISSION WORK ORDER	SEU	WOR	KORDER				
WORK ORDER #: <b>3864286</b> PARENT WO #: DESCRIPTION: MONTHLY WELL		JM: <b>AC-OPSC2</b> TWO						
REMARKS: COMPLETE SEE ATTACH	MENT							
TARGET START DATE: 2/1/20 TARGET COMP DATE: 2/28/3 SCHEDULE START: SCHEDULE FINISH:	2010	ROUTE NUMBER: STATUS: CLOSE REQUESTED BY: BAGATES REPORT DATE: 12/4/2009 PM ACTIVITY CLASS: SURVEY						
ASSET #: ASSET DESCRIPTION: LOCATION ID: AC-WEST FIE LOC. DESCRIPTION: WEST FIELD PHYSICAL LOCATION:	LD							
RESPONSIBLE SUPERVISOR	<u>/ OWNER</u> <u>WO</u>		<u>PRIORITY</u>	ACCOUNT INFO				
OPERTNS /		PM	3	832.020 C7				
DATE STARTED: 02/03/2010	DATE COMPLET	ED: 03/03/201	0					
EST. Labor HRS: 0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hours	5				
ACT. Labor HRS: 2.00	OPERATN	1	0.00					
ACTUALS POSTED: LABORCOD	<u>CRAFT</u>	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>				
CGATDULA	STATECH	2.00	0.00	03/03/2010				
JOB PLAN NUMBER: AC-OPS JOB PLAN DESCRIPTION: MONTHLY JOB OPERATIONS: 10 CHECK CELLAR	WELL INSPECTIONS							
20 CHECK GRATING								
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40 CHECK PLATFORM								
50 REMOVE WEEDS								
60 CHECK FOR LEAKS								
	CHECK FOR LEAKS							
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11/2/2019	GAS TRANSMISS	ION WORK ORDER	SEU	WORKORDER
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P-47				
P-39				
P-38				
F-30				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
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	: MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
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SS-1				
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SS-31				
SS-44				
SS-44A				

WORK ORDER #: 3864286	PMNUM: AC-OPSC2
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DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMISS	SION WORK ORD	ER	SEU	WOR	KORDER
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	ENT WO #:						
DES	SCRIPTION: N	MONTHLY WELL INS	PECTIONS - CRE	EW TWO			
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			Labor Code/			Planned Hours	
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	Τ	P1RXL	STATECH	4	.00	0.00	03/04/2010
JOB PLAN I		AC-OPS					
JOB PLAN I	DESCRIPTIO	N: MONTHLY WEL	L INSPECTIONS				
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COMMENTS	-						

11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
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	10-20 on the following e			
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P-26E				
P-25R				
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P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
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	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO			
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SS-25					
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22-25B					
SS-1					
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55-0					
SS-5					
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SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>3901405</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	)	GAS TR/	ANSMISSIC	ON WORK OF	RDER	SI	EU	WOR	KORDER
PA	RENT WO #	: <b>3928070</b> : : MONTHLY W	FIL INSPE	-CTIONS - C		4: <b>AC-OPS</b>	C2		
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TARGET START DATE: 4/1/2010 TARGET COMP DATE: 4/30/2010 SCHEDULE START: SCHEDULE FINISH:			-	ROUTE NUMBER: STATUS: CLOSE REQUESTED BY: BAGATES REPORT DATE: 2/12/2010 PM ACTIVITY CLASS: SURVEY					
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		OPERTNS /				M		3	832.020 C7
DAT	E STARTED	: 03/23/2010		DATE COM	1PLETE	D: 04/28/2	010		
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<u>ACTUAL</u>	<u>S POSTED:</u>	LABOR	CODE	CRAF	T	<u>REG. H</u>	<u>RS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
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11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
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P-26B				
P-26C				
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P-26D				
P-26E				
P-25R				
25K				
P-47				
p-39				
סכ ר				
p-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
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SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 3928070	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMISS	SION WORK OF	RDER	SEU	WOR	KORDER
PAR	ENT WO #	: <b>3944058</b> : : MONTHLY WELL INS		PMNUM: <b>AC</b> REW TWO	-OPSC2		
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LOC. I		ON: ID: AC-WEST FIELD ON: WEST FIELD					
R	SPONSIBL	<u>E SUPERVISOR / OW</u>	<u>NER</u>	WORK TYP	E I	PRIORITY	ACCOUNT INFO
		OPERTNS /		PM		3	832.020 C7
DATE	STARTED	: 04/27/2010	DATE COM	IPLETED: 05,	/27/2010	)	
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ACT. La	bor HRS:	4.00	OPERATN	1		0.00	
<u>ACTUALS</u>	<u>5 POSTED:</u>	LABORCODE TP1RXL	<u>CRAF</u> STATECH	<u>T R</u>	<u>EG. HRS</u> 4.00	OVERTIME 0.00	<u>WORKDATE</u> 05/01/2010
JOB PLAN JOB PLAN JOB OPER	DESCRIPT	AC-OPS ION: MONTHLY WEL	L INSPECTION	S			
10	CHECK CEI	LAR					
20	CHECK GR	ATING					
30	CHECK RAI	ILINGS					
40	CHECK PLA	ATFORM					
50	REMOVE W	/EEDS					
60	CHECK FOR	R LEAKS					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENT	S:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WC			AC-OPSC2	
	ON: MONTHLY WELL INSPEC		)	
	is 10-20 on the following eq	uipment:		
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P-26C				
. 200				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
г- <b>Ј</b> О				
PS-42				
P-40				
SS-9				
		26 / 294		

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2		
	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: 3944058	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	S - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	ION WORK ORD	ER SE	u wor	RKORDER
WORK ORDER #:	3974770	PI	MNUM: AC-OPS	C2	
PARENT WO #:					
DESCRIPTION:	MONTHLY WELL INS	PECTIONS - CRE	EW TWO		
REMARKS: INSPECT	TION COMPLETE, NO	SUBSTANDARD	CONDITIONS -		
TARGET ST	ART DATE: 6/1/2010		ROUTE NUMBE	R:	
	OMP DATE: 6/30/2010			S: CLOSE	
	JLE START: LE FINISH:		REQUESTED E	BY: BAGATES E: 4/12/2010	
SCHEDU			PM ACTIVITY CLAS		
ASSET	· #•				
ASSET DESCRIPTIO					
	ID: AC-WEST FIELD				
LOC. DESCRIPTIC	ON: WEST FIELD				
PHYSICAL LOCATIO	ON:				
<u>RESPONSIBLE</u>	E SUPERVISOR / OW	<u>NER </u>	<u>NORK TYPE</u>	PRIORITY	ACCOUNT INFO
	OPERTNS /		PM	3	832.020 C7
DATE STARTED:	05/24/2010	DATE COMPI	LETED: 07/04/20	)10	
EST. Labor HRS:	0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hour	<u>-S</u>
ACT. Labor HRS:	4.00	OPERATN	1	0.00	
ACTUALS POSTED:	LABORCODE	<u>CRAFT</u>	<u>REG. H</u>	RS <u>OVERTIME</u>	<u>WORKDATE</u>
	TP1RXL	STATECH	4.00	0.00	07/04/2010
JOB PLAN NUMBER:	AC-OPS				
JOB PLAN DESCRIPTI	ON: MONTHLY WELI	L INSPECTIONS			
JOB OPERATIONS:					
10 CHECK CEL	LAR				
20 CHECK GRA	ATING				
30 CHECK RAII	LINGS				
40 CHECK PLA	TFORM				
50 REMOVE WI	EEDS				
60 CHECK FOR	LEAKS				
70 MAKE SURE	E WELL HAS PROPER S	SIGNAGE			
COMMENTS:					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#:		AC-OPSC2	
	ON: MONTHLY WELL INSPE s 10-20 on the following ec		)	
	s 10-20 on the following et	Juipment.		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
2510				
47				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				
		30 / 284		

11/2/2019	GAS TRANSMISSION W	ORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: AC	C-OPSC2	
DESCRIPTIO	N: MONTHLY WELL INSPECTIO	ONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

=

SEU

WORK ORDER #: <b>3974770</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
WORK ORDER			PMNUM: AC	-OPSC2		
PARENT WO						
DESCRIPTIC	ON: MONTHLY WELL INS	PECTIONS - C	CREW TWO			
	d vavle leaks at P26ARe ACW-P26A-05 leaking		63333			
TARGET	START DATE: 7/1/2010		ROUTE	NUMBER:		
	COMP DATE: 7/31/2010			STATUS:		
	EDULE START:			STED BY:		
SCHE	DULE FINISH:		PM ACTIVIT	RT DATE:		
					0011121	
	SET #:					
ASSET DESCRIP	N ID: AC-WEST FIELD					
	TION: WEST FIELD					
PHYSICAL LOCA						
RESPONSI	BLE SUPERVISOR / OW	NER	WORK TYPI	E F	PRIORITY	ACCOUNT INFO
	OPERTNS /		PM		3	832.020 C7
DATE STARTE	D: 06/22/2010	DATE CON	IPLETED: 07	/31/2010	1	
EST. Labor HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Quar</u>	<u>ntity l</u>	Planned Hours	2
ACT. Labor HRS:	: 4.00	OPERATI	N 1		0.00	
ACTUALS POSTER	D: LABORCODE	CRAF	<u>-T RI</u>	EG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
	CGATDULA	STATECH		4.00	0.00	07/31/2010
JOB PLAN NUMBER	R: AC-OPS					
JOB PLAN DESCRIP	PTION: MONTHLY WEL	L INSPECTION	NS			
JOB OPERATIONS:						
10 CHECK C	ELLAR					
20 CHECK G	GRATING					
30 CHECK R	AILINGS					
40 CHECK P	LATFORM					
50 REMOVE	WEEDS					
60 CHECK F	OR LEAKS					
70 MAKE SU	JRE WELL HAS PROPER	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
WORK ORDER #: 3 PARENT WO #:	<b>3984256</b> MONTHLY WELL INSPECTIONS -	PMNUM: AC-(	OPSC2	
	-20 on the following equipment:			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WO	RK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#:	PMNUM: AC	-OPSC2	
DESCRIPTIO	N: MONTHLY WELL INSPECTION	IS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 3984256	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	NS - CREW TWO

SS-44B

SS-3

11/2/2019	Ð	GAS TRANSMISS	SION WORK ORDE	R SE	U WO	RKORDER	
PA	RENT WO #	: <b>4019999</b> : : MONTHLY WELL INS		NUM: <b>AC-OPS</b> W TWO	C2		
REMAR	KS: Comple	ete see attachment					
TARGET START DATE: 8/1/2010 TARGET COMP DATE: 8/30/2010 SCHEDULE START: SCHEDULE FINISH:			PI	ROUTE NUMBER: STATUS: CLOSE REQUESTED BY: BAGATES REPORT DATE: 6/4/2010 PM ACTIVITY CLASS: SURVEY			
LOC.		ON: ID: AC-WEST FIELD ON: WEST FIELD					
<u>F</u>	RESPONSIBL	E SUPERVISOR / OW	<u>NER</u> <u>W</u>	ORK TYPE	PRIORITY	ACCOUNT INFO	
		OPERTNS /	DATE COMPLE	PM	3	832.020 C7	
	abor HRS:	: 07/26/2010 0.00	Labor Code/ Craft	Quantity	Planned Hou	<u>rs</u>	
ACT. L	abor HRS:	2.00	OPERATN	1	0.00		
<u>ACTUAL</u>	<u>S POSTED:</u>	LABORCODE CGATDULA	<u>CRAFT</u> STATECH	<u>REG. H</u> 2.00	<u>RS</u> <u>OVERTIME</u> 0.00	<u>WORKDATE</u> 08/29/2010	
JOB PLAN	N NUMBER: N DESCRIPT RATIONS:	AC-OPS ION: MONTHLY WEL	L INSPECTIONS				
10	CHECK CE	LLAR					
20	CHECK GR	ATING					
30	CHECK RA	ILINGS					
40	CHECK PL	ATFORM					
50	REMOVE WEEDS						
60	CHECK FO	R LEAKS					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMEN	TS:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WC			AC-OPSC2	
	ON: MONTHLY WELL INSPEC		)	
	s 10-20 on the following eq	uipment:		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
r-zjn				
D (7				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	K ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #	:	PMNUM: AC-	OPSC2	
DESCRIPTION	: MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4019999</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	IS - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMISS	SION WORK OF	RDER	SEU	WOR	KORDER
WORK	ORDER #	: 4042121		PMNUM:	AC-OPSC2	2	
PAR	ENT WO #	:					
DES	SCRIPTION	: MONTHLY WELL INS	SPECTIONS - C	REW TW	0		
REMARK	S: COMPL	ETE SEE ATTACHMEN	Т				
	TARGET S	TART DATE: 9/1/2010		RO	UTE NUMBER	:	
		COMP DATE: 9/30/2010			STATUS		
		ULE START:			QUESTED BY		
	SCHEDU	JLE FINISH:			EPORT DATE		
				i i i i i i i i i i i i i i i i i i i		SORVET	
	ASSE						
	DESCRIPTI						
		ID: AC-WEST FIELD ON: WEST FIELD					
	AL LOCATI						
		<u>E SUPERVISOR / OW</u>	NER	WORK	TYPE	PRIORITY	ACCOUNT INFO
<u>IXL</u>		OPERTNS /		PM		3	832.020 C7
DATE	STARTED	: 08/26/2010	DATE COM	IPLETED	09/30/201	0	
EST. Lal	bor HRS:	0.00	Labor Code Craft	<u>e/ (</u>	Quantity	Planned Hour	<u>S</u>
ACT. La	bor HRS:	4.50	OPERATN	I	1	0.00	
ACTUALS	5 POSTED:	LABORCODE	CRAF	Т	REG. HRS	OVERTIME	WORKDATE
		TP1KJJ	STATECH		2.00	0.00	09/25/2010
		TP1KJJ	STATECH		2.00	0.00	09/26/2010
		CGATDULA	STATECH		0.50	0.00	09/30/2010
		AC-OPS					
		ION: MONTHLY WEL		IS			
JOB OPER							
	CHECK CEI	LLAR					
	CHECK GR						
	CHECK RAI						
	REMOVE W						
	-	-					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENT	S:						

COMMENTS:

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
PARENT WO			C-OPSC2	
	ON: MONTHLY WELL INSPEC			
	is 10-20 of the following equ	iipment.		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
D 20				
P-38				
<b>56</b> 4 <b>5</b>				
PS-42				
P-40				
SS-9				
		42 / 284		

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WO		PMNUM: A	C-OPSC2	
DESCRIPTI	ON: MONTHLY WELL INSPEC	CTIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4042121</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	IS - CREW TWO

SS-44B

SS-3

11/2/201	9	(	GAS TRANSMISS	ION WORK O	RDER	SEU	WOR	KORDER
WOF	RK ORDER #	: 406	9251		PMNUM:	C-OPSC2		
	RENT WO #							
DE	SCRIPTION	: MON	NTHLY WELL INS	PECTIONS - C	REW TWO			
REMAR	RKS: INSPEC	TION	COMPLETE, NO	SUBSTANDAR	D CONDIT	IONS -		
			DATE: 10/1/2010		ROUT	E NUMBER:		
			DATE: 10/31/2010	1	DEOL	STATUS:		
	SCHED SCHEDI				-	JESTED BY: PORT DATE:		
	001120	,,				ITY CLASS:		
	ASSE							
ASSET	DESCRIPTI							
1.00	LOCATION DESCRIPTI		C-WEST FIELD					
	CAL LOCATI							
		-	PERVISOR / OWI	VER	WORK T	/PE I	PRIORITY	ACCOUNT INFO
-			RTNS /		PM		3	832.020 C7
DAT	TE STARTED	: 09/2	24/2010	DATE COM	IPLETED: 1	10/24/2010	)	
EST. L	abor HRS:	0.00	1	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qu</u>	<u>iantity</u>	Planned Hours	5
ACT. L	abor HRS:	4.00	)	OPERATIN	I	1	0.00	
<u>ACTUAI</u>	LS POSTED:		LABORCODE	CRAF	T	REG. HRS	<u>OVERTIME</u>	WORKDATE
		TP1	RXL	STATECH		4.00	0.00	10/24/2010
	N NUMBER: N DESCRIPT		AC-OPS MONTHLY WEL	L INSPECTION	IS			
	RATIONS:							
10	CHECK CE							
20	CHECK GR		-					
30	CHECK RA							
40	CHECK PLA							
50	REMOVE W							
60	CHECK FO	r lea	KS					
70	MAKE SUR	e wei	L HAS PROPER	SIGNAGE				
COMMEN	TS:							

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WO			AC-OPSC2	
	ON: MONTHLY WELL INSPE		)	
P-26		aipment.		
F-20				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER	R #: <b>4069251</b>	PMNUM: A	C-OPSC2		
PARENT WO					
DESCRIPTI	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
00 2011					
22-25B					
SS-1					
55-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>4069251</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK ORDE	ER SEU	WOR	KORDER
WORK ORDER # PARENT WO #	:		NUM: AC-OPSC2	2	
DESCRIPTION	: MONTHLY WELL INS	SPECTIONS - CRE	W TWO		
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDARD (	CONDITIONS -		
TARGET C SCHED	TART DATE: 11/1/2010 COMP DATE: 11/30/2010 ULE START: JLE FINISH:		ROUTE NUMBER STATUS REQUESTED BY REPORT DATE M ACTIVITY CLASS	: CLOSE : BAGATES : 9/10/2010	
ASSET DESCRIPTI LOCATION LOC. DESCRIPTI PHYSICAL LOCATI	ON: ID: AC-WEST FIELD ON: WEST FIELD				
<u>RESPONSIBL</u>	<u>E SUPERVISOR / OW</u> OPERTNS /		<u>ORK TYPE</u> PM	PRIORITY 3	ACCOUNT INFO 832.020 C7
DATE STARTED	: 10/20/2010	DATE COMPL	ETED: 11/03/201	0	
EST. Labor HRS:	0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hours	<u>S</u>
ACT. Labor HRS:	9.00	OPERATN	1	0.00	
ACTUALS POSTED:	LABORCODE CGATDULA TP1KJJ TP1RXL	<u>CRAFT</u> STATECH STATECH STATECH	<u>REG. HRS</u> 3.00 3.00 3.00	<u>OVERTIME</u> 0.00 0.00 0.00	<u>WORKDATE</u> 11/03/2010 11/03/2010 11/03/2010
JOB OPERATIONS:10CHECK CEI20CHECK GR30CHECK RA40CHECK PLA50REMOVE W60CHECK FOR	ATING ILINGS ATFORM /EEDS				

11/2/2019	GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
PARENT WO	x #: <b>4092806</b> ) #: ON: MONTHLY WELL INSP		AC-OPSC2	
	s 10-20 on the following e		)	
P-26				
1 20				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
F-20L				
P-25R				
F-ZJK				
P-47				
1 77				
P-39				
P-38				
PS-42				
· - ·=				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER	
	R #: <b>4092806</b>	PMNUM: A	C-OPSC2		
PARENT WC					
DESCRIPTI	ON: MONTHLY WELL INSPEC	LTIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
55-25A					
22-25B					
SS-1					
SS-1-0					
33-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					
33-44A					

WORK ORDER #: 4092806 PMNUM: AC-OPSC2 PARENT WO #: DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK ORDER	SEU	WOR	KORDER
WORK ORDER # PARENT WO # DESCRIPTION			UM: <b>AC-OPSC</b> TWO	2	
REMARKS: COMPL	ETE SE ATTACHMENT				
TARGET SCHED	START DATE: 12/1/2010 COMP DATE: 12/31/2010 DULE START: ULE FINISH:		ROUTE NUMBER STATUS REQUESTED BY REPORT DATE ACTIVITY CLASS	: CLOSE : BAGATES : 10/8/2010	
	ION: N ID: AC-WEST FIELD ION: WEST FIELD				
<u>RESPONSIB</u>	LE SUPERVISOR / OWI	NER WO	<u>RK TYPE</u>	PRIORITY	ACCOUNT INFO
DATE STARTED	OPERTNS / 0: 11/17/2010	DATE COMPLET	PM FD: 12/28/201	3	832.020 C7
EST. Labor HRS:		Labor Code/ Craft	Quantity	Planned Hours	<u></u>
ACT. Labor HRS:	2.00	OPERATN	1	0.00	
ACTUALS POSTED:	LABORCODE CGATDULA	<u>CRAFT</u> STATECH	<u>REG. HR</u> 2.00	<u>6 OVERTIME</u> 0.00	<u>WORKDATE</u> 12/28/2010
JOB OPERATIONS:10CHECK CE20CHECK GR30CHECK RA40CHECK PL50REMOVE V60CHECK FO	TION: MONTHLY WELL ELLAR ATING ILLINGS ATFORM VEEDS				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	N: MONTHLY WELL INSPECT	IONS - CREW TWO		
AC-OPS Operations	s 10-20 on the following equi	pment:		
P-26				
P-26A				
P-26B				
P-26C				
. 200				
P-26D				
P-26E				
P-25R				
D 47				
P-47				
P-39				
P-38				
PS-42				
10 12				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2		
	". DN: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
22 250					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>4101027</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS -	CREW TWO

SS-44B

SS-3

11/2/2019	Ð	G	GAS TRANSMISS	SION WORK OF	RDER	SEU	WOR	KORDER
WOR	K ORDER #	: 413	1476		PMNUM: AC	-OPSC2		
	RENT WO #							
DE	SCRIPTION	: MON	THLY WELL INS	PECTIONS - C	REW TWO			
REMAR	KS: INSPEC	TION	COMPLETE, NO	SUBSTANDAR	D CONDITIC	DNS -		
			ATE: 1/1/2011		ROUTE	NUMBER:		
			ATE: 1/31/2011		DEOUE	STATUS:		
	SCHED SCHEDI				-	STED BY: RT DATE:	BAGATES 11/5/2010	
	SCHED				PM ACTIVIT			
	ASSE	Г#:						
ASSET	DESCRIPTI							
			C-WEST FIELD					
	DESCRIPTI CAL LOCATI		EST FIELD					
			ERVISOR / OW		WORK TYP	= [	RIORITY	ACCOUNT INFO
<u>r</u>			TNS /		PM		3	832.020 C7
DAT	E STARTED		1/2010	DATE COM	IPLETED: 01	/15/2011		
EST. La	abor HRS:	0.00		Labor Code	<u>e/ Quai</u>	<u>ntity l</u>	Planned Hour	<u>S</u>
ACT		4 00		<u>Craft</u>				
	abor HRS:			OPERATN			0.00	
<u>ACTUAL</u>	<u>S POSTED:</u>		LABORCODE		<u>T R</u>			WORKDATE
		TP1R	(XL	STATECH		4.00	0.00	01/15/2011
JOB PLAN	NUMBER:		AC-OPS					
JOB PLAN	N DESCRIPT	ION:	MONTHLY WEL	L INSPECTION	S			
	RATIONS:							
10	CHECK CE							
20	CHECK GR	ATING	i					
30	CHECK RA	ILINGS	5					
40	CHECK PL	ATFOR	Μ					
50	REMOVE W	/EEDS						
60	CHECK FO	R LEAF	Ś					
70	MAKE SUR	E WEL	L HAS PROPER	SIGNAGE				
COMMEN	TS:							

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#: <b>4131476</b> #:	PMNUM:	AC-OPSC2	
DESCRIPTIO	ON: MONTHLY WELL INSPE	CTIONS - CREW TWO		
AC-OPS Operation	s 10-20 on the following eq	uipment:		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
251				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
	#: 4131476	PMNUM: A	C-OPSC2		
PARENT WO	• #: DN: MONTHLY WELL INSPEC <sup>-</sup>	TIONS - CREW TWO			
SS-29					
00 25					
00.05					
SS-25					
SS-25A					
22-25B					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>4131476</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	S - CREW TWO

SS-44B

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11/2/2019		GAS TR	ANSMISSI	ON WORK OF	RDER	SEU	wo	ORKORDER
WORK C	ORDER #:	4155480			PMNUM:	AC-OPSC2	2	
	NT WO #:							
DESC	CRIPTION	MONTHLY \	VELL INSP	ECTIONS - C	REW TWO			
REMARKS	: INSPEC	TION COMPL	ETE, NO S	SUBSTANDAR	D CONDIT	IONS -		
		TART DATE: 2			ROUT	TE NUMBER:		
		OMP DATE: 2, JLE START:	/28/2011		DEO	STATUS:		
		ILE FINISH:			-	UESTED BY: PORT DATE:	12/3/2010	
						/ITY CLASS:		
	ASSET							
ASSET DE								
		ID: AC-WEST						
PHYSICAL		ON: WEST FI	ELD					
		E SUPERVIS		FR	WORK T	<u>YPE</u>	PRIORITY	ACCOUNT INFO
<u>KLO</u>		OPERTNS /			PM	<u></u>	3	832.020 C7
DATE S	STARTED:		L	DATE COM	PLETED:	02/03/201	1	
EST. Labo				Labor Code			Planned Hou	<u>urs</u>
ACT. Labo	or HDC.	2 00		<u>Craft</u>		1	0.00	
			0005	OPERATN		1	0.00	
ACTUALS F	POSTED:	LABOR TP1KJJ		STATECH	Τ	2.00	OVERTIM 0.00	
		IFIKJJ		STATLCT		2.00	0.00	02/03/2011
JOB PLAN N					_			
		ION: MONT	HLY WELL	INSPECTION	S			
JOB OPERAT	TIONS: HECK CEL							
	EMOVE W							
	HECK FOF							
70 M	AKE SURE	E WELL HAS	PROPER S	IGNAGE				
COMMENTS:	:							

11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	x #: <b>4155480</b> ) #:	PMNUM:	AC-OPSC2	
DESCRIPTIO	ON: MONTHLY WELL INSPE	CTIONS - CREW TWO	)	
AC-OPS Operation	s 10-20 on the following e	quipment:		
P-26				
P-26A				
P-26B				
2-26C				
200				
P-26D				
26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
WORK ORDER #3		PMNUM: AC-	OPSC2	
DESCRIPTION	: MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4155480</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	NS - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANS	MISSION WORK O	RDER	SEU	WOR	KORDER
WORK	ORDER #	: 4167957		PMNUM: AC-	OPSC2		
	NT WO #						
DESC	CRIPTION	: MONTHLY WELL	INSPECTIONS - C	CREW TWO			
REMARKS	S: INSPEC	TION COMPLETE,	NO SUBSTANDAR		IS -		
		TART DATE: 3/1/20		ROUTE N	UMBER:		
		COMP DATE: 3/31/2	011		TATUS:		
		ULE START: JLE FINISH:		-		BAGATES 12/29/2010	
	SCHEDO			PM ACTIVITY			
	ASSET	Γ#:					
	ESCRIPTI	-					
		ID: AC-WEST FIEL	D				
	L LOCATI	ON: WEST FIELD					
		E SUPERVISOR /		WORK TYPE		PRIORITY	ACCOUNT INFO
	STONSIDE	OPERTNS /	OWNER	PM	1	3	832.020 C7
DATE S	STARTED:	-	DATE CON	1PLETED: 03/1	L3/2011		
	or HRS:		Labor Cod			Planned Hour	<u>S</u>
			<u>Craft</u>				
	or HRS:		OPERATI			0.00	
ACTUALS	POSTED:					OVERTIME	
		TP1RXL	STATECH		4.00	0.00	03/13/2011
JOB PLAN N	UMBER:	AC-OPS					
JOB PLAN D	DESCRIPTI	ION: MONTHLY	WELL INSPECTION	IS			
JOB OPERA							
	HECK CEL						
	HECK GR						
	HECK RAI						
40 C	HECK PLA	TFORM					
50 R	EMOVE W	/EEDS					
60 C	HECK FOF	R LEAKS					
70 M	IAKE SURI	E WELL HAS PROP	PER SIGNAGE				
COMMENTS	:						

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WC	R #: <b>4167957</b>	PMNUM: A	C-OPSC2	
	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO		
C-OPS Operation	s 10-20 on the following equ	uipment:		
2-26				
P-26A				
r-20A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				
		66 / 284		

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: AC	C-OPSC2	
DESCRIPTIC	N: MONTHLY WELL INSPECT	TIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 4167957	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL	INSPECTIONS - CREW TWO

SS-44B

SS-3

11/2/2019	9	GAS	TRANSMISS	ION WORK OF	RDER	SEU	WOR	RKORDER
WOR	K ORDER #	: 420086	9		PMNUM:	AC-OPSC2		
PA	RENT WO #	:						
DE	SCRIPTION	: MONTHL	Y WELL INS	PECTIONS - C	REW TWC	)		
REMAR	RKS: INSPEC	TION COM	1PLETE, NO	SUBSTANDAR	D CONDI	TIONS -		
		TART DATE			ROU	TE NUMBER:	:	
			: 4/30/2011		DEO	STATUS:		
		ULE START JLE FINISH			-	UESTED BY:		
						VITY CLASS		
	ASSE							
ASSET	DESCRIPTI							
	LOCATION DESCRIPTI							
	CAL LOCATI		TILLD					
			ISOR / OWN	IER	WORK T	YP <u>E</u>	PRIORITY	ACCOUNT INFO
-		OPERTNS			PM		3	832.020 C7
DAT	E STARTED	: 03/21/20	)11	DATE COM	IPLETED:	04/27/201	1	
EST. L	abor HRS:	0.00		<u>Labor Code</u> <u>Craft</u>	e/ Qu	<u>uantity</u>	Planned Hour	<u>'S</u>
ACT. L	abor HRS:	4.00		OPERATIN	I	1	0.00	
<u>ACTUAL</u>	<u>S POSTED:</u>	LAB	<u>ORCODE</u>	CRAF	T	REG. HRS	OVERTIME	<u>WORKDATE</u>
		TP1KJJ		STATECH		4.00	0.00	04/27/2011
	N NUMBER: N DESCRIPT			_ INSPECTION	IS			
	RATIONS:							
10	CHECK CE							
20	CHECK GR							
30	CHECK RA							
40	CHECK PLA							
50	REMOVE W	_						
60	CHECK FO	R LEAKS						
70	MAKE SUR	E WELL HA	AS PROPER S	SIGNAGE				
COMMEN	TS:							

11/2/2019	GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO			AC-OPSC2	
	10-20 on the following e			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER		PMNUM: A	C-OPSC2		
PARENT WO	#: DN: MONTHLY WELL INSPECT				
DESCRIPTIC	N. MONTHET WELL INSPECT	IONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
22 230					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
33-3					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: **4200869** PMNUM: **AC-OPSC2** PARENT WO #: DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO

SS-44B

SS-3

11/2/2019	Ð	GAS TRANSM	ISSION WORK O	RDER	SEU	WOR	KORDER
WOR	K ORDER #	: 4229333		PMNUM: AC	-OPSC2		
	RENT WO #						
DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO							
REMAR	KS: INSPEC	CTION COMPLETE,	NO SUBSTANDAR	D CONDITIO	NS -		
		TART DATE: 5/1/201		ROUTE	NUMBER:		
		COMP DATE: 5/31/20	11		STATUS:		
		OULE START: ULE FINISH:				BAGATES 3/14/2011	
	SCHED	OLL I INISH.		PM ACTIVIT			
	ASSE	Т#:					
ASSET	DESCRIPTI	ION:					
	LOCATION	ID: AC-WEST FIELD	)				
LOC.	DESCRIPTI	ON: WEST FIELD					
PHYSI	CAL LOCATI	ION:					
<u>F</u>	RESPONSIBL	<u>LE SUPERVISOR / (</u> OPERTNS /	<u>DWNER</u>	<u>WORK TYPI</u> PM	<u> </u>	PRIORITY 3	ACCOUNT INFO 832.020 C7
DAT	E STARTED	: 04/25/2011	DATE COM	1PLETED: 05,	/26/2011		
	abor HRS:		Labor Cod			Planned Hours	<u>s</u>
			<u>Craft</u>				
ACT. L	abor HRS:	3.00	OPERATI	I 1		0.00	
<u>ACTUAL</u>	<u>S POSTED:</u>			<u>-T RI</u>		<u>OVERTIME</u>	<u>WORKDATE</u>
		ТР1КЈЈ	STATECH		3.00	0.00	05/26/2011
JOB PLAN	NUMBER:	AC-OPS					
JOB PLAN	DESCRIPT	TON: MONTHLY W	/ELL INSPECTION	IS			
JOB OPE	RATIONS:						
10	CHECK CE	LLAR					
20	CHECK GR	ATING					
30	CHECK RA	ILINGS					
40	CHECK PLA	ATFORM					
50	REMOVE W	VEEDS					
60	CHECK FO	R LEAKS					
70	MAKE SUR	E WELL HAS PROP	ER SIGNAGE				
COMMEN	TS:						

11/2/2019	GAS TRANSMISSION WO	RK ORDER	SEU	WORKORDER
WORK ORDER #:		PMNUM: A	C-OPSC2	
PARENT WO #: DESCRIPTION:	MONTHLY WELL INSPECTION	S - CRFW TWO		
	0-20 on the following equipme			
P-26				
P-26A				
P-26B				
1 200				
P-26C				
1 200				
P-26D				
1 200				
P-26E				
F-ZUL				
P-25R				
F-ZJK				
P-47				
1 7/				
P-39				
P-38				
PS-42				
10 12				
P-40				
55.0				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#: <b>4229333</b> #:	PMNUM: A	C-OPSC2	
DESCRIPTIO	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

=

SEU

WORK ORDER #: <b>4229333</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	9	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER		
WOR	RK ORDER #	: 4253299		PMNUM: AC-	OPSC2				
PA	RENT WO #	:							
DE	DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO								
REMAR	RKS: GREAS	ING AND BRUSH IN C	ELLARS TAKE	N CARE OF					
	TARGET S	TART DATE: 6/1/2011		ROUTE N	IUMBER:				
		COMP DATE: 6/30/2011			STATUS:				
		ULE START: JLE FINISH:		-		BAGATES 4/13/2011			
	SCHED			PM ACTIVITY					
	ASSE	T #:							
ASSET	DESCRIPTI								
		ID: AC-WEST FIELD							
	CAL LOCATI	ON: WEST FIELD							
		LE SUPERVISOR / OW		WORK TYPE		RIORITY	ACCOUNT INFO		
<u>1</u>	<u>(LSFONSIDE</u>	OPERTNS /		PM	. <u>r</u>	3	832.020 C7		
DAT	TE STARTED	: 05/23/2011	DATE COM	MPLETED: 06/	30/2011				
	abor HRS:		<u>Labor Cod</u> <u>Craft</u>			Planned Hours	<u>5</u>		
ACT. L	abor HRS:	8.00	OPERATI	N 1		0.00			
<u>ACTUAL</u>	LS POSTED:	LABORCODE	CRA	FT <u>RE</u>	<u>G. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>		
		TP1KJJ	STATECH		8.00	0.00	06/30/2011		
		AC-OPS ION: MONTHLY WEL	L INSPECTIO	NS					
	RATIONS:								
10	CHECK CEI								
20	CHECK GR	ATING							
30	CHECK RAI	ILINGS							
40	CHECK PLA	ATFORM							
50	REMOVE W	/EEDS							
60	CHECK FO	R LEAKS							
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE						
COMMEN	TS:								

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WC			AC-OPSC2	
	ON: MONTHLY WELL INSPEC		)	
	s 10-20 on the following eq	uipment:		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
D 47				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WOR	K ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #:	:	PMNUM: AC-	OPSC2	
DESCRIPTION	: MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4253299</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	9	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
WOR	K ORDER #:	4268318		PMNUM: AC-	OPSC2		
	RENT WO #:						
DE	SCRIPTION:	MONTHLY WELL INS	SPECTIONS - C	CREW TWO			
REMAR	KS: COMPLE	TED PRIOR BUT NOT	RECORDED				
	TARGET ST	ART DATE: 7/1/2011		ROUTE N	UMBER:		
		OMP DATE: 7/31/2011			STATUS:		
		LE START:				BAGATES	
	SCHEDUL	LE FINISH:		PM ACTIVITY		5/6/2011 SURVEY	
				TH ACTIVITY	CLA35.	SORVET	
	ASSET						
ASSET	DESCRIPTIC						
100		ID: AC-WEST FIELD					
	CAL LOCATIC						
_		E SUPERVISOR / OW	NER	WORK TYPE		RIORITY	ACCOUNT INFO
<u> </u>		OPERTNS /		PM	<u> </u>	3	832.020 C7
DAT		11/06/2013	DATE COM	IPLETED: 11/	06/2013		
EST. L	abor HRS:	0.00	<u>Labor Cod</u> Craft	<u>e/ Quant</u>	<u>tity I</u>	Planned Hours	5
ACT. L	abor HRS:	1.00	OPERATI	N 1		0.00	
ACTUAL	S POSTED:	LABORCODE	CRAF	T RE	G. HRS	<u>OVERTIME</u>	WORKDATE
		CAWARNER	MGMT		1.00	0.00	11/06/2013
JOB PLAN	NUMBER:	AC-OPS					
JOB PLAN	DESCRIPTION	ON: MONTHLY WEL	L INSPECTION	IS			
JOB OPE	RATIONS:						
10	_	ARS SHALL BE COVE					
20		R FLOORING SHALL				N	
30	CHECK RAIL	DITION SO AS TO E	CLUDE PEOPL		ALS.		
40	CHECK PLAT						
50	REMOVE WE	-					
60	CHECK FOR						
70	MAKE SURE	WELL HAS PROPER	SIGNAGE				
COMMEN	TS:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WO			AC-OPSC2	
	ON: MONTHLY WELL INSPE			
	s 10-20 on the following ec	Jupment.		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				
•				

11/2/2019	GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
PARENT WO		PMNUM: A	C-OPSC2	
DESCRIPTIO	ON: MONTHLY WELL INSPE	ECTIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4268318</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

1/2/2019 GAS TRANSMISS	SION WORK OR	DER	SEU	WOR	KORDER
WORK ORDER #: <b>4289721</b>	F	MNUM: AC-OF	PSC2		
PARENT WO #:					
DESCRIPTION: MONTHLY WELL INS	SPECTIONS - CR	EW TWO			
REMARKS: INSPECTION COMPLETE, NO	SUBSTANDARD	CONDITIONS	-		
TARGET START DATE: 8/1/2011		ROUTE NUM	1BER:		
TARGET COMP DATE: 8/31/2011			ATUS: C		
SCHEDULE START:		REQUESTE			
SCHEDULE FINISH:		REPORT I PM ACTIVITY CI			
ASSET #: ASSET DESCRIPTION:					
LOCATION ID: AC-WEST FIELD					
LOC. DESCRIPTION: WEST FIELD					
PHYSICAL LOCATION:					
RESPONSIBLE SUPERVISOR / OW	/NFR	WORK TYPE	Р	RIORITY	ACCOUNT INFO
OPERTNS /		PM		3	832.020 C7
DATE STARTED: 07/19/2011	DATE COMF	PLETED: 08/26	/2011		
EST. Labor HRS: 0.00	<u>Labor Code</u> <u>Craft</u>	<u>Quantity</u>	L P	lanned Hours	5
ACT. Labor HRS: 4.00	OPERATN	1		0.00	
ACTUALS POSTED: LABORCODE	<u>CRAFT</u>	REG.	HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
AESTRELLA	STATECH	4.0	00	0.00	08/26/2011
OB PLAN NUMBER: AC-OPS					
OB PLAN DESCRIPTION: MONTHLY WEL	L INSPECTIONS	5			
OB OPERATIONS:					
0 WELL CELLARS SHALL BE COVE	RED AND KEPT	DRAINED			
CELLARS SHOULD BE PROTECTI					AL.
0 GRATING OR FLOORING SHALL	-				
GOOD CONDITION SO AS TO E	XCLUDE PEOPLE	AND ANIMALS	5.		
0 CHECK RAILINGS					
0 CHECK PLATFORM					
0 REMOVE WEEDS					
0 CHECK FOR LEAKS					
0 MAKE SURE WELL HAS PROPER	SIGNAGE				
OMMENTS:					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#: <b>4289721</b>	PMNUM:	AC-OPSC2	
DESCRIPTI	ON: MONTHLY WELL INSPE	CTIONS - CREW TWO	)	
AC-OPS Operation	s 10-20 on the following eq	uipment:		
<sup>D</sup> -26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
251				
P-47				
p-39				
<b>D-38</b>				
-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#: <b>4289721</b> #:	PMNUM: A	C-OPSC2	
DESCRIPTIO	ON: MONTHLY WELL INSPECT	TIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4289721</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPEC	TIONS - CREW TWO

SS-44B

SS-3

L1/2/2019 GAS TRANSMISS	ION WORK ORD	ER SEU	WOR	RKORDER
WORK ORDER #: <b>4326030</b> PARENT WO #:	PM	INUM: AC-OPSC	2	
DESCRIPTION: MONTHLY WELL INSI	PECTIONS - CRE	W TWO		
REMARKS: INSPECTION COMPLETE, NO	SUBSTANDARD (	CONDITIONS -		
TARGET START DATE: 9/1/2011		ROUTE NUMBER	.:	
TARGET COMP DATE: 9/30/2011			: CLOSE	
SCHEDULE START:		REQUESTED BY		
SCHEDULE FINISH:	D	REPORT DATE M ACTIVITY CLASS		
			SORVET	
ASSET #:				
ASSET DESCRIPTION:				
LOCATION ID: AC-WEST FIELD LOC. DESCRIPTION: WEST FIELD				
PHYSICAL LOCATION:				
RESPONSIBLE SUPERVISOR / OWN		ORK TYPE	PRIORITY	ACCOUNT INFO
OPERTNS /		PM	3	832.020 C7
DATE STARTED: 08/22/2011	DATE COMPL		-	0021020 07
EST. Labor HRS: 0.00	Labor Code/			<u><u><u>´S</u></u></u>
	<u>Craft</u>			
ACT. Labor HRS: 4.00	OPERATN	1	0.00	
ACTUALS POSTED: LABORCODE AESTRELLA	<u>CRAFT</u> STATECH	<u>REG. HRS</u> 4.00		<u>WORKDATE</u> 09/29/2011
IOB PLAN NUMBER: AC-OPS				
OB PLAN DESCRIPTION: MONTHLY WELL	_ INSPECTIONS			
IOB OPERATIONS:				
10 WELL CELLARS SHALL BE COVER	RED AND KEPT D	RAINED		
CELLARS SHOULD BE PROTECTE	D FROM AS MUC	H RUNOFF WATE	R AS PRACTIC	AL.
20 GRATING OR FLOORING SHALL E	-		IN	
GOOD CONDITION SO AS TO EX	CLUDE PEOPLE A	ND ANIMALS.		
30 CHECK RAILINGS				
40 CHECK PLATFORM				
50 REMOVE WEEDS				
50 CHECK FOR LEAKS				
70 MAKE SURE WELL HAS PROPER S	SIGNAGE			
COMMENTS:				

11/2/2019	GAS TRANSMISSION	I WORK ORDER	SEU	WORKORDER
WORK ORDEF PARENT WC	R #: <b>4326030</b>	PMNUM:	AC-OPSC2	
DESCRIPTI	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO		
AC-OPS Operation	ns 10-20 on the following equ	ipment:		
P-26				
0				
P-26A				
P-26B				
200				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
20				
P-38				
PS-42				
P-40				
1 +0				
SS-9				
		00 / 284		

11/2/2019	GAS TRANSMISSION	N WORK ORDER	SEU	WORKORDER
WORK ORDEF PARENT WC	R #: <b>4326030</b>	PMNUM: A	C-OPSC2	
DESCRIPTI	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4326030</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

WORK ORDER #: 4345104         PMNUM: AC-OPSC2           PARENT WO #:         PMNUM: AC-OPSC2	
DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO	
REMARKS: INSPECTION COMPLETE, NO SUBSTANDARD CONDITIONS -	
TARGET START DATE: 10/1/2011 ROUTE NUMBER:	
TARGET COMP DATE: 10/31/2011STATUS: CLOSE	
SCHEDULE START: REQUESTED BY: BAGATES	
SCHEDULE FINISH: REPORT DATE: 7/29/2011 PM ACTIVITY CLASS: SURVEY	
PM ACTIVITY CLASS: SURVEY	
ASSET #:	
ASSET DESCRIPTION:	
LOCATION ID: AC-WEST FIELD	
LOC. DESCRIPTION: WEST FIELD	
PHYSICAL LOCATION:	
RESPONSIBLE SUPERVISOR / OWNER WORK TYPE PRIORITY	
OPERTNS / PM 3	832.020 C7
DATE STARTED: 09/20/2011 DATE COMPLETED: 10/22/2011	
EST. Labor HRS: 0.00 <u>Labor Code/ Quantity Planned Hours</u> <u>Craft</u>	<u>S</u>
ACT. Labor HRS: 3.00 OPERATN 1 0.00	
ACTUALS POSTED: LABORCODE CRAFT REG. HRS OVERTIME	WORKDATE
RBLACK STATECH 3.00 0.00	10/22/2011
JOB PLAN NUMBER: AC-OPS	
JOB PLAN DESCRIPTION: MONTHLY WELL INSPECTIONS	
JOB OPERATIONS:	
10 WELL CELLARS SHALL BE COVERED AND KEPT DRAINED	
CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICA	AL.
20 GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN	
GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.	
30 CHECK RAILINGS	
40 CHECK PLATFORM	
50 REMOVE WEEDS	
60 CHECK FOR LEAKS	
70 MAKE SURE WELL HAS PROPER SIGNAGE	

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM:	AC-OPSC2	
	With the second seco	CTIONS - CREW TWO	C	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
. 202				
P-26E				
P-25R				
P-47				
P-39				
D 20				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WOR	K ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #	:	PMNUM: AC-	OPSC2	
DESCRIPTION	I: MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 4345104 PMNUM: AC-OPSC2
PARENT WO #:
DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO

SS-44B

SS-3

11/2/2019	)	GAS TRANSMIS	SION WORK O	RDER	SEU	WOR	KORDER
_	-	: 4360455		PMNUM: AC	C-OPSC2		
	RENT WO #						
DE	SCRIPTION	: MONTHLY WELL INS	SPECTIONS - C	CREW TWO			
REMAR	KS: INSPEC	TION COMPLETE, NO	SUBSTANDAR		ONS -		
		TART DATE: 11/1/2011		ROUTE	NUMBER:		
		COMP DATE: 11/30/201	1		STATUS: 0		
		ULE START: JLE FINISH:		-	ESTED BY: I ORT DATE: 8		
	SCHED	JEL I INISII.		PM ACTIVI			
	ASSE	т.#.					
ASSET	DESCRIPTI						
ASSET		ID: AC-WEST FIELD					
LOC.		ON: WEST FIELD					
PHYSIC	CAL LOCATI	ON:					
<u>R</u>	ESPONSIBL	<u>_E SUPERVISOR / OW</u>	<u>'NER</u>	WORK TYP	<u>PE P</u>	RIORITY	ACCOUNT INFO
		OPERTNS /		PM		3	832.020 C7
DAT	E STARTED	: 10/17/2011	DATE CON	IPLETED: 11	/19/2011		
EST. La	abor HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qua</u>	<u>ntity</u> <u>F</u>	Planned Hours	<u>5</u>
ACT. La	abor HRS:	3.00	OPERATI	J	1	0.00	
<u>ACTUAL</u>	S POSTED:	LABORCODE	CRA	T R	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
		RBLACK	STATECH		3.00	0.00	11/19/2011
JOB PLAN	I NUMBER:	AC-OPS					
JOB PLAN	I DESCRIPT	ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPER	RATIONS:						
10	WELL CELL	ARS SHALL BE COVE	RED AND KEP	Γ DRAINED			
		SHOULD BE PROTECT					AL.
20		OR FLOORING SHALL	_			J	
30	CHECK RA	NDITION SO AS TO EX	CLUDE PEOPL	E AND ANIN	IALS.		
	CHECK PLA						
40							
50	REMOVE W	_					
60	CHECK FO	_					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENT	rs:						

11/2/2019	GAS TRANSMISSION	I WORK ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #: DESCRIPTION:			AC-OPSC2	
	0-20 on the following equ			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	K ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #:	:	PMNUM: <b>AC-</b>	OPSC2	
DESCRIPTION:	MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4360455</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019 GAS TRANSMISS	ION WORK ORDE	R SEU	WOR	KORDER
WORK ORDER #: <b>4387356</b> PARENT WO #: DESCRIPTION: MONTHLY WELL INSF		NUM: <b>AC-OPSC2</b>	2	
REMARKS: INSPECTION COMPLETE, NO S				
TARGET START DATE: 12/1/2011		ROUTE NUMBER	:	
TARGET COMP DATE: 12/31/2011		STATUS	-	
SCHEDULE START:		REQUESTED BY		
SCHEDULE FINISH:	PI	REPORT DATE M ACTIVITY CLASS		
ASSET #:				
ASSET DESCRIPTION:				
LOCATION ID: AC-WEST FIELD				
LOC. DESCRIPTION: WEST FIELD				
PHYSICAL LOCATION:				
<u>RESPONSIBLE SUPERVISOR / OWN</u> OPERTNS /		<u>ORK TYPE</u> PM	PRIORITY 3	ACCOUNT INFO 832.020 C7
DATE STARTED: 11/21/2011	DATE COMPLI	TED: 12/17/201	1	
EST. Labor HRS: 0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hour	<u>S</u>
ACT. Labor HRS: 2.00	OPERATN	1	0.00	
ACTUALS POSTED: LABORCODE RBLACK	<u>CRAFT</u> STATECH	<u>REG. HRS</u> 2.00		WORKDATE
KDLACK	STATECH	2.00	0.00	12/17/2011
JOB PLAN NUMBER: AC-OPS				
JOB PLAN DESCRIPTION: MONTHLY WELL	INSPECTIONS			
JOB OPERATIONS: 10 WELL CELLARS SHALL BE COVER				
10 WELL CELLARS SHALL BE COVER CELLARS SHOULD BE PROTECTEI			R AS PRACTIC	21
20 GRATING OR FLOORING SHALL E				<b>~L</b> .
GOOD CONDITION SO AS TO EX	CLUDE PEOPLE A	ND ANIMALS.		
30 CHECK RAILINGS				
40 CHECK PLATFORM				
50 REMOVE WEEDS				
60 CHECK FOR LEAKS				
70 MAKE SURE WELL HAS PROPER S	SIGNAGE			
COMMENTS:				

11/2/2019	GAS TRANSMISSION	N WORK ORDER	SEU	WORKORDER
PARENT WC		PMNUM: A	C-OPSC2	
	ON: MONTHLY WELL INSPEC			
	is 10-20 on the following eq	uipment.		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
251				
D 47				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				
		02 / 294		

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
	R #: <b>4387356</b>	PMNUM: AC	C-OPSC2	
PARENT WO	0 #: ION: MONTHLY WELL INSPEC			
DLSCRIPTI	ION. MONTHET WELL INSPEC	110N3 - CRLW 1WO		
SS-29				
SS-25				
SS-25A				
55 ZJR				
22-25B				
SS-1				
SS-1-0				
0010				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4387356</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMIS	SION WORK ORDE	R SEU	WOR	KORDER
	R #: <b>4408476</b>	PM	NUM: AC-OPSC2	2	
PARENT W					
DESCRIPT	ON: MONTHLY WELL IN	SPECTIONS - CRE	N TWO		
REMARKS: INS	PECTION COMPLETE, NO	) SUBSTANDARD (	CONDITIONS -		
TARGE	T START DATE: 1/1/2012		ROUTE NUMBER:	:	
	ET COMP DATE: 1/31/2012	2	STATUS		
	SCHEDULE START: REQUESTED BY: BA				
SCF	EDULE FINISH:	DI	REPORT DATE: 4 ACTIVITY CLASS		
		r i	ACTIVITY CLASS.	SORVET	
	SET #:				
ASSET DESCRI					
	ON ID: AC-WEST FIELD				
	PTION: WEST FIELD				
PHYSICAL LOC					
RESPONS	DIBLE SUPERVISOR / OW OPERTNS /	<u>VNER</u> <u>W</u>	<u>ORK TYPE</u> PM	PRIORITY 3	ACCOUNT INFO 832.020 C7
	-			-	052.020 C7
	ED: 12/13/2011		TED: 01/14/201	2	
EST. Labor HR	5: 0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hours	<u>S</u>
ACT. Labor HR	5: 5.00	OPERATN	1	0.00	
ACTUALS POST	ED: LABORCODE	<u>CRAFT</u>	<u>REG. HRS</u>	OVERTIME	<u>WORKDATE</u>
	RBLACK	STATECH	5.00	0.00	01/14/2012
JOB PLAN NUMBE	R: AC-OPS				
JOB PLAN DESCR	IPTION: MONTHLY WE	LL INSPECTIONS			
JOB OPERATIONS	5:				
10 WELL C	ELLARS SHALL BE COVE	ERED AND KEPT DF	RAINED		
CELLAF	S SHOULD BE PROTECT	ED FROM AS MUC	H RUNOFF WATE	R AS PRACTICA	AL.
	IG OR FLOORING SHALL			[N	
	CONDITION SO AS TO E	XCLUDE PEOPLE A	ND ANIMALS.		
	RAILINGS				
40 CHECK	PLATFORM				
50 REMOV	E WEEDS				
60 CHECK	FOR LEAKS				
70 MAKE S	SURE WELL HAS PROPER	SIGNAGE			
COMMENTS:					

11/2/2019	GAS TRANSMISSIC	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following e			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION W	ORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	R #: <b>4408476</b>	PMNUM: AC	C-OPSC2	
DESCRIPTIO	ON: MONTHLY WELL INSPECTIC	NS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4408476</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK O	RDER	SEU	wo	DRKORDER
WORK ORD PARENT V	'O #	:		-	AC-OPSC2	2	
DESCRIP	ION	: MONTHLY WELL IN	SPECTIONS - C	CREW TW	0		
REMARKS: IN	SPEC	TION COMPLETE, NO	O SUBSTANDAR	RD COND	ITIONS -		
TARG	ET S	TART DATE: 2/1/2012		ROL	JTE NUMBER	:	
		COMP DATE: 2/28/2012	2		STATUS		
		ULE START: JLE FINISH:			QUESTED BY EPORT DATE		
30	ΠΕΟΟ	JLE FINISH.			IVITY CLASS		
Α	SSET	Γ#:					
ASSET DESCR							
		ID: AC-WEST FIELD					
LOC. DESCR	IPTI	ON: WEST FIELD					
PHYSICAL LO	CATI	ON:					
RESPON	SIBL	E SUPERVISOR / OV	<u>VNER</u>	WORK <sup>-</sup>	<u>TYPE</u>	PRIORITY	ACCOUNT INFO
		OPERTNS /		PM		3	832.020 C7
DATE STAR	TED	: 01/23/2012	DATE CON	1PLETED:	02/11/201	2	
EST. Labor H	S:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ C</u>	<u>)uantity</u>	Planned Ho	<u>urs</u>
ACT. Labor H	s:	2.00	OPERATI	N	1	0.00	
ACTUALS POST	<u>ED:</u>	LABORCODE RBLACK		<u>-T</u>	<u>REG. HRS</u> 2.00		E <u>WORKDATE</u> 02/11/2012
JOB PLAN NUME	ER:	AC-OPS					
JOB PLAN DESC	RIPT	ION: MONTHLY WE	LL INSPECTION	١S			
JOB OPERATION	S:						
10 WELL	CELL	ARS SHALL BE COVE	ERED AND KEP	T DRAINE	D		
CELLA	RS S	HOULD BE PROTECT	ED FROM AS M	IUCH RUN	NOFF WATE	R AS PRACTI	CAL.
		OR FLOORING SHALL	_			IN	
		IDITION SO AS TO E	XCLUDE PEOPL	E AND A	NIMALS.		
		ILINGS					
40 CHECI	( PLA	TFORM					
50 REMO	/E W	EEDS					
60 CHECI	( FOF	R LEAKS					
70 MAKE	SUR	E WELL HAS PROPER	R SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WO			C-OPSC2	
	ON: MONTHLY WELL INSPE			
2-26				
-20				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
25R				
P-47				
p-39				
P-38				
°S-42				
P-40				
SS-9				
5-50				

11/2/2019	GAS TRANSMISSION W	ORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	N: MONTHLY WELL INSPECTIO	ONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4428965</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMISS	SION WORK O	RDER	SEU	WOF	RKORDER
PAREI	NT WO #			_	AC-OPSC2		
DESC	CRIPTION	: MONTHLY WELL INS	SPECTIONS - C	CREW TWO			
REMARKS	: INSPEC	TION COMPLETE, NO	SUBSTANDAR	RD CONDIT	IONS -		
٦	TARGET S	TART DATE: 3/1/2012		ROUT	TE NUMBER:		
		COMP DATE: 3/31/2012			STATUS:		
		ULE START: JLE FINISH:		•	UESTED BY:	BAGATES 12/30/2011	
	SCHEDO	JEE FINISH.			/ITY CLASS:		
	ASSET	Γ#:					
ASSET DE	ESCRIPTI	ON:					
L	OCATION	ID: AC-WEST FIELD					
LOC. DE	ESCRIPTI	ON: WEST FIELD					
PHYSICA	L LOCATI	ON:					
RES	SPONSIBL	E SUPERVISOR / OW	NER	WORK T	YPE	<u>PRIORITY</u>	
		OPERTNS /		PM		3	832.020 C7
DATE S	STARTED	02/21/2012	DATE CON	IPLETED:	03/10/2012	2	
EST. Labo	or HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qu</u>	<u>uantity</u>	Planned Hour	<u>'S</u>
ACT. Labo	or HRS:	2.00	OPERATI	N	1	0.00	
ACTUALS I	POSTED:	LABORCODE RBLACK		T	<u>REG. HRS</u> 2.00		<u>WORKDATE</u> 03/10/2012
JOB PLAN N	IUMBER:	AC-OPS					
JOB PLAN D	ESCRIPT	ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPERAT	TIONS:						
10 W	ELL CELL	ARS SHALL BE COVE	RED AND KEP	T DRAINED	)		
CI	ELLARS S	HOULD BE PROTECTI	ED FROM AS M	IUCH RUNG	OFF WATER	R AS PRACTIC	AL.
		OR FLOORING SHALL	_			N	
		IDITION SO AS TO EX	KCLUDE PEOPL	E AND AN	IMALS.		
	HECK RAI						
	HECK PLA	-					
	EMOVE W						
60 CI	HECK FOR	R LEAKS					
70 M.	AKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENTS	:						

11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
PARENT WC	R #: <b>4461450</b> ) #: ON: MONTHLY WELL INSPE		AC-OPSC2	
	s 10-20 on the following ed			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
D 40				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WO	RK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #	#:	PMNUM: AC	-OPSC2	
DESCRIPTION	N: MONTHLY WELL INSPECTION	IS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>4461450</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	IS - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK ORD	ER <b>SEU</b>	WOR	KORDER
WORK ORDER # PARENT WO #	#:		INUM: AC-OPSC	2	
DESCRIPTIO	N: MONTHLY WELL INS	PECTIONS - CRE	W TWO		
REMARKS: INSPE	CTION COMPLETE, NO	SUBSTANDARD	CONDITIONS -		
TARGET	START DATE: 4/1/2012		ROUTE NUMBER		
	COMP DATE: 4/30/2012			: CLOSE	
	OULE START: DULE FINISH:		REQUESTED BY REPORT DATE		
SCIEL	OLL FINISH.	Р	M ACTIVITY CLASS		
ASSE	T #:				
ASSET DESCRIPT	ION:				
LOCATIO	N ID: AC-WEST FIELD				
LOC. DESCRIPT	ION: WEST FIELD				
PHYSICAL LOCAT	ION:				
RESPONSIE	LE SUPERVISOR / OW	NER <u>W</u>	<u>/ORK TYPE</u>	PRIORITY	ACCOUNT INFO
	OPERTNS /		PM	3	832.020 C7
DATE STARTE	03/22/2012	DATE COMPL	ETED: 04/08/201	2	
EST. Labor HRS:	0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hour	<u>S</u>
ACT. Labor HRS:	2.50	OPERATN	1	0.00	
ACTUALS POSTED	: <u>LABORCODE</u> RBLACK	<u>CRAFT</u> STATECH	<u>REG. HRS</u> 2.50	<u>OVERTIME</u> 0.00	<u>WORKDATE</u> 04/08/2012
JOB PLAN NUMBER:	AC-OPS				
JOB PLAN DESCRIP	TION: MONTHLY WEL	L INSPECTIONS			
JOB OPERATIONS:					
10 WELL CEL	LARS SHALL BE COVE	RED AND KEPT D	RAINED		
CELLARS	SHOULD BE PROTECTE	ED FROM AS MUC	H RUNOFF WATE	R AS PRACTIC	AL.
	OR FLOORING SHALL	-		IN	
	NDITION SO AS TO EX	CLUDE PEOPLE A	AND ANIMALS.		
30 CHECK RA					
40 CHECK PL	-				
50 REMOVE	WEEDS				
60 CHECK FC	OR LEAKS				
70 MAKE SU	RE WELL HAS PROPER	SIGNAGE			
COMMENTS:					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WC	R #: <b>4471937</b> ) #: ON: MONTHLY WELL INSPEC		AC-OPSC2	
	s 10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
r J-42				
P-40				
1 TU				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2		
	#. DN: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
SS-1					
33 1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>4471937</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
WORK ORDER # PARENT WO #			PMNUM: A	C-OPSC2	1	
DESCRIPTION	: MONTHLY WELL INS	PECTIONS - C	REW TWO			
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDIT	IONS		
TARGET C SCHED	TART DATE: 5/1/2012 COMP DATE: 5/31/2012 ULE START: JLE FINISH:		REQU REP	E NUMBER: STATUS JESTED BY ORT DATE: ITY CLASS	CLOSE BAGATES 2/24/2012	
LOC. DESCRIPTI PHYSICAL LOCATI	ON: ID: AC-WEST FIELD ON: WEST FIELD	NER	WORK TY	PE	PRIORITY	ACCOUNT INFO
	OPERTNS /		PM		3	832.020 C7
DATE STARTED	: 07/01/2012	DATE COM	1PLETED: 0	7/01/201	2	
EST. Labor HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qu</u>	<u>antity</u>	Planned Hour	<u>S</u>
ACT. Labor HRS:	6.00	OPERATI	J	1	0.00	
ACTUALS POSTED:	LABORCODE AOZUNA RBLACK	<u>CRAF</u> STATECH STATECH	<u>-</u> T	<u>REG. HRS</u> 3.00 3.00	OVERTIME 0.00 0.00	<u>WORKDATE</u> 07/01/2012 07/01/2012
JOB PLAN NUMBER: JOB PLAN DESCRIPT	AC-OPS ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPERATIONS:						
CELLARS S 20 GRATING (	ARS SHALL BE COVER HOULD BE PROTECTE OR FLOORING SHALL NDITION SO AS TO EX	D FROM AS M BE INSTALLED	IUCH RUNC AND MAIN	OFF WATER		AL.
30 CHECK RAI				MALS.		
40 CHECK PLA						
50 REMOVE W	/EEDS					
60 CHECK FO	R LEAKS					
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSION	N WORK ORDER	SEU	WORKORDER
PARENT WC		PMNUM: A	C-OPSC2	
	ON: MONTHLY WELL INSPEC			
	is 10-20 on the following equ	upment:		
P-26				
P-26A				
P-26B				
P-26C				
. 200				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
1 50				
<b>DO</b> 40				
PS-42				
P-40				
SS-9				
		22 / 294		

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
	R #: <b>4508307</b>	PMNUM: A	C-OPSC2		
PARENT WC					
DESCRIPTI	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
55 25N					
22-25B					
SS-1					
55-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>4508307</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.30CHECK RAILINGS40CHECK PLATFORM50REMOVE WEEDS50CHECK FOR LEAKS	11/2/2019		GAS TRANSMISS	SION WORK OF	RDER	SEU	WOR	KORDER
REMARKS: INSPECTION COMPLETE, NO SUBSTANDARD CONDITIONS TARGET START DATE: 6/1/2012 TARGET START DATE: 6/1/2012 TARGET START DATE: 6/1/2012 TARGET COMP DATE: 6/3/2012 STATUS: CLOSE SCHEDULE START: REQUESTED BY: BAGATES SCHEDULE START: REPORT DATE: 4/4/2012 PM ACTIVITY CLASS: SURVEY ASSET #: ASSET DESCRIPTION: LOCATION ID: AC-WEST FIELD LOC. DESCRIPTION: LOCATION ID: AC-WEST FIELD PHYSICAL LOCATION: RESPONSIBLE SUPERVISOR / OWNER WORK TYPE PRIORITY ACCOUNT INFO OPERTNS / PM 3 832.020 C7 DATE STARTED: 05/25/2012 EST. Labor HRS: 0.00 Labor Code/ Quantity Planned Hours Craft ACT. Labor HRS: 3.00 OPERATN 1 0.00 ACTUALS POSTED: LABORCODE CRAFT REG. HRS OVERTIME WORKDATE RBLACK STATECH 3.00 0.00 05/25/2012 IOB PLAN NUMBER: AC-OPS IOB PLAN DESCRIPTION: MONTHLY WELL INSPECTIONS IOB OPERATIONS: IOB OPERATIONS: IOB WELL CELLARS SHALL BE COVERED AND KEPT DRAINED CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL. GORATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS. IO CHECK RAILINGS IO CHECK FOR LEAKS IO MAKE SURE WELL HAS PROPER SIGNAGE	PAR	ENT WO #	:			-OPSC2		
TARGET START DATE: 6/1/2012       ROUTE NUMBER: SCHEDULE START: SCHEDULE START: SCHEDULE FINISH:       STATUS: CLOSE REQUESTED BY: BAGATES REPORT DATE: 4/4/2012 PM ACTIVITY CLASS: SURVEY         ASSET #:       ASSET DESCRIPTION: LOCATION ID: AC-WEST FIELD LOC. DESCRIPTION: WEST FIELD PHYSICAL LOCATION:       VORK TYPE       PRIORITY       ACCOUNT INFO 832.020 C7         DATE STARTED: 05/25/2012       DATE COMPLETED: 05/25/2012       832.020 C7         DATE STARTED: 05/25/2012       DATE COMPLETED: 05/25/2012       832.020 C7         DATE STARTED: 05/25/2012       DATE COMPLETED: 05/25/2012       832.020 C7         CATE STARTED: 05/25/2012       DATE COMPLETED: 05/25/2012       832.020 C7         DATE STARTED: 05/25/2012       DATE COMPLETED: 05/25/2012       832.020 C7         CTATE ACT. Labor HRS:       0.00       Labor Code/ Craft       Quantity       Planned Hours         ACT. Labor HRS:       3.00       OPERATIN       1       0.00       05/25/2012         IOB PLAN NUMBER:       AC-OPS       ACOMPLETED: 3.00       0.00       05/25/2012         IOB PLAN NUMBER:       AC-OPS       000       0.00       0.02/25/2012       0.00         IOB PLAN NUMBER:       AC-OPS       0.00       0.00       0.5/25/2012       0.00         IOB PLAN NUMBER:       AC-OPS       0.00       0.00       0.5/25/2012	DES	SCRIPTION	: MONTHLY WELL INS	SPECTIONS - C	REW IWO			
TARGET COMP DATE: 6/30/2012 STATUS: CLOSE SCHEDULE START: REQUESTED BY: BAGATES SCHEDULE FINISH: REPORT DATE: 4/4/2012 PM ACTIVITY CLASS: SURVEY ASSET #: ASSET DESCRIPTION: LOCATION ID: AC-WEST FIELD LOC. DESCRIPTION: WEST FIELD PHYSICAL LOCATION ID: AC-WEST FIELD OPERTNS / PM 3 832.020 C7 DATE STARTED: 05/25/2012 DATE COMPLETED: 05/25/2012 EST. Labor HRS: 0.00 Labor Code/ Quantity Planned Hours Craft ACT. Labor HRS: 3.00 OPERATN 1 0.00 ACTUALS POSTED: LABORCODE CRAFT REG. HRS OVERTIME WORKDATE RBLACK STATECH 3.00 0.60 0;25/2012 NOB PLAN NUMBER: AC-OPS NOB PLAN NUMBER: AC-OPS NOB OPERATIONS: 100 WELL CELLARS SHALL BE COVERED AND KEPT DRAINED CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL. 20 GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS. 30 CHECK RALLINGS 40 CHECK FOR LEAKS 50 REMOVE WEEDS 50 CHECK FOR LEAKS 70 MAKE SURE WELL HAS PROPER SIGNAGE	REMARK	(S: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDITIO	NS		
ASSET #: ASSET DESCRIPTION: LOCATION ID: AC-WEST FIELD LOC. DESCRIPTION: WEST FIELD DOTE STARTED: 05/25/2012 MORE TYPE PRIORITY ACCOUNT INFO OPERINS / PM 3 ACCOUNT INFO OPERIA DOTE COMPLETED: 05/25/2012 EST. Labor HRS: 0.00 Labor Code/ Quantity Planned Hours Craft ACT. Labor HRS: 3.00 OPERATN 1 0.00 ACTUALS POSTED: LABORCODE CRAFT REG. HRS OVERTIME WORKDATE RBLACK STATECH 3.00 0.00 05/25/2012 NOB PLAN NUMBER: AC-OPS NOB PLAN NUMER: AC-OPS NOB PLAN NUMER: AC		TARGET O	COMP DATE: 6/30/2012			STATUS:		
ASSET DESCRIPTION: LOCATION ID: AC-WEST FIELD LOC. DESCRIPTION: WEST FIELD PHYSICAL LOCATION: RESPONSIBLE SUPERVISOR / OWNER PM 3 ACCOUNT INFO OPERTNS / PM 3 832.020 C7 DATE STARTED: 05/25/2012 DATE COMPLETED: 05/25/2012 EST. Labor HRS: 0.00 Labor Code/ Quantity Planned Hours Craft ACT. Labor HRS: 3.00 OPERATN 1 0.00 ACTUALS POSTED: LABORCODE CRAFT REG. HRS OVERTIME WORKDATE RBLACK STATECH 3.00 0.00 05/25/2012 HOB PLAN NUMBER: AC-OPS HOB PLAN NUMBER: AC-OPS HOB OPERATIONS: HOB OPERATIONS: HOB OPERATIONS: HOB OPERATIONS: IOB OPERATIONS: IOB WELL CELLARS SHALL BE COVERED AND KEPT DRAINED CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL. 20 GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS. 30 CHECK RAILINGS 40 CHECK PLATFORM 50 REMOVE WEEDS 50 CHECK FOR LEAKS 70 MAKE SURE WELL HAS PROPER SIGNAGE		SCHEDU	JLE FINISH:					
OPERTNS /       PM       3       832.020 C7         DATE STARTED: 05/25/2012       DATE COMPLETED: 05/25/2012       EST. Labor HRS:       0.00       Labor Code/ Craft       Quantity       Planned Hours         ACT. Labor HRS:       3.00       OPERATN       1       0.00         ACTUALS POSTED:       LABORCODE       CRAFT       REG. HRS       OVERTIME       WORKDATE         RBLACK       STATECH       3.00       0.00       05/25/2012         DOB PLAN NUMBER:       AC-OPS       AC-OPS       0.00       05/25/2012         DOB PLAN NUMBER:       AC-OPS       AC-OPS       0.00       0.5/25/2012         DOB PLAN DESCRIPTION:       MONTHLY WELL INSPECTIONS       0.00       05/25/2012         DOB OPERATIONS:       WELL CELLARS SHALL BE COVERED AND KEPT DRAINED       0.00       05/25/2012         DOB OPERATIONS:       GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND MAINTAINED IN       GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND MAINTAINED IN       GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.         30       CHECK RAILINGS       GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN       GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.         30       CHECK PLATFORM       GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN       GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED	LOC.	DESCRIPTI LOCATION DESCRIPTI	ON: ID: AC-WEST FIELD ON: WEST FIELD					
EST. Labor HRS:       0.00       Labor Code/ Craft       Quantity       Planned Hours         ACT. Labor HRS:       3.00       OPERATN       1       0.00         ACTUALS POSTED:       LABORCODE RBLACK       CRAFT STATECH       REG. HRS       OVERTIME OVERTIME       WORKDATE WORKDATE         100       PLAN NUMBER:       AC-OPS       ACTOR       3.00       0.00       05/25/2012         100       PLAN NUMBER:       AC-OPS       AC-OPS       ACTOR       ACTOR       ACTOR         100       VELL CELLARS SHALL BE COVERED AND KEPT DRAINED CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL.       ACTOR       ACTOR       ACTOR         200       GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.       ANIMALS.       ACTOR       ACTOR <td< td=""><td><u>RI</u></td><td>ESPONSIBI</td><td></td><td><u>NER</u></td><td></td><td><u> </u></td><td></td><td></td></td<>	<u>RI</u>	ESPONSIBI		<u>NER</u>		<u> </u>		
ACT. Labor HRS:       3.00       OPERATN       1       0.00         ACTUALS POSTED:       LABORCODE       CRAFT       REG. HRS       OVERTIME       WORKDATE         RBLACK       STATECH       3.00       0.00       05/25/2012         IOB PLAN NUMBER:       AC-OPS         IOB PLAN DESCRIPTION:       MONTHLY WELL INSPECTIONS         IOB OPERATIONS:       IOB OPERATIONS:         IO       WELL CELLARS SHALL BE COVERED AND KEPT DRAINED         CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL.         20       GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN         GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.         30       CHECK RAILINGS         40       CHECK PLATFORM         50       REMOVE WEEDS         50       CHECK FOR LEAKS         70       MAKE SURE WELL HAS PROPER SIGNAGE	DATE	STARTED	: 05/25/2012	DATE COM	PLETED: 05/	25/2012		
ACTUALS POSTED:       LABORCODE       CRAFT       REG. HRS       OVERTIME       WORKDATE         NOB       RBLACK       STATECH       3.00       0.00       05/25/2012         NOB       PLAN NUMBER:       AC-OPS       0.00       05/25/2012         NOB       PLAN DESCRIPTION:       MONTHLY WELL INSPECTIONS       0.00       05/25/2012         NOB       PLAN DESCRIPTION:       MONTHLY WELL INSPECTIONS       0.00       05/25/2012         NOB       OB OPERATIONS:       0       WORKDATE       0.00       0.00       05/25/2012         10       WELL CELLARS SHALL BE COVERED AND KEPT DRAINED       CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL.         20       GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN       GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.         30       CHECK RAILINGS       40       CHECK PLATFORM       50       REMOVE WEEDS         50       CHECK FOR LEAKS       50       CHECK FOR LEAKS       50       CHECK FOR LEAKS         70       MAKE SURE WELL HAS PROPER SIGNAGE       50       MAKE SURE WELL HAS PROPER SIGNAGE       50	EST. La	bor HRS:	0.00		e/ Quan	<u>tity</u> <u>I</u>	Planned Hours	<u>S</u>
RBLACKSTATECH3.000.0005/25/2012NOB PLAN NUMBER:AC-OPSNOB PLAN DESCRIPTION:MONTHLY WELL INSPECTIONSNOB OPERATIONS:10WELL CELLARS SHALL BE COVERED AND KEPT DRAINED CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL.20GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.30CHECK RAILINGS40CHECK PLATFORM50REMOVE WEEDS50CHECK FOR LEAKS70MAKE SURE WELL HAS PROPER SIGNAGE	ACT. La	bor HRS:	3.00	OPERATN	1		0.00	
<ul> <li>DOB PLAN DESCRIPTION: MONTHLY WELL INSPECTIONS</li> <li>DOB OPERATIONS:</li> <li>WELL CELLARS SHALL BE COVERED AND KEPT DRAINED CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL.</li> <li>GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.</li> <li>CHECK RAILINGS</li> <li>CHECK PLATFORM</li> <li>REMOVE WEEDS</li> <li>CHECK FOR LEAKS</li> <li>MAKE SURE WELL HAS PROPER SIGNAGE</li> </ul>	ACTUALS	<u>S POSTED:</u>			<u>T R</u> E			
<ul> <li>WELL CELLARS SHALL BE COVERED AND KEPT DRAINED</li> <li>CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL.</li> <li>GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN</li> <li>GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.</li> <li>CHECK RAILINGS</li> <li>CHECK PLATFORM</li> <li>REMOVE WEEDS</li> <li>CHECK FOR LEAKS</li> <li>MAKE SURE WELL HAS PROPER SIGNAGE</li> </ul>				L INSPECTION	S			
CELLARS SHOULD BE PROTECTED FROM AS MUCH RUNOFF WATER AS PRACTICAL. GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS. CHECK RAILINGS CHECK PLATFORM CHECK PLATFORM CHECK FOR LEAKS MAKE SURE WELL HAS PROPER SIGNAGE								
<ul> <li>GRATING OR FLOORING SHALL BE INSTALLED AND MAINTAINED IN GOOD CONDITION SO AS TO EXCLUDE PEOPLE AND ANIMALS.</li> <li>CHECK RAILINGS</li> <li>CHECK PLATFORM</li> <li>REMOVE WEEDS</li> <li>CHECK FOR LEAKS</li> <li>MAKE SURE WELL HAS PROPER SIGNAGE</li> </ul>	-	-					AS PRACTICA	21
<ul> <li>CHECK RAILINGS</li> <li>CHECK PLATFORM</li> <li>REMOVE WEEDS</li> <li>CHECK FOR LEAKS</li> <li>MAKE SURE WELL HAS PROPER SIGNAGE</li> </ul>	20	GRATING (	OR FLOORING SHALL	BE INSTALLED	AND MAINT	AINED IN		<b>.</b>
<ul> <li>REMOVE WEEDS</li> <li>CHECK FOR LEAKS</li> <li>MAKE SURE WELL HAS PROPER SIGNAGE</li> </ul>								
50CHECK FOR LEAKS70MAKE SURE WELL HAS PROPER SIGNAGE	40	CHECK PLA	ATFORM					
70 MAKE SURE WELL HAS PROPER SIGNAGE	50	REMOVE W	/EEDS					
	60	CHECK FO	R LEAKS					
COMMENTS:	70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
	COMMENT	S:						

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WC	x #: <b>4531907</b>	PMNUM: A	C-OPSC2	
DESCRIPTI	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO		
AC-OPS Operation	s 10-20 on the following equ	uipment:		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
1 251				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDE	R #: <b>4531907</b>	PMNUM: A	C-OPSC2		
	CON: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>4531907</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	S - CREW TWO

SS-44B

SS-3

11/2/2019	9 GAS TRANSMISS	ION WORK ORDER	SEU	WOR	KORDER
WOR	K ORDER #: 5001313	PMNU	JM: AC-OPSC	2	
PA	RENT WO #:				
DE	SCRIPTION: MONTHLY WELL INSP	PECTIONS - CREW	TWO		
	TARGET START DATE: 7/1/2012		ROUTE NUMBER		
	TARGET COMP DATE: 7/31/2012		STATUS		
	SCHEDULE START:		REQUESTED BY	: BAGATES	
	SCHEDULE FINISH:		REPORT DATE		
		PM A	ACTIVITY CLASS	5:	
	ASSET #:				
ASSET	DESCRIPTION:				
	LOCATION ID: AC-WEST FIELD				
	DESCRIPTION: WEST FIELD				
PHYSI	CAL LOCATION:				
Ē	RESPONSIBLE SUPERVISOR / OWN OPERTNS /	<u>IER</u> <u>WOF</u>	<u>RK TYPE</u> PM	PRIORITY 3	ACCOUNT INFO 832.020 C7
DAT	E STARTED: 06/25/2012	DATE COMPLET	ED: 11/04/201	13	
EST. L	abor HRS: 0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hour	<u>s</u>
ACT. L	abor HRS: 0.00	OPERATN	1	0.00	
<u>ACTUAL</u>	<u>S POSTED:</u> <u>LABORCODE</u>	<u>CRAFT</u>	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
	N NUMBER: AC-OPS				
JOB PLA	N DESCRIPTION: MONTHLY WELL	INSPECTIONS			
JOB OPE	RATIONS:				
10	WELL CELLARS SHALL BE COVER	ED AND KEPT DRA	INED		
	CELLARS SHOULD BE PROTECTED	D FROM AS MUCH	RUNOFF WATE	R AS PRACTICA	AL.
20	GRATING OR FLOORING SHALL E	BE INSTALLED AND	MAINTAINED	IN	
	GOOD CONDITION SO AS TO EXC	CLUDE PEOPLE ANI	D ANIMALS.		
30	CHECK RAILINGS				
40	CHECK PLATFORM				
50	REMOVE WEEDS				
60	CHECK FOR LEAKS				
70	MAKE SURE WELL HAS PROPER S	SIGNAGE			

COMMENTS:

11/2/2019	GAS TRANSMISSIC	ON WORK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO # DESCRIPTION		PMNUM: <b>A</b>	C-OPSC2	
	10-20 on the following ed			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION W	ORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: AC	C-OPSC2	
	N: MONTHLY WELL INSPECTIO	ONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5001313	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	IS - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK O	RDER	SEU	WOR	KORDER
WORK OR PARENT		: <b>5001321</b> :		PMNUM:	AC-OPSC2		
DESCRI	PTION	: MONTHLY WELL IN	SPECTIONS - C	REW TWO			
REMARKS: I	NSPEC	TION COMPLETE, NO	D SUBSTANDAR	D CONDIT	IONS		
TAF	RGET S	TART DATE: 8/1/2012		ROUT	E NUMBER:		
		COMP DATE: 8/31/2012	2		STATUS:		
		ULE START: JLE FINISH:		-	JESTED BY: PORT DATE:		
	SCILDU	JLL FINISH.			ITY CLASS:	3/4/2012	
	ASSE	Γ#:					
ASSET DES	CRIPTI	ON:					
		ID: AC-WEST FIELD					
		ON: WEST FIELD					
PHYSICAL L	OCATI	ON:					
RESPO	ONSIBL	<u>E SUPERVISOR / OV</u>	<u>VNER</u>		<u> /PE                                   </u>	PRIORITY	ACCOUNT INFO
		OPERTNS /		PM		3	832.020 C7
DATE STA	ARIED	: 08/26/2012	DATE COM	IPLETED: (	08/26/2012		
EST. Labor I	HRS:	0.00	<u>Labor Code</u> <u>Craft</u>	<u>e/ Qu</u>	<u>iantity</u> <u>I</u>	Planned Hour	<u>S</u>
ACT. Labor l	HRS:	2.50	OPERATI	l	1	0.00	
ACTUALS PO	STED:	LABORCODE	CRAF	Τ	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
		RBLACK	STATECH		2.50	0.00	08/26/2012
JOB PLAN NUM	MBER:	AC-OPS					
JOB PLAN DES	SCRIPT	ION: MONTHLY WE	LL INSPECTION	S			
JOB OPERATIO	ONS:						
10 WEL	L CELL	ARS SHALL BE COVE	ERED AND KEPT	DRAINED	)		
_		SHOULD BE PROTECT			-		AL.
		OR FLOORING SHALL	-			N	
		NDITION SO AS TO E ILINGS	XCLUDE PEOPL	E AND AN	IMALS.		
		ATFORM					
	IOVE W						
		R LEAKS					
70 MAK	E SUR	E WELL HAS PROPER	R SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO # DESCRIPTION		PMNUM: A	C-OPSC2	
	10-20 on the following ec			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
PARENT WO		PMNUM: A	C-OPSC2	
DESCRIPTI	ON: MONTHLY WELL INSPE	CTIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5001321	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS -	CREW TWO

SS-44B

SS-3

REMARKS: INSPECTIO TARGET STAR TARGET COM SCHEDULE SCHEDULE ASSET # ASSET DESCRIPTION LOC. DESCRIPTION PHYSICAL LOCATION RESPONSIBLE S	ONTHLY WELL INSI ON COMPLETE, NO 2 T DATE: 9/1/2012 IP DATE: 9/30/2012 START: FINISH: AC-WEST FIELD WEST FIELD SUPERVISOR / OWN	<u>PECTIONS - C</u> SUBSTANDAR	D CONDITIO ROUTE I REQUES	NS NUMBER: STATUS: STED BY: RT DATE:		
REMARKS: INSPECTIO TARGET STAR TARGET COM SCHEDULE SCHEDULE ASSET # ASSET DESCRIPTION LOCATION ID LOC. DESCRIPTION PHYSICAL LOCATION RESPONSIBLE S OI DATE STARTED: 05 EST. Labor HRS: 0.	ON COMPLETE, NO S T DATE: 9/1/2012 IP DATE: 9/30/2012 START: FINISH: AC-WEST FIELD WEST FIELD SUPERVISOR / OWN	SUBSTANDAR	D CONDITIO ROUTE I REQUES REPOR	NUMBER: STATUS: STED BY: RT DATE:	BAGATES	
TARGET STAR TARGET COM SCHEDULE SCHEDULE ASSET # ASSET DESCRIPTION LOCATION ID LOC. DESCRIPTION PHYSICAL LOCATION RESPONSIBLE S OI DATE STARTED: 05 EST. Labor HRS: 0.	RT DATE: 9/1/2012 IP DATE: 9/30/2012 E START: FINISH: : : AC-WEST FIELD : WEST FIELD : SUPERVISOR / OWN		ROUTE I REQUES REPOR	NUMBER: STATUS: STED BY: RT DATE:	BAGATES	
TARGET COM SCHEDULE SCHEDULE ASSET # ASSET DESCRIPTION LOCATION ID LOC. DESCRIPTION PHYSICAL LOCATION RESPONSIBLE S OI DATE STARTED: 09 EST. Labor HRS: 0.	IP DATE: 9/30/2012 START: FINISH: : : AC-WEST FIELD : WEST FIELD : SUPERVISOR / OWN		REQUES	STATUS: STED BY: RT DATE:	BAGATES	
ASSET DESCRIPTION LOCATION ID LOC. DESCRIPTION PHYSICAL LOCATION <u>RESPONSIBLE S</u> OI DATE STARTED: 09 EST. Labor HRS: 0.	: : AC-WEST FIELD : WEST FIELD : SUPERVISOR / OWN					
OI DATE STARTED: 09 EST. Labor HRS: 0.						
DATE STARTED: 09 EST. Labor HRS: 0.		<u>NER</u>	WORK TYPE	E E	PRIORITY	
EST. Labor HRS: 0.	PERTNS /		PM		3	832.020 C7
		DATE COM	IPLETED: 09/	/23/2012		
ACT. Labor HRS: 4.	.00	<u>Labor Code</u> <u>Craft</u>	<u>e/ Quan</u>	<u>itity</u> <u>I</u>	Planned Hours	2
	.00	OPERATN	I 1		0.00	
ACTUALS POSTED:	LABORCODE	<u>CRAF</u>	T <u>R</u> E	<u>EG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
RI	BLACK	STATECH		2.00	0.00	09/23/2012
TF	P3JKR	STATECH		2.00	0.00	09/23/2012
OB PLAN NUMBER: OB PLAN DESCRIPTION		_ INSPECTION	IS			
OB OPERATIONS:						
	S SHALL BE COVER					
GRATING OR	FLOORING SHALL E	BE INSTALLED	AND MAINT	AINED IN		۱L.
0 CHECK RAILIN	TION SO AS TO EX	CLUDE PEOPL	E AND ANIM	ALS.		
0 CHECK PLATE						
0 REMOVE WEE						
0 CHECK FOR LI						
		SIGNAGE				
OMMENTS:	VELL HAS PROPER S					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION W	ORK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #		PMNUM: A	C-OPSC2	
DESCRIPTION	N: MONTHLY WELL INSPECTIC	ONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5010446	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK ORD	ER SEL	J WOF	RKORDER
WOR	< ORDER #	: 5010454	PI	MNUM: AC-OPSC	2	
PA	RENT WO #	:				
DE	SCRIPTION	: MONTHLY WELL INS	SPECTIONS - CRE	EW TWO		
REMAR	KS: INSPEC	TION COMPLETE, NO	SUBSTANDARD	CONDITIONS		
	TARGET S	TART DATE: 10/1/2012		ROUTE NUMBE	र:	
		COMP DATE: 10/31/201	2		S: CLOSE	
		ULE START: JLE FINISH:		REQUESTED B		
	SCIEDC		I	PM ACTIVITY CLASS		
	ASSET	Γ#:				
ASSET	DESCRIPTI	ON:				
		ID: AC-WEST FIELD				
		ON: WEST FIELD				
	CAL LOCATI					
<u>R</u>	ESPONSIBL	E SUPERVISOR / OW	<u>NER \</u>	VORK TYPE	PRIORITY	ACCOUNT INFO
		OPERTNS /		PM	3	832.020 C7
DAT	E STARTED	: 10/21/2012	DATE COMPI	_ETED: 10/21/20	12	
EST. La	bor HRS:	0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hour	<u>'S</u>
ACT. La	bor HRS:	6.00	OPERATN	1	0.00	
<u>ACTUAL</u>	S POSTED:	LABORCODE	<u>CRAFT</u>	<u>REG. HR</u>	<u>S</u> <u>OVERTIME</u>	<u>WORKDATE</u>
		RBLACK	STATECH	2.00	0.00	10/21/2012
		AOZUNA	STATECH	2.00	0.00	10/21/2012
		TP3JKR	STATECH	2.00	0.00	10/21/2012
JOB PLAN	NUMBER:	AC-OPS				
JOB PLAN	DESCRIPT	ION: MONTHLY WEL	L INSPECTIONS			
JOB OPEF	ATIONS:					
10	-	ARS SHALL BE COVE				
20						AL.
20		DR FLOORING SHALL	-		1N	
30	CHECK RAI	IDITION SO AS TO E	ACLUDE PEUPLE	AND ANIMALS.		
40	CHECK PLA					
+0 50	REMOVE W					
50 60	CHECK FOR					
			SIGNACE			
70		E WELL HAS PROPER	SIGNAGE			
COMMEN	'S'					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER		PMNUM: AC	C-OPSC2	
DESCRIPTIO	N: MONTHLY WELL INSPECT	IONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5010454	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK O	RDER	SEU	WOR	KORDER
WORK ORD PARENT V		: <b>5010462</b>		PMNUM: AC	C-OPSC2		
DESCRIP	TION	: MONTHLY WELL IN	SPECTIONS - C	CREW TWO			
REMARKS: IN	SPEC	CTION COMPLETE, NO	O SUBSTANDAF		ONS		
TARG	ET S	TART DATE: 11/1/2012	2	ROUTE	NUMBER:		
		COMP DATE: 11/30/203	12		STATUS: 0		
		ULE START:		-	ESTED BY: I		
SC	HED!	ULE FINISH:		PM ACTIVI	ORT DATE: ! TY CLASS:	5/18/2012	
^	SSE	т #•					
		ID: AC-WEST FIELD					
LOC. DESC	RIPTI	ON: WEST FIELD					
PHYSICAL LO	CATI	ON:					
RESPON	ISIBI	<u>E SUPERVISOR / OV</u>	<u>VNER</u>	WORK TYP	<u>PE P</u>	RIORITY	ACCOUNT INFO
		OPERTNS /		PM		3	832.020 C7
DATE STAR	RTED	: 11/30/2012	DATE CON	IPLETED: 1	1/30/2012		
EST. Labor H	RS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qua</u>	<u>ntity</u> <u>F</u>	Planned Hour	<u>S</u>
ACT. Labor H	RS:	4.00	OPERATI	N	1	0.00	
ACTUALS POST	TED:	LABORCODE	CRA	<u>-T</u> <u>F</u>	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
		EWPINO	OPERATN		4.00	0.00	11/30/2012
JOB PLAN NUME	BER:	AC-OPS					
JOB PLAN DESC	RIPT	ION: MONTHLY WE	LL INSPECTION	IS			
JOB OPERATION	IS:						
10 WELL	CELI	ARS SHALL BE COV	ERED AND KEP	F DRAINED.			
_		SHOULD BE PROTECT					AL.
	-	OR FLOORING SHALL	-			l	
		NDITION SO AS TO E	XCLUDE PEOPL	E AND ANIN	IALS.		
		ILINGS					
		ATFORM					
		VEEDS					
	_	R LEAKS					
70 MAKE	SUR	E WELL HAS PROPER	R SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER 7 PARENT WO 7 DESCRIPTIO			AC-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDE	R #: <b>5010462</b>	PMNUM: A	C-OPSC2		
PARENT WO					
DESCRIPTI	ION: MONTHLY WELL INSPECT	IONS - CREW TWO			_
SS-29					
SS-25					
SS-25A					
22-25B					
SS-1					
SS-1-0					
33-1-0					
SS-6					
SS-8					
SS-5					
CC 21					
SS-31					
SS-44					
SS-44A					
33-44A					

WORK ORDER #: 5010462	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS -	· CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK C	ORDER	SEU	WOR	KORDER
PARENT	WO #:		CRECTIONS		1: AC-OPSC2		
		MONTHLY WELL IN					
		TION COMPLETE, NO		RD CONI	DITIONS		
TA	RGET CO SCHEDU	ART DATE: 12/1/2012 OMP DATE: 12/31/201 JLE START: LE FINISH:		R	DUTE NUMBER: STATUS: EQUESTED BY: REPORT DATE: TIVITY CLASS:	CLOSE BAGATES 5/18/2012	
ASSET DESC LOC	ATION CRIPTIC	DN: ID: AC-WEST FIELD DN: WEST FIELD					
RESPC	<b>NSIBL</b>	E SUPERVISOR / OV	<u>VNER</u>	<u>WORK</u>	TYPE	<u>PRIORITY</u>	
		OPERTNS /		Ρ		3	832.020 C7
DATE STA	ARTED:	12/15/2012	DATE CO	MPLETED	): 12/15/201	2	
EST. Labor H	HRS:	0.00	<u>Labor Coo</u> <u>Craft</u>	<u>de/</u>	<u>Quantity</u>	Planned Hour	<u>S</u>
ACT. Labor H	HRS:	8.00	OPERAT	N	1	0.00	
ACTUALS POS	STED:	LABORCODE	<u>CRA</u>	<u>FT</u>	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
		RBLACK	STATECH		4.00	0.00	12/15/2012
		AOZUNA	STATECH		4.00	0.00	12/15/2012
		AC-OPS ON: MONTHLY WE	LL INSPECTIO	NS			
OB OPERATIC	ONS:						
0 WEL	L CELL	ARS SHALL BE COVE	ERED AND KEP	PT DRAIN	IED		
0 GRA	TING O	HOULD BE PROTECT	BE INSTALLE	D AND M	IAINTAINED I		λL.
	CK RAI	DITION SO AS TO E	XCLUDE PEOP	LE AND	ANIMALS.		
	OVE W	-					
-	-						
		E WELL HAS PROPER	SIGNAGE				
OMMENTS:							
SUULINI S.							

GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
#: <b>5010470</b> #:			
		)	
s to zo on the following e	equipment.		
	#: <b>5010470</b> #: DN: MONTHLY WELL INSP	#:	#: 5010470 PMNUM: AC-OPSC2 #: DN: MONTHLY WELL INSPECTIONS - CREW TWO

11/2/2019	GAS TRANSMISSION W	ORK ORDER	SEU	WORKORDER	
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2		
	<pre>&gt;</pre>	ONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
22-230					
SS-1					
SS-1-0					
SS-6					
33-0					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: 5010470	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK OR	DER	SEU	WOR	KORDER
WORK ORDER #		F	PMNUM: AC-O	PSC2		
PARENT WO #						
DESCRIPTION	: MONTHLY WELL INS	SPECTIONS - CR	REW TWO			
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDARD	CONDITIONS	5		
	TART DATE: 1/1/2013		ROUTE NU	MBER:		
	COMP DATE: 1/31/2013			ATUS: (		
	ULE START: JLE FINISH:		REQUESTI		3AGATES 5/18/2012	
SCHEDO	JEET INISH.		PM ACTIVITY C		)/10/2012	
ASSET	г <i>#</i> .					
ASSET DESCRIPTI						
	ID: AC-WEST FIELD					
LOC. DESCRIPTI						
PHYSICAL LOCATI	ON:					
<b>RESPONSIBL</b>	E SUPERVISOR / OW	<u>NER</u>	WORK TYPE	<u>P</u>	<u>RIORITY</u>	ACCOUNT INFO
	OPERTNS /		PM		3	832.020 C7
DATE STARTED	: 01/30/2013	DATE COM	PLETED: 01/30	0/2013		
EST. Labor HRS:	0.00	<u>Labor Code</u> <u>Craft</u>	<u>/ Quantit</u>	<u>y</u> P	lanned Hours	<u>S</u>
ACT. Labor HRS:	3.00	OPERATN	1		0.00	
ACTUALS POSTED:	LABORCODE	<u>CRAFT</u>	<u>REG</u>	<u>. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
	RBLACK	STATECH	3	.00	0.00	01/30/2013
JOB PLAN NUMBER:	AC-OPS					
JOB PLAN DESCRIPT	ION: MONTHLY WEL	L INSPECTIONS	5			
JOB OPERATIONS:						
10 WELL CELL	ARS SHALL BE COVER	RED AND KEPT	DRAINED			
	HOULD BE PROTECTE					AL.
	OR FLOORING SHALL					
	NDITION SO AS TO EX	CLUDE PEOPLE	AND ANIMAL	S.		
30 CHECK RAI						
40 CHECK PLA						
50 REMOVE W	/EEDS					
60 CHECK FOR	R LEAKS					
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #		PMNUM: A	C-OPSC2	
	10-20 on the following ed			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	K ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #:		PMNUM: AC-	OPSC2	
DESCRIPTION:	MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5010478	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMISS	SION WORK OF	RDER	SEU	WOR	KORDER
_	ORDER # ENT WO #	: <b>5010486</b> :		PMNUM: AC-	OPSC2		
DES	CRIPTION	: MONTHLY WELL INS	PECTIONS - C	REW TWO			
REMARK	S: INSPEC	TION COMPLETE, NO	SUBSTANDAR		NS		
	TARGET S	TART DATE: 2/1/2013		ROUTE N	UMBER:		
		COMP DATE: 2/28/2013			STATUS: (		
		ULE START: JLE FINISH:		-	STED BY: E	BAGATES 5/18/2012	
	SCHEDU	JEE FINISH.		PM ACTIVITY		5/16/2012	
	ASSE	Γ#:					
ASSET D	DESCRIPTI	ON:					
		ID: AC-WEST FIELD					
		ON: WEST FIELD					
	AL LOCATI						
<u>RE</u>	SPONSIBL	<u>E SUPERVISOR / OW</u> OPERTNS /	<u>NER</u>	WORK TYPE PM	<u> </u>	<u>RIORITY</u> 3	ACCOUNT INFO 832.020 C7
DATE	STARTED	: 02/18/2013	DATE COM	PLETED: 02/	18/2013		
EST. Lab	oor HRS:	0.00	<u>Labor Code</u> <u>Craft</u>	<u>e/ Quan</u>	<u>tity F</u>	Planned Hours	<u>S</u>
ACT. Lab	oor HRS:	4.00	OPERATN	1		0.00	
<u>ACTUALS</u>	POSTED:	LABORCODE	CRAF	<u>T RE</u>	G. HRS	<u>OVERTIME</u>	<b>WORKDATE</b>
		TP3JKR	STATECH		4.00	0.00	02/18/2013
JOB PLAN I	NUMBER:	AC-OPS					
JOB PLAN I	DESCRIPT	ION: MONTHLY WEL	L INSPECTION	S			
JOB OPERA	ATIONS:						
		ARS SHALL BE COVE					
							AL.
		OR FLOORING SHALL				l	
	CHECK RAI	NDITION SO AS TO EX	CLUDE PEOPL		4L5.		
-	REMOVE W	-					
		_					
		E WELL HAS PROPER	SIGNAGE				
COMMENTS	5:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WO		PMNUM: A	C-OPSC2	
DESCRIPTIO	ON: MONTHLY WELL INSPE	CTIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5010486	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	IS - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
WORK ORDER #	: 5010494		PMNUM: AC	-OPSC2		
PARENT WO #						
DESCRIPTION	: MONTHLY WELL INS	SPECTIONS - C	REW TWO			
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDITIC	DNS		
TARGET S	TART DATE: 3/1/2013		ROUTE	NUMBER:		
	COMP DATE: 3/31/2013		DEOUE	STATUS: (		
	ULE START: JLE FINISH:		-	STED BY: E RT DATE: 5		
SCIEDO	JEE FINISH.		PM ACTIVIT		0/10/2012	
ASSET	г <i>#</i> .					
ASSET DESCRIPTI						
	ID: AC-WEST FIELD					
LOC. DESCRIPTI						
PHYSICAL LOCATI	ON:					
<b>RESPONSIBL</b>	E SUPERVISOR / OW	<u>NER</u>	WORK TYP	<u>E P</u>	<u>RIORITY</u>	ACCOUNT INFO
	OPERTNS /		PM		3	832.020 C7
DATE STARTED	: 03/27/2013	DATE COM	IPLETED: 03	/27/2013		
EST. Labor HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Quar</u>	<u>ntity</u> <u>P</u>	Planned Hours	<u>S</u>
ACT. Labor HRS:	3.00	OPERATI	N 1	L	0.00	
ACTUALS POSTED:	LABORCODE	CRAF	<u>T R</u>	<u>EG. HRS</u>	<u>OVERTIME</u>	<b>WORKDATE</b>
	RARAIZA	STATECH		3.00	0.00	03/27/2013
JOB PLAN NUMBER:	AC-OPS					
JOB PLAN DESCRIPT	ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPERATIONS:						
	ARS SHALL BE COVE			-		
	HOULD BE PROTECTE					AL.
	DR FLOORING SHALL	-				
	NDITION SO AS TO EX	CLUDE PEOPL	E AND ANIM	IALS.		
40 CHECK PLA	-					
50 REMOVE W	_					
60 CHECK FOI	-					
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
DESCRIPTIC	N: MONTHLY WELL INSPEC	TIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5010494	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	Ð	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
-	-	: 5010502		PMNUM: A	C-OPSC2		
	RENT WO #						
DE	SCRIPTION	: MONTHLY WELL INS	PECTIONS - C	REW TWO			
REMAR	KS: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDITI	ONS		
	TARGET S	TART DATE: 4/1/2013		ROUTE	NUMBER:		
		COMP DATE: 4/30/2013			STATUS: (		
		ULE START: JLE FINISH:		-	ESTED BY: I DRT DATE: !		
	SCHEDU	JLE FINISH:		PM ACTIVI		5/16/2012	
	ACCE	τ.μ.					
ASSET	ASSE <sup>®</sup> DESCRIPTI						
ASSLI		ID: AC-WEST FIELD					
LOC.		ON: WEST FIELD					
	CAL LOCATI						
R	RESPONSIB	E SUPERVISOR / OW	NER	WORK TYP	PE P	RIORITY	ACCOUNT INFO
_		OPERTNS /		PM		3	832.020 C7
DAT	E STARTED	: 04/20/2013	DATE COM	IPLETED: 04	4/20/2013		
EST. La	abor HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qua</u>	intity <u>F</u>	Planned Hour	<u>S</u>
ACT. La	abor HRS:	3.00	OPERATIN	I	1	0.00	
<u>ACTUAL</u>	S POSTED:	LABORCODE	CRAF	<u>T</u> <u>F</u>	REG. HRS	<u>OVERTIME</u>	<b>WORKDATE</b>
		TP3JKR	STATECH		3.00	0.00	04/20/2013
JOB PLAN	NUMBER:	AC-OPS					
JOB PLAN	DESCRIPT	ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPE	RATIONS:						
10		ARS SHALL BE COVER					
		SHOULD BE PROTECTE					AL.
20		OR FLOORING SHALL				l	
30	CHECK RA	NDITION SO AS TO EX	CLUDE PEOPL		MALS.		
40	CHECK PLA						
50	REMOVE W						
60	CHECK FO						
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMEN	TS:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	( ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #:		PMNUM: AC	-OPSC2	
DESCRIPTION:	MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5010502	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS -	· CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	ION WORK OF	RDER	SEU	WOR	KORDER
WORK ORDER #: 5 PARENT WO #:	6010510		PMNUM: AC	-OPSC2		
	IONTHLY WELL INSP	PECTIONS - C	REW TWO			
REMARKS: INSPECTI	ON COMPLETE, NO S	SUBSTANDAR	D CONDITIC	ONS		
TARGET STAF	RT DATE: 5/1/2013		ROUTE	NUMBER:		
TARGET CON			STATUS: 0			
SCHEDULI			•	STED BY: E		
SCHEDULE	: FINISH:		PM ACTIVIT	RT DATE: 5	5/18/2012	
			FMACIIVII	T CLASS.		
ASSET #						
ASSET DESCRIPTION						
LOC. DESCRIPTION	): AC-WEST FIELD					
PHYSICAL LOCATION						
	SUPERVISOR / OWN	IED	WORK TYPI	<b>с р</b>	RIORITY	ACCOUNT INFO
	PERTNS /		PM		3	832.020 C7
	5/27/2013	DATE COM		/27/2013	-	
EST. Labor HRS: 0	.00	Labor Code Craft	e/ Quar	<u>ntity P</u>	Planned Hours	<u>5</u>
ACT. Labor HRS: 2	.00	OPERATN	1		0.00	
ACTUALS POSTED:	LABORCODE	CRAF	<u>T</u> <u>R</u>	EG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
Т	P3JKR	STATECH		2.00		05/27/2013
JOB PLAN NUMBER:	AC-OPS					
JOB PLAN DESCRIPTIO	N: MONTHLY WELL	INSPECTION	S			
JOB OPERATIONS:						
10 WELL CELLAR	RS SHALL BE COVER	ED AND KEPT	DRAINED			
CELLARS SHO	OULD BE PROTECTE	D FROM AS M	UCH RUNOF	F WATER	AS PRACTICA	AL.
	FLOORING SHALL E	-			l	
	ITION SO AS TO EX	CLUDE PEOPL	E AND ANIM	ALS.		
30 CHECK RAILI						
40 CHECK PLATE						
50 REMOVE WEE	DS					
60 CHECK FOR L	EAKS					
70 MAKE SURE V	WELL HAS PROPER S	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
PARENT WO			AC-OPSC2	
	ON: MONTHLY WELL INSPE s 10-20 on the following ed			
P-26				
F-20				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
2010				
D 47				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2		=
	N: MONTHLY WELL INSPECT	TIONS - CREW TWO			_
SS-29					
SS-25					
SS-25A					
22-25B					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: 5010510	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	Ð	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
WOR	K ORDER #	: 5230820		PMNUM:	AC-OPSC2		
PA	RENT WO #	:					
DE	SCRIPTION	: MONTHLY WELL INS	PECTIONS - C	CREW TWC	)		
REMAR	KS: INSPEC	TION COMPLETE, NO	SUBSTANDAR		FIONS		
	TARGET S	TART DATE: 6/1/2013		ROU	TE NUMBER:		
	TARGET COMP DATE: 6/30/2013				STATUS:		
		ULE START:		-	UESTED BY:		
	SCHEDU	JLE FINISH:			PORT DATE: VITY CLASS:		
	1005	<b>T</b>		THACT			
ACCET	ASSE <sup>®</sup> DESCRIPTI						
ASSLI		ID: AC-WEST FIELD					
LOC.		ON: WEST FIELD					
	CAL LOCATI						
R	RESPONSIB	E SUPERVISOR / OW	NER	WORK T	<u>YPE</u>	PRIORITY	ACCOUNT INFO
-		OPERTNS /		PM		3	832.020 C7
DAT	E STARTED	: 06/25/2013	DATE COM	IPLETED:	06/25/201	3	
EST. La	abor HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qı</u>	uantity	Planned Hour	<u>S</u>
ACT. La	abor HRS:	2.00	OPERATI	N	1	0.00	
ACTUAL	S POSTED:	LABORCODE	CRAF	-T	REG. HRS	<b>OVERTIME</b>	WORKDATE
		AOZUNA	STATECH		2.00	0.00	06/25/2013
JOB PLAN	NUMBER:	AC-OPS					
JOB PLAN	DESCRIPT	ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPER	RATIONS:						
10	WELL CELL	ARS SHALL BE COVE	RED AND KEP	Γ DRAINE	)		
		SHOULD BE PROTECTE			-		AL.
20		OR FLOORING SHALL	_			N	
20		NDITION SO AS TO EX	CLUDE PEOPL	LE AND AN	IMALS.		
30	CHECK RA						
40	CHECK PLA	-					
50	REMOVE W	_					
60	CHECK FO	R LEAKS					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMEN	TS:						

11/2/2019	GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO			AC-OPSC2	
	10-20 on the following e		·	
P-26	-			
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
	R #: <b>5230820</b>	PMNUM: A	C-OPSC2		
PARENT WO					
DESCRIPTI	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
CC 1					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
55-444					
SS-44A					

WORK ORDER #: <b>5230820</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

1/2/2019	GAS TRANSMISS	ION WORK OF	RDER	SEU	WOR	KORDER
WORK ORDER # PARENT WO # DESCRIPTION			PMNUM: <b>AC-(</b> REW TWO	OPSC2		
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDITION	S		
TARGET C SCHED	TART DATE: 7/1/2013 COMP DATE: 7/31/2013 ULE START: JLE FINISH:		REQUEST	TATUS: ED BY: DATE:	CLOSE BAGATES 5/4/2013	
LOC. DESCRIPTI PHYSICAL LOCATI	ON: ID: AC-WEST FIELD ON: WEST FIELD ON:					
RESPONSIBL	<u>E SUPERVISOR / OWI</u> OPERTNS /	<u>NER</u>	WORK TYPE PM	ŀ	<u>PRIORITY</u> 3	ACCOUNT INFO 832.020 C7
DATE STARTED	: 07/27/2013	DATE COM		7/2013	-	
EST. Labor HRS:		Labor Code Craft			Planned Hours	5
ACT. Labor HRS:	6.00	OPERATN	1		0.00	
ACTUALS POSTED:	<u>LABORCODE</u> TP3JKR AOZUNA	<u>CRAF</u> STATECH STATECH	3	<u>G. HRS</u> 3.00 3.00	<u>OVERTIME</u> 0.00 0.00	<u>WORKDATE</u> 07/27/2013 07/27/2013
OB PLAN NUMBER: OB PLAN DESCRIPT	AC-OPS ION: MONTHLY WELI	L INSPECTION	S			
OB OPERATIONS:						
	ARS SHALL BE COVER HOULD BE PROTECTE					A I
20 GRATING C	DR FLOORING SHALL INTERNET	BE INSTALLED	AND MAINTA	INED I		<i>۱</i> ∟.
CHECK RAI						
O CHECK PLA	TFORM					
50 REMOVE W	/EEDS					
50 CHECK FOR	R LEAKS					
70 MAKE SUR	E WELL HAS PROPER S	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WC	R #: <b>5264539</b>	PMNUM: A	C-OPSC2	
	ON: MONTHLY WELL INSPEC	TIONS - CREW TWO		
AC-OPS Operation	is 10-20 on the following eq	uipment:		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WO	RK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #	<b>#:</b>	PMNUM: AC	-OPSC2	
DESCRIPTION	N: MONTHLY WELL INSPECTION	S - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5264539	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK ORD	ER SE	u wo	RKORDER
WORK ORDER # PARENT WO #		19	MNUM: AC-OPS	C2	
DESCRIPTION	: MONTHLY WELL INS	SPECTIONS - CRE	W TWO		
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDARD	CONDITIONS		
TARGET S	TART DATE: 8/1/2013		ROUTE NUMBE	R:	
	COMP DATE: 8/31/2013			IS: CLOSE	
	ULE START:		REQUESTED E		
SCRED	JLE FINISH:	F	PM ACTIVITY CLAS	E: 5/17/2013 S:	
ASSE	T #:				
ASSET DESCRIPTI	ON:				
LOCATION	ID: AC-WEST FIELD				
LOC. DESCRIPTI	ON: WEST FIELD				
PHYSICAL LOCATI	ON:				
<u>RESPONSIBI</u>	<u>E SUPERVISOR / OW</u>	NER V	<u>VORK TYPE</u>	PRIORITY	ACCOUNT INFO
	OPERTNS /		PM	3	832.020 C7
DATE STARTED	: 08/24/2013	DATE COMPL	ETED: 08/24/20	)13	
EST. Labor HRS:	0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hou	<u>Irs</u>
ACT. Labor HRS:	2.00	OPERATN	1	0.00	
ACTUALS POSTED:	<u>LABORCODE</u> RARAIZA	<u>CRAFT</u> STATECH		<u>OVERTIME</u> 0.00	<u>WORKDATE</u> 08/24/2013
JOB PLAN NUMBER:	AC-OPS				
JOB PLAN DESCRIPT	ION: MONTHLY WEL	L INSPECTIONS			
JOB OPERATIONS:					
10 WELL CELL	ARS SHALL BE COVE	RED AND KEPT D	RAINED		
CELLARS S	SHOULD BE PROTECTE	ED FROM AS MUC	CH RUNOFF WAT	ER AS PRACTIO	CAL.
	OR FLOORING SHALL	-		D IN	
	NDITION SO AS TO E	CLUDE PEOPLE	AND ANIMALS.		
30 CHECK RA					
40 CHECK PLA	ATFORM				
50 REMOVE W	/EEDS				
60 CHECK FO	R LEAKS				
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE			
COMMENTS:					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WC		PMNUM: A	C-OPSC2	
	ON: MONTHLY WELL INSPEC			
C-OPS Operation	is 10-20 on the following eq	uipment:		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
<b>D</b> 20				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#:	PMNUM: A	C-OPSC2	
DESCRIPTIC	ON: MONTHLY WELL INSP	ECTIONS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5276660	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK ORDE	ER SEU	WOR	KORDER
WORK ORDER # PARENT WO #		PM	INUM: AC-OPSC2	2	
DESCRIPTION	I: MONTHLY WELL INS	PECTIONS - CRE	W TWO		
REMARKS: INSPE	CTION COMPLETE, NO	SUBSTANDARD (	CONDITIONS		
TARGET S	START DATE: 9/1/2013		ROUTE NUMBER	:	
	COMP DATE: 9/30/2013		STATUS		
	OULE START: ULE FINISH:		REQUESTED BY REPORT DATE		
SCHED	OLL FINISH.	PI	M ACTIVITY CLASS		
ASSE	T #:				
ASSET DESCRIPT	ION:				
LOCATION	ID: AC-WEST FIELD				
	ION: WEST FIELD				
PHYSICAL LOCAT	ION:				
<u>RESPONSIB</u>	LE SUPERVISOR / OW OPERTNS /	<u>NER W</u>	<u>ORK TYPE</u> PM	PRIORITY 3	ACCOUNT INFO 832.020 C7
DATE STARTED	): 09/27/2013	DATE COMPLI	ETED: 09/27/201	3	
EST. Labor HRS:	0.00	<u>Labor Code/</u> <u>Craft</u>	Quantity	Planned Hour	<u>S</u>
ACT. Labor HRS:	2.00	OPERATN	1	0.00	
ACTUALS POSTED	LABORCODE	<u>CRAFT</u>	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
	TP3JKR	STATECH	2.00	0.00	09/27/2013
JOB PLAN NUMBER:	AC-OPS				
JOB PLAN DESCRIPT	FION: MONTHLY WEL	L INSPECTIONS			
JOB OPERATIONS:					
10 WELL CEL	LARS SHALL BE COVE	RED AND KEPT DI	RAINED		
	SHOULD BE PROTECTE				AL.
	OR FLOORING SHALL	-		IN	
	NDITION SO AS TO EX	CLUDE PEOPLE A	IND ANIMALS.		
40 CHECK PL	-				
50 REMOVE V					
60 CHECK FC					
70 MAKE SUF	RE WELL HAS PROPER	SIGNAGE			
COMMENTS:					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO # DESCRIPTION		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WO	RK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #		PMNUM: AC	C-OPSC2	
DESCRIPTION	N: MONTHLY WELL INSPECTION	IS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5302585	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS -	· CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK ORD	ER SEU	WOR	KORDER
WORK ORDER # PARENT WO #		PM	INUM: AC-OPSC	2	
DESCRIPTION	: MONTHLY WELL INS	SPECTIONS - CRE	W TWO		
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDARD	CONDITIONS		
TARGET S	TART DATE: 10/1/2013		ROUTE NUMBER	R:	
	COMP DATE: 10/31/2013	3		S: COMP	
	ULE START:		REQUESTED BY		
SCHEDU	JLE FINISH:	Р	REPORT DATE M ACTIVITY CLASS		
ASSE	Γ#:				
ASSET DESCRIPTI	ON:				
LOCATION	ID: AC-WEST FIELD				
LOC. DESCRIPTI					
PHYSICAL LOCATI	ON:				
<u>RESPONSIBL</u>	<u>E SUPERVISOR / OW</u> OPERTNS /	<u>NER W</u>	<u>ORK TYPE</u> PM	PRIORITY 3	ACCOUNT INFO 832.020 C7
DATE STARTED	: 10/22/2013	DATE COMPL	ETED: 10/22/202	13	
EST. Labor HRS:		Labor Code/ Craft	Quantity		<u>S</u>
ACT. Labor HRS:	3.00	OPERATN	1	0.00	
ACTUALS POSTED:	LABORCODE	<u>CRAFT</u>	REG. HR	<u>S</u> <u>OVERTIME</u>	<b>WORKDATE</b>
	RSBARRA	OPERATN	3.00	0.00	10/22/2013
JOB PLAN NUMBER:	AC-OPS				
JOB PLAN DESCRIPT	ION: MONTHLY WEL	L INSPECTIONS			
JOB OPERATIONS:					
	ARS SHALL BE COVE				
	SHOULD BE PROTECTE				AL.
	OR FLOORING SHALL	-		IN	
30 CHECK RA	NDITION SO AS TO E	CLUDE PEOPLE A	IND ANIMALS.		
40 CHECK PLA	-				
50 REMOVE W	-				
60 CHECK FO	_				
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE			
COMMENTS:					

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
PARENT WC	x #: <b>5326337</b> ) #: ON: MONTHLY WELL INSPE		AC-OPSC2	
	s 10-20 on the following ed			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION V	VORK ORDER	SEU	WORKORDER	
WORK ORDER		PMNUM: A	C-OPSC2		
PARENT WO	#: DN: MONTHLY WELL INSPECTI	ONS - CREW TWO			
SS-29					
33-29					
SS-25					
SS-25A					
22-25B					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: 5326337	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	IS - CREW TWO

SS-3

11/2/2019		GAS TRANSMIS	SSION WORK	ORDER	SEU	wo	RKORDER
WORK ORDE PARENT W				PMNU	M: AC-OPSC	2	
DESCRIPT	ION	: MONTHLY WELL IN	ISPECTIONS -	CREW T	WO		
REMARKS: INS	PEC	TION COMPLETE, NO	O SUBSTANDA	RD CON	DITIONS		
TARGI	T S	TART DATE: 11/1/2013	3	R	OUTE NUMBER	.:	
		COMP DATE: 11/30/201	13		STATUS		
		ULE START: JLE FINISH:		ŀ	REQUESTED BY REPORT DATE		
50	ILDU	JEE FINISH.		PM A	CTIVITY CLASS		
AS	SET	Г <i>#</i> :					
ASSET DESCR	PTI	ON:					
	-	ID: AC-WEST FIELD					
		ON: WEST FIELD					
PHYSICAL LOC		_					
<u>RESPON</u>	SIBL	E SUPERVISOR / OV	<u>NNER</u>		<u>K TYPE</u>		
		OPERTNS /	<b>-</b> • <b>- -</b> • •		PM	3	832.020 C7
DATE STAR	ED	11/22/2013	DATE CC	MPLETE	D: 11/22/201	.3	
EST. Labor HR	S:	0.00	<u>Labor Co</u> <u>Craft</u>		<u>Quantity</u>	<u>Planned Hou</u>	<u>Irs</u>
ACT. Labor HR	S:	2.00	OPERAT	N	1	0.00	
ACTUALS POST	ED:	LABORCODE	CRA	<u>AFT</u>	REG. HRS	<u>OVERTIM</u>	<u>E</u> <u>WORKDATE</u>
		TP3JKR	STATECH		2.00	0.00	11/22/2013
JOB PLAN NUMB	R:	AC-OPS					
JOB PLAN DESCR	IPT	ION: MONTHLY WE	ELL INSPECTIO	NS			
JOB OPERATION	5:						
-		ARS SHALL BE COVE					
_		HOULD BE PROTECT					CAL.
		OR FLOORING SHALL	_			IN	
30 CHECK		IDITION SO AS TO E	EXCLUDE PEOF	LE AND	ANIMALS.		
		ATFORM					
		-					
50 REMO							
		R LEAKS					
70 MAKES	SUR	E WELL HAS PROPER	R SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSI	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO DESCRIPTIO			AC-OPSC2	
	s 10-20 on the following e			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WOR	RK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: AC	-OPSC2	
	ON: MONTHLY WELL INSPECTION	S - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
33-0				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5348629	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	S - CREW TWO

SS-3

11/2/2019		GAS TRANSMIS	SION WORK OF	RDER	SEU	WOR	KORDER
PARE	ENT WO #			PMNUM: AC-	OPSC2		
DES	CRIPTION	: MONTHLY WELL INS	SPECTIONS - C	REW IWO			
REMARK	S: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDITIO	١S		
		TART DATE: 12/1/2013		ROUTE N			
		COMP DATE: 12/31/201 ULE START:	3		STATUS: (	COMP BAGATES	
		JLE FINISH:		-		9/19/2013	
				PM ACTIVITY		-, -,	
	ASSE	Γ#:					
ASSET D	DESCRIPTI	ON:					
		ID: AC-WEST FIELD					
		ON: WEST FIELD					
	AL LOCATI						
<u>RE</u>	SPONSIBL	<u>E SUPERVISOR / OW</u>	<u>'NER</u>	WORK TYPE PM	P	<u>PRIORITY</u> 3	ACCOUNT INFO 832.020 C7
	STADTED	OPERTNS /			77/2012	-	832.020 C7
		: 12/23/2013	DATE COM	PLETED: 12/	23/2013		
EST. Lab	oor HRS:	0.00	<u>Labor Code</u> <u>Craft</u>	<u>e/ Quant</u>	<u>city</u> <u>F</u>	Planned Hour	<u>S</u>
ACT. Lat	oor HRS:	2.00	OPERATN	1		0.00	
<u>ACTUALS</u>	POSTED:	<u>LABORCODE</u> TP3JKR	<u>CRAF</u> STATECH		<u>G. HRS</u> 2.00		<u>WORKDATE</u> 12/23/2013
JOB PLAN	NUMBER:	AC-OPS					
JOB PLAN	DESCRIPT	ION: MONTHLY WEL	L INSPECTION	S			
JOB OPERA	ATIONS:						
10 V	WELL CELL	ARS SHALL BE COVE	RED AND KEPT	DRAINED			
		HOULD BE PROTECT					AL.
		OR FLOORING SHALL				l	
	GOOD CON CHECK RAI	NDITION SO AS TO EX	XCLUDE PEOPL	E AND ANIMA	LS.		
-		-					
	REMOVE W						
		_	01011-05				
		E WELL HAS PROPER	SIGNAGE				
COMMENTS	5:						

11/2/2019	GAS TRANSMISSIO	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO			AC-OPSC2	
	s 10-20 on the following e		)	
P-26		quipinenti		
20				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER	R #: <b>5370671</b>	PMNUM: A	C-OPSC2		
PARENT WO					
DESCRIPTI	ON: MONTHLY WELL INSPECT	TONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
22-230					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: <b>5370671</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECT	TIONS - CREW TWO

SS-3

11/2/2019		GAS TRANSMIS	SION WORK O	RDER	SEU	WOR	KORDER
WORK ORDE	393370		PMNUM:	AC-OPSC2			
		IONTHLY WELL INS	SPECTIONS - C	REW TW	C		
REMARKS: INS	PECTI	ON COMPLETE, NO	SUBSTANDAR	D CONDI	TIONS		
TARGE	T STAF	RT DATE: 1/1/2014		ROU	TE NUMBER:		
TARG		IP DATE: 1/31/2014			STATUS:	COMP	
		E START:			UESTED BY:		
SCH	EDULE	FINISH:			EPORT DATE: VITY CLASS:	10/18/2013	
AS	SET #	:					
ASSET DESCR	PTION	1:					
LOCAT	ON IC	AC-WEST FIELD					
LOC. DESCR	PTION	: WEST FIELD					
PHYSICAL LOC	ATION	1:					
RESPONS		SUPERVISOR / OW	<u>'NER</u>		YPE	<u>PRIORITY</u>	ACCOUNT INFO
		PERTNS /		PM		3	832.020 C7
DATE STAR	ED: 0	1/20/2014	DATE COM	IPLETED:	01/20/201	4	
EST. Labor HR	: 0	.00	<u>Labor Cod</u> <u>Craft</u>	e∕ Q	<u>uantity</u>	Planned Hour	<u>S</u>
ACT. Labor HR	5: 4	.00	OPERATI	J	1	0.00	
ACTUALS POST	<u>D:</u>	LABORCODE	CRAF	T	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
	С	MARTIN	STATECH		4.00	0.00	01/20/2014
JOB PLAN NUMBE	R:	AC-OPS					
JOB PLAN DESCR	PTIO	N: MONTHLY WEL	L INSPECTION	IS			
JOB OPERATIONS	:						
10 WELL C	ELLAR	S SHALL BE COVE	RED AND KEP	L DRAINE	D		
CELLAF	S SHO	OULD BE PROTECT	ED FROM AS M	UCH RUN	IOFF WATEF	R AS PRACTIC	AL.
		FLOORING SHALL	_			N	
		TION SO AS TO E	XCLUDE PEOPL	e and an	NIMALS.		
30 CHECK							
40 CHECK							
50 REMOV							
60 CHECK	FOR L	EAKS					
70 MAKE S	URE V	VELL HAS PROPER	SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSION	N WORK ORDER	SEU	WORKORDER
WORK ORDEF PARENT WO	R #: <b>5393370</b>	PMNUM: A	C-OPSC2	
	ON: MONTHLY WELL INSPEC	CTIONS - CREW TWO		
C-OPS Operation	ns 10-20 on the following eq	uipment:		
-26				
P-26A				
-20A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				
		000 / 204		

11/2/2019	GAS TRANSMISSION W	ORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WC	R #: <b>5393370</b>	PMNUM: AC	C-OPSC2	
	ON: MONTHLY WELL INSPECTIO	NS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5393370	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMIS	SION WORK ORD	ER <b>S</b>	EU WO	RKORDER
WORK ORDER #		PM	INUM: AC-OPS	5C2	
PARENT WO #					
DESCRIPTION	: MONTHLY WELL INS	SPECTIONS - CRE	W TWO		
REMARKS: MAXIM	0 #5494201				
TARGET S	TART DATE: 2/1/2014		ROUTE NUME	BER:	
	COMP DATE: 2/28/2014			US: COMP	
	ULE START:		-	BY: BAGATES	
SCHEDU	JLE FINISH:	P	M ACTIVITY CLA	ATE: 11/15/2013	
ASSE					
ASSET DESCRIPTI					
	ID: AC-WEST FIELD				
LOC. DESCRIPTI PHYSICAL LOCATI					
<u>RESPONSIBI</u>	<u>E SUPERVISOR / OW</u> OPERTNS /	<u>INER V</u>	<u>/ORK TYPE</u> PM	<u>PRIORITY</u> 3	ACCOUNT INFO 832.020 C7
					032.020 C7
	: 02/26/2014	DATE COMPL	ETED: 02/26/2	2014	
EST. Labor HRS:	0.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	<u>Planned Hou</u>	<u>Irs</u>
ACT. Labor HRS:	3.50	OPERATN	1	0.00	
ACTUALS POSTED:	LABORCODE	<u>CRAFT</u>	REG. H	IRS OVERTIM	<u>WORKDATE</u>
	RSBARRA	OPERATN	3.50	0.00	02/26/2014
JOB PLAN NUMBER:	AC-OPS				
JOB PLAN DESCRIPT	ION: MONTHLY WEL	L INSPECTIONS			
JOB OPERATIONS:					
	ARS SHALL BE COVE				
	SHOULD BE PROTECTI				CAL.
	OR FLOORING SHALL	-			
	NDITION SO AS TO E	XCLUDE PEOPLE A	AND ANIMALS.		
40 CHECK PLA					
50 REMOVE W	_				
60 CHECK FO	R LEAKS				
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE			
COMMENTS:					

11/2/2019	GAS TRANSMISSIO	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following e			
P-26	-			
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	K ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #		PMNUM: AC-	OPSC2	
	N: MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5413488	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTION	IS - CREW TWO

SS-3

11/2/2019	GAS TRANSMISS	SION WORK OF	RDER	SEU	WOR	KORDER
WORK ORDER #	: 5461460		PMNUM: AC-	-OPSC2		
PARENT WO #						
DESCRIPTION	MONTHLY WELL INS	PECTIONS - C	REW TWO			
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDITIO	NS		
	TART DATE: 3/1/2014		ROUTE N	NUMBER:		
	OMP DATE: 3/31/2014			STATUS: (		
	JLE START: JLE FINISH:		-	STED BY: E RT DATE: 1		
SCIEDO	ILL I INISH.				1/0/2014	
ASSET	- #.		-			
ASSET DESCRIPTI						
	ID: AC-WEST FIELD					
LOC. DESCRIPTI						
PHYSICAL LOCATI	ON:					
<b>RESPONSIBL</b>	E SUPERVISOR / OW	<u>NER</u>	WORK TYPE	<u> </u>	<u>RIORITY</u>	ACCOUNT INFO
	OPERTNS /		PM		3	832.020 C7
DATE STARTED	03/27/2014	DATE COM	PLETED: 03/	27/2014		
EST. Labor HRS:	0.00	<u>Labor Code</u> <u>Craft</u>	e/ Quan	<u>tity F</u>	Planned Hours	<u>5</u>
ACT. Labor HRS:	3.00	OPERATN	1		0.00	
ACTUALS POSTED:	LABORCODE	<u>CRAF</u>	<u>t re</u>	<u>G. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
	CMARTIN	STATECH		3.00	0.00	03/27/2014
JOB PLAN NUMBER:	AC-OPS					
JOB PLAN DESCRIPT	ION: MONTHLY WEL	L INSPECTION	S			
JOB OPERATIONS:						
	ARS SHALL BE COVER					
	HOULD BE PROTECTE					AL.
	OR FLOORING SHALL					
	IDITION SO AS TO EX	CLUDE PEOPL	E AND ANIM	ALS.		
30 CHECK RAI						
40 CHECK PLA	-					
50 REMOVE W	-					
60 CHECK FOR	_					
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO DESCRIPTIO		PMNUM: <b>A</b>	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #:		PMNUM: AC-	OPSC2	
DESCRIPTION:	MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: <b>5461460</b>	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
WORK	CORDER #	: 5468834		PMNUM: AC-	-OPSC2		
PAR	ENT WO #	:					
DES	SCRIPTION	: MONTHLY WELL INS	PECTIONS - C	REW TWO			
REMARK	S: INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDITIO	NS		
	TARGET S	TART DATE: 4/1/2014		ROUTE N	NUMBER:		
		COMP DATE: 4/30/2014			STATUS: (		
		ULE START:		-	STED BY: I		
	SCHEDU	JLE FINISH:		PM ACTIVITY		1/26/2014	
				TH ACTIVITY	CLASS.		
	ASSE						
	DESCRIPTI						
		ID: AC-WEST FIELD ON: WEST FIELD					
	AL LOCATI						
		E SUPERVISOR / OW		WORK TYPE	: c	RIORITY	ACCOUNT INFO
<u>IXI</u>		OPERTNS /		PM	<u> </u>	3	832.020 C7
DATE	STARTED	: 04/29/2014	DATE COM		29/2014	-	
	bor HRS:		<u>Labor Cod</u> Craft			Planned Hours	<u>S</u>
ACT. La	bor HRS:	3.00	OPERATI	I 1		0.00	
ACTUALS	5 POSTED:	LABORCODE	CRAF	<u>T Re</u>	<u>G. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
		TP3JKR	STATECH		3.00	0.00	04/29/2014
JOB PLAN	NUMBER:	AC-OPS					
JOB PLAN	DESCRIPT	ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPER	ATIONS:						
10	WELL CELL	ARS SHALL BE COVER	RED AND KEPT	DRAINED			
	CELLARS S	HOULD BE PROTECTE	ED FROM AS M	UCH RUNOFF	WATER	AS PRACTICA	AL.
-		OR FLOORING SHALL	_			l	
		NDITION SO AS TO EX	CLUDE PEOPL	E AND ANIMA	ALS.		
	CHECK RAI						
40	CHECK PLA	ATFORM					
50	REMOVE W	/EEDS					
60	CHECK FO	R LEAKS					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENT	S:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WO	RK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: AC	C-OPSC2	
DESCRIPTIO	N: MONTHLY WELL INSPECTION	S - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: **5468834** PMNUM: **AC-OPSC2** PARENT WO #: DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO

SS-44B

SS-3

11/2/2019	9	GAS TRANSMISS	SION WORK C	RDER	SEU	WOR	KORDER
PA	RENT WO #			PMNUM: A	C-OPSC2		
		TION COMPLETE, NO			ONS		
	TARGET S TARGET C SCHED	TART DATE: 5/1/2014 COMP DATE: 5/31/2014 ULE START: JLE FINISH:		ROUTE	E NUMBER: STATUS: ESTED BY: DRT DATE:	BAGATES	
LOC. PHYSI	DESCRIPTI CAL LOCATI	ON: ID: AC-WEST FIELD ON: WEST FIELD	NER	<u>WORK TY</u>	<u>2E F</u>	<u>PRIORITY</u> 3	ACCOUNT INFO 832.020 C7
DAT	E STARTED	: 05/21/2014	DATE COI		5/21/2014	-	
EST. L	abor HRS:	0.00	Labor Coc Craft	<u>le/ Qua</u>	<u>intity</u> <u>I</u>	Planned Hours	2
ACT. L	abor HRS:	6.00	OPERAT	N	1	0.00	
<u>ACTUAL</u>	<u>S POSTED:</u>	LABORCODE JCOX RSBARRA	<u>CRA</u> STATECH OPERATN	<u>FT I</u>	REG. HRS 3.00 3.00	<u>OVERTIME</u> 0.00 0.00	<u>WORKDATE</u> 05/21/2014 05/21/2014
		AC-OPS ION: MONTHLY WEL	L INSPECTIO	NS			
JOB OPE	RATIONS:						
10 20	CELLARS S GRATING (	ARS SHALL BE COVE HOULD BE PROTECTE OR FLOORING SHALL NDITION SO AS TO E	ED FROM AS N BE INSTALLE	UCH RUNO	FF WATER TAINED IN		۱L.
30	CHECK RAI				17 LO.		
40	CHECK PLA	ATFORM					
50	REMOVE W	/EEDS					
60	CHECK FO	R LEAKS					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMEN	TS:						

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER			AC-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #:		PMNUM: AC-	OPSC2	
DESCRIPTION:	MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: **5489566** PMNUM: **AC-OPSC2** PARENT WO #: DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO

SS-44B

SS-3

11/2/2019	)	GAS TRANSMISS	SION WORK O	RDER	SEU	WOR	KORDER
WOR	K ORDER #	: 5511820		PMNUM:	AC-OPSC2		
PAF	RENT WO #	:					
DE	SCRIPTION	: MONTHLY WELL INS	PECTIONS - C	REW TWO			
REMAR	KS: INSPEC	TION COMPLETE, NO	SUBSTANDAR	RD CONDIT	IONS		
	TARGET S	TART DATE: 6/1/2014		ROUT	E NUMBER:		
		COMP DATE: 6/30/2014			STATUS:		
		ULE START:		-	UESTED BY:		
	SCHEDI	JLE FINISH:			PORT DATE: /ITY CLASS:	3/19/2014	
	ACCE	Г. #.		i i i i i i i i i i i i i i i i i i i			
ACCET	ASSE <sup>-</sup> DESCRIPTI						
ASSET		ID: AC-WEST FIELD					
LOC.		ON: WEST FIELD					
	CAL LOCATI						
R	ESPONSIBL	E SUPERVISOR / OW	NER	WORK T	<u>YPE</u>	PRIORITY	ACCOUNT INFO
_		OPERTNS /		PM		3	832.020 C7
DAT	E STARTED	: 06/24/2014	DATE CON	IPLETED:	06/24/2014	ļ	
EST. La	abor HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Qu</u>	lantity	Planned Hour	<u>S</u>
ACT. La	abor HRS:	2.00	OPERATI	N	1	0.00	
<u>ACTUAL</u>	<u>S POSTED:</u>	LABORCODE	CRA	- <u>T</u>	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
		TP3JKR	STATECH		2.00	0.00	06/24/2014
JOB PLAN	NUMBER:	AC-OPS					
JOB PLAN	I DESCRIPT	ION: MONTHLY WEL	L INSPECTION	IS			
JOB OPER	RATIONS:						
10	_	ARS SHALL BE COVER					
		SHOULD BE PROTECTE					AL.
20		OR FLOORING SHALL	-			N	
20	GOOD CON	NDITION SO AS TO EX	CLUDE PEOPL	LE AND AN	IMALS.		
30							
40	CHECK PLA	-					
50	REMOVE W	_					
60	CHECK FO	R LEAKS					
70	MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENT	TS:						

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER
PARENT WC		PMNUM: A	C-OPSC2	
	ON: MONTHLY WELL INSPEC			
	s 10-20 on the following equ	lipment:		
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
F-ZJK				
D 47				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WORK	ORDER	SEU	WORKORDER
WORK ORDER #: PARENT WO #:		PMNUM: AC-	OPSC2	
DESCRIPTION:	MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5511820	PMNUM: AC-OPSC2
PARENT WO #:	

DESCRIPTION: MONTHLY WELL INSPECTIONS - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK O	RDER	SEU	WO	RKORDER
WORK ORDE PARENT W	) #:			_	AC-OPSC2	2	
DESCRIPT	ON: N	MONTHLY WELL INS	SPECTIONS - C	CREW TWO	)		
REMARKS: INS	PECTI	ON COMPLETE, NO	SUBSTANDAR	RD CONDI	TIONS		
TARG	T STA	RT DATE: 7/1/2014		ROU	TE NUMBER:	:	
		MP DATE: 7/31/2014			STATUS		
		E START:			UESTED BY:		
SCr	EDULI	E FINISH:			PORT DATE:		
	OFT	<i>u</i> .					
ASSET DESCR	SET 7						
		C: AC-WEST FIELD					
		N: WEST FIELD					
PHYSICAL LOC							
		SUPERVISOR / OW	/NER	WORK T	YPE	PRIORITY	ACCOUNT INFO
		DPERTNS /		PM		3	832.020 C7
DATE STAR	ED: 0	)7/22/2014	DATE CON	IPLETED:	07/22/201	4	
EST. Labor HR	S: C	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Q</u>	<u>uantity</u>	Planned Hou	<u>rs</u>
ACT. Labor HR	5: 4	ł.00	OPERATI	N	1	0.00	
ACTUALS POST		LABORCODE CMARTIN		T	<u>REG. HRS</u> 4.00		WORKDATE 07/22/2014
JOB PLAN NUMBI	R:	AC-OPS					
JOB PLAN DESCR	ΙΡΤΙΟ	N: MONTHLY WEI	L INSPECTION	IS			
JOB OPERATION	:						
10 WELL 0	ELLAI	RS SHALL BE COVE	RED AND KEP		D		
CELLA	S SH	OULD BE PROTECT	ED FROM AS M	IUCH RUN	OFF WATER	R AS PRACTIC	CAL.
20 GRATII	IG OR	FLOORING SHALL	BE INSTALLED	) and ma	INTAINED I	[N	
		ITION SO AS TO E	XCLUDE PEOPL	E AND AN	IIMALS.		
30 CHECK	RAILI	INGS					
40 CHECK	PLAT	FORM					
50 REMOV	e wei	EDS					
60 CHECK	FOR I	LEAKS					
70 MAKE 9	URE	WELL HAS PROPER	SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSIO	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#:	PMNUM: A	C-OPSC2	
	N: MONTHLY WELL INSPE 10-20 on the following e			
P-26	5			
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WOR	K ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #		PMNUM: AC	-OPSC2	
DESCRIPTION	: MONTHLY WELL INSPECTIONS	- CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5536606	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019 G	SAS TRANSMISSIC	ON WORK OF	RDER	SEU	WOR	KORDER
WORK ORDER #: 5559	9037		PMNUM: A	C-OPSC2		
PARENT WO #:						
DESCRIPTION: MON	THLY WELL INSPE	ECTIONS - C	REW TWO			
REMARKS: INSPECTION (	COMPLETE, NO SU	UBSTANDAR	D CONDITI	ONS		
TARGET START D	ATE: 8/1/2014		ROUTE	NUMBER:		
TARGET COMP D				STATUS:		
SCHEDULE ST			-	ESTED BY:		
SCHEDULE FIN	1150:		PM ACTIVI	ORT DATE: TY CLASS:	5/16/2014	
ASSET #: ASSET DESCRIPTION:						
LOCATION ID: AC	C-WEST FIELD					
LOC. DESCRIPTION: W						
PHYSICAL LOCATION:						
RESPONSIBLE SUP	ERVISOR / OWNE	R	WORK TY	PE F	RIORITY	ACCOUNT INFO
OPER	TNS /		PM		3	832.020 C7
DATE STARTED: 08/25	5/2014	DATE COM	PLETED: 08	8/25/2014		
EST. Labor HRS: 0.00		<u>Labor Code</u> <u>Craft</u>	<u>e/ Qua</u>	antity <u>I</u>	Planned Hour	<u>S</u>
ACT. Labor HRS: 4.00		OPERATN		1	0.00	
ACTUALS POSTED:	LABORCODE	<u>CRAF</u>	<u>T</u>	REG. HRS	<u>OVERTIME</u>	<b>WORKDATE</b>
CMAF	RTIN S	STATECH		4.00	0.00	08/25/2014
JOB PLAN NUMBER:	AC-OPS					
JOB PLAN DESCRIPTION:	MONTHLY WELL	INSPECTION	S			
JOB OPERATIONS:						
	HALL BE COVERE					
	D BE PROTECTED					AL.
	ORING SHALL BE	_			۱	
	N SO AS TO EXCI	LUDE PEOPL	E AND ANI	MALS.		
30 CHECK RAILINGS	-					
40 CHECK PLATFORM						
50 REMOVE WEEDS						
60 CHECK FOR LEAK	Ś					
70 MAKE SURE WELI	L HAS PROPER SI	GNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSIC	N WORK ORDER	SEU	WORKORDER
WORK ORDER 7 PARENT WO 7		PMNUM: A	C-OPSC2	
	10-20 on the following ed			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2		
	». DN: MONTHLY WELL INSPEC	TIONS - CREW TWO			
SS-29					
SS-25					
SS-25A					
22-25B					
22 250					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: 5559037	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS -	CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMISS	SION WORK OR	RDER	SEU	WOR	KORDER
WORK ORDER #	: 5589995		PMNUM: AC	-OPSC2		
PARENT WO #						
DESCRIPTION	: MONTHLY WELL INS	SPECTIONS - CI	REW TWO			
REMARKS: INSPEC	TION COMPLETE, NO	SUBSTANDARI	D CONDITIO	NS		
TARGET ST	TART DATE: 9/1/2014		ROUTE N	NUMBER:		
	COMP DATE: 9/30/2014			STATUS: (		
	ULE START:		-	STED BY: I		
SCHEDU	JLE FINISH:				5/25/2014	
	<b>F</b> # .		TH ACTIVIT	I CLASS.		
ASSET DESCRIPTI						
	ID: AC-WEST FIELD					
LOC. DESCRIPTI						
PHYSICAL LOCATI						
RESPONSIBL	E SUPERVISOR / OW	NER	WORK TYPE	E P	RIORITY	ACCOUNT INFO
	OPERTNS /		PM		3	832.020 C7
DATE STARTED	: 09/25/2014	DATE COM	PLETED: 09/	/25/2014		
EST. Labor HRS:	0.00	<u>Labor Code</u> <u>Craft</u>	e/ Quan	i <u>tity</u> F	Planned Hours	<u>s</u>
ACT. Labor HRS:	3.50	OPERATN	1		0.00	
ACTUALS POSTED:	LABORCODE	CRAF	<u>T RE</u>	<u>EG. HRS</u>	<u>OVERTIME</u>	<b>WORKDATE</b>
	RSBARRA	OPERATN		3.50	0.00	09/25/2014
JOB PLAN NUMBER:	AC-OPS					
JOB PLAN DESCRIPT	ION: MONTHLY WEL	L INSPECTION	S			
JOB OPERATIONS:						
10 WELL CELL	ARS SHALL BE COVE	RED AND KEPT	DRAINED			
	HOULD BE PROTECTE					AL.
	DR FLOORING SHALL	-			l	
	IDITION SO AS TO EX	CLUDE PEOPLE	E AND ANIM	ALS.		
30 CHECK RAI						
40 CHECK PLA						
50 REMOVE W						
60 CHECK FOR	R LEAKS					
70 MAKE SUR	E WELL HAS PROPER	SIGNAGE				
COMMENTS:						

11/2/2019	GAS TRANSMISSION	N WORK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #	:	PMNUM: A	C-OPSC2	
	I: MONTHLY WELL INSPEC			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION	WORK ORDER	SEU	WORKORDER	
	R #: 5589995	PMNUM: A	C-OPSC2		
PARENT WC	) #: ON: MONTHLY WELL INSPEC <sup>-</sup>	TIONS - CREW TWO			
66.20					
SS-29					
SS-25					
SS-25A					
22-25B					
CC 1					
SS-1					
SS-1-0					
SS-6					
SS-8					
SS-5					
SS-31					
SS-44					
SS-44A					

WORK ORDER #: 5589995	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	5 - CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK O	RDER	SEU	WOR	KORDER
WORK ORE		: <b>5614603</b>		PMNUM:	AC-OPSC2		
		: MONTHLY WELL INS	SPECTIONS - C	REW TWO	)		
REMARKS: IN	ISPEC	TION COMPLETE, NO	) SUBSTANDAR	D CONDIT	IONS		
TAR	GET S	TART DATE: 10/1/2014		ROUT	TE NUMBER:		
		COMP DATE: 10/31/201	4		STATUS:		
-	-	ULE START:		-	UESTED BY:		
5	CHEDU	JLE FINISH:			PORT DATE: /ITY CLASS:	//25/2014	
	ASSE	Γ#:					
ASSET DESC	RIPTI	ON:					
		ID: AC-WEST FIELD					
		ON: WEST FIELD					
PHYSICAL LC	DCATI	ON:					
RESPO	NSIBL	E SUPERVISOR / OW	<u>/NER</u>		YPE	PRIORITY	
		OPERTNS /		PM		3	832.020 C7
DATE STA	RTED	: 10/21/2014	DATE COM	IPLETED:	10/21/2014	1	
EST. Labor H	IRS:	0.00	<u>Labor Code</u> <u>Craft</u>	<u>e/ Qu</u>	<u>uantity</u>	Planned Hour	<u>S</u>
ACT. Labor H	IRS:	4.00	OPERATI	l	1	0.00	
ACTUALS POS	STED:	LABORCODE	CRAF	Τ	REG. HRS	<u>OVERTIME</u>	WORKDATE
		CMARTIN	STATECH		4.00	0.00	10/21/2014
JOB PLAN NUM	BER:	AC-OPS					
JOB PLAN DESC	CRIPT	ION: MONTHLY WE	LL INSPECTION	S			
JOB OPERATIO	NS:						
10 WELL	CELL	ARS SHALL BE COVE	RED AND KEPT		)		
_		HOULD BE PROTECT			-		AL.
	_	OR FLOORING SHALL	_			N	
		NDITION SO AS TO E	XCLUDE PEOPL	E AND AN	IMALS.		
		ILINGS					
		ATFORM					
		/EEDS					
60 CHEC	CK FO	R LEAKS					
70 MAKE	E SUR	E WELL HAS PROPER	SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSIO	N WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO		PMNUM: A	C-OPSC2	
	10-20 on the following eq			
P-26				
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WOR	K ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #	ŧ:	PMNUM: AC	C-OPSC2	
DESCRIPTION	I: MONTHLY WELL INSPECTIONS	S - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5614603	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS	- CREW TWO

SS-44B

SS-3

11/2/2019		GAS TRANSMIS	SION WORK O	RDER	SEU	WOR	KORDER
		5642862		PMNUM:	AC-OPSC2		
	T WO #						
DESCR	IPTION	MONTHLY WELL INS	SPECTIONS - C	REW TWC	)		
REMARKS:	INSPEC	TION COMPLETE, NO	SUBSTANDAR	D CONDI	TIONS		
		TART DATE: 11/1/2014		ROU	TE NUMBER:		
T		OMP DATE: 11/30/201	4	550	STATUS:		
		JLE START: JLE FINISH:		-	UESTED BY: PORT DATE:		
	SCHEDU	ILL I INISII.			VITY CLASS:		
	ASSET	- #.		_			
ASSET DES							
		ID: AC-WEST FIELD					
		ON: WEST FIELD					
PHYSICAL I	LOCATI	ON:					
RESP	ONSIBL	E SUPERVISOR / OW	<u>/NER</u>	WORK T	YPE	PRIORITY	ACCOUNT INFO
		OPERTNS /		PM		3	832.020 C7
DATE ST	ARTED:	11/24/2014	DATE COM	IPLETED:	11/24/2014	4	
EST. Labor	HRS:	0.00	<u>Labor Cod</u> <u>Craft</u>	<u>e/ Q</u>	<u>uantity</u>	Planned Hour	<u>S</u>
ACT. Labor	HRS:	2.00	OPERATI	J	1	0.00	
ACTUALS PC	OSTED:	<b>LABORCODE</b>	CRAF	T	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
		CMARTIN	STATECH		2.00	0.00	11/24/2014
JOB PLAN NU	MBER:	AC-OPS					
JOB PLAN DES	SCRIPTI	ON: MONTHLY WE	L INSPECTION	IS			
JOB OPERATI	ONS:						
-	-	ARS SHALL BE COVE					
_		HOULD BE PROTECT			-		AL.
		OR FLOORING SHALL	_			N	
	ECK RAI	IDITION SO AS TO E	ACLUDE PEOPL	E AND AN	IIMALS.		
	MOVE W						
		R LEAKS	CICNACC				
	KE SURI	E WELL HAS PROPER	SIGNAGE				
COMMENTS:							

11/2/2019	GAS TRANSMISSIO	ON WORK ORDER	SEU	WORKORDER
WORK ORDER PARENT WO	#:	PMNUM: A		
	N: MONTHLY WELL INSPE 10-20 on the following e			
P-26	5			
P-26A				
P-26B				
P-26C				
P-26D				
P-26E				
P-25R				
P-47				
P-39				
P-38				
PS-42				
P-40				
SS-9				

11/2/2019	GAS TRANSMISSION WO	ORK ORDER	SEU	WORKORDER
WORK ORDER # PARENT WO #	<b>#:</b>	PMNUM: AC	C-OPSC2	
DESCRIPTION	N: MONTHLY WELL INSPECTION	NS - CREW TWO		
SS-29				
SS-25				
SS-25A				
22-25B				
SS-1				
SS-1-0				
SS-6				
SS-8				
SS-5				
SS-31				
SS-44				
SS-44A				

WORK ORDER #: 5642862	PMNUM: AC-OPSC2
PARENT WO #:	
DESCRIPTION: MONTHLY WELL INSPECTIONS -	CREW TWO

SS-44B

SS-3

11/2/2019	GAS TRANSMIS	SION WORK ORDER	DOG	WOR	KORDER
WORK ORDER :	#: 5705182	PMN	JM: ACOPSC2		
PARENT WO	#:				
DESCRIPTIO	N: AB1960 MONTHLY	WELL INSPECTIONS	CREW TWO		
REMARKS: INSPE	CTION COMPLETE, NO	) SUBSTANDARD CO	NDITIONS		
TARGET	START DATE: 12/1/2014		ROUTE NUMBER:		
TARGET	COMP DATE: 12/31/201	4	STATUS: 0	COMP	
SCHE	DULE START:		REQUESTED BY: I	MAXADMIN	
SCHED	OULE FINISH:		REPORT DATE:	12/15/2014	
		PM /	ACTIVITY CLASS: I	ENVIRONMENT	AL
ASSE	ET #:				
ASSET DESCRIPT	TON:				
LOCATIO	N ID: AC-WEST FIELD				
LOC. DESCRIPT	TON: WEST FIELD				
PHYSICAL LOCAT	TON:				
RESPONSIE	BLE SUPERVISOR / OW	/NFR WO	RK TYPE P	RIORITY	ACCOUNT INFO
	OPERTNS /		PM+	3	832.020 C7
DATE STARTE	D: 12/18/2014	DATE COMPLET	ED: 12/18/2014		
EST. Labor HRS:	4.00	<u>Labor Code/</u> <u>Craft</u>	Quantity F	Planned Hours	2
ACT. Labor HRS:	4.00				
ACTUALS POSTED	: LABORCODE	<u>CRAFT</u>	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
	CMARTIN	STATECH	4.00	0.00	12/18/2014
JOB PLAN NUMBER	AB1960-M-WE	ELLS			
JOB PLAN DESCRIP	TION: AB1960 MONT	THLY PRODUCTION F	ACILITY/WELL II	NSPECTIONS	
JOB OPERATIONS:					
10 Inspect w	ells as follows:				
a. Verify t grating, v applicable remove it	that appropriate signa rerify that floor or grat e. c. Verify that well ce using a vacuum truck lls are safe and passal	ing is in good condit ellars are free of star or pump it to an ap	ion so as to excl nding liquids. If li propriate locatio	ude people ar quid is preser n. d. Verify th	nd animals, as nt in any cellar, nat roads leading

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

debris.

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

Asset: Lat:	PORTER 26 PORTER 26	Long -118.557236209
Asset:	18944	
Lat:	PORTER 26A PORTER 26A 34.315713631	Long -118.557349347
Asset:	18946 PORTER 26B PORTER 26B	
Lat:	34.315724662	Long -118.557307117
Asset:	PORTER 26C (IDLE) PORTER 26C	
Lat:		Long -118.557258718
Asset: Lat:	PORTER 26D PORTER 26D	<b>Long</b> -118.557172184
	18948	<b>J</b>
Lat:	PORTER 26E PORTER 26E 34.315778247	Long -118.557109736
Asset: Lat:	18942 PORTER 25R PORTER 25R 34.316770589	<b>Long</b> -118.561246731
Asset: Lat:	PORTER 47 PORTER 47	<b>Long</b> -118.56016589
Asset:		
Lat:	PORTER 39 PORTER 39 34.312449281	Long -118.560033469
Asset:	18961 PORTER 38 PORTER 38	
Lat:	34.312459627	Long -118.56107517
Asset: Lat:	18981 PORTER SESNON 42 PORTER SESNON 42 34.311060976	<b>Long</b> -118.562464735

11/2/2019
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PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	F L		1 JOD OF LIKATIONS ON
Asset:	PORTER 40 PORTER 40		
Lat:	34.310028595		<b>Long</b> -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292		Long -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	29	
Lat:	34.315286146		<b>Long</b> -118.56650612
Asset: Lat:	18996 STANDARD SESNON 2 STANDARD SESNON 2 34.315091725	25	<b>Long</b> -118.564071354
<b>.</b> .	40007		-
Asset: Lat:	STANDARD SESNON STANDARD SESNON 34.315067769	25A	<b>Long</b> -118.564141408
Asset:	18008		
Lat:	STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	25B	<b>Long</b> -118.564146337
Asset: Lat:	19008 STANDARD SESNON STANDARD SESNON 34.318261511	1	) <b>Long</b> -118.564493399
A 4-	10000		
Asset: Lat:	STANDARD SESNON STANDARD SESNON 34.318304246	1-0	<b>Long</b> -118.564565996
Asset:	18988 STANDARD SESNON ( STANDARD SESNON (		
Lat:	34.314090303		Long -118.570090299
Asset:	18990 STANDARD SESNON 3 STANDARD SESNON 3	. ,	
Lat:	34.313254552		Long -118.568351168
Asset:	STANDARD SESNON		-
Lat:	STANDARD SESNON 34.313829368		Long -118.566441739

11	/2/20	)19
	/ 2/ 20	111

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

# PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019	GAS TRANSMIS	SION WORK ORDE	R DOG	WOR	KORDER
WORK ORDER	#: 5705187	PM	NUM: ACOPSC2		
PARENT WO	#:				
DESCRIPTIO	N: AB1960 MONTHLY	WELL INSPECTION	S CREW TWO		
REMARKS: INSPE	CTION COMPLETE, NO	D SUBSTANDARD C	ONDITIONS		
TARGET	START DATE: 1/1/2015		ROUTE NUMBER:		
TARGET	COMP DATE: 1/31/2015	5	STATUS:	COMP	
SCHE	DULE START:		REQUESTED BY:	MAXADMIN	
SCHEI	DULE FINISH:		REPORT DATE:		
		PN	ACTIVITY CLASS:	ENVIRONMENT	AL
ASS	ET #:				
ASSET DESCRIPT	FION:				
LOCATIO	N ID: AC-WEST FIELD				
LOC. DESCRIPT	TION: WEST FIELD				
PHYSICAL LOCAT	FION:				
RESPONSI	BLE SUPERVISOR / OV	VNER W	ORK TYPE	PRIORITY	ACCOUNT INFO
	OPERTNS /		PM+	3	832.020 C7
DATE STARTE	D: 01/28/2015	DATE COMPLE	TED: 01/28/2015	)	
EST. Labor HRS:	4.00	<u>Labor Code/</u> <u>Craft</u>	Quantity	Planned Hours	5
ACT. Labor HRS:	4.00				
ACTUALS POSTED	LABORCODE	<u>CRAFT</u>	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
	CMARTIN	STATECH	4.00	0.00	01/28/2015
JOB PLAN NUMBER	: AB1960-M-W	ELLS			
JOB PLAN DESCRIP	TION: AB1960 MON	THLY PRODUCTION	FACILITY/WELL I	NSPECTIONS	
JOB OPERATIONS:					
	ells as follows:				
grating, v applicable remove it	that appropriate signa verify that floor or gra e. c. Verify that well co cusing a vacuum truck Ils are safe and passa	ting is in good conc ellars are free of sta k or pump it to an a	lition so as to exc anding liquids. If l appropriate locatio	lude people an iquid is prese on. d. Verify t	nd animals, as nt in any cellar, hat roads leading

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

debris.

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

Asset: Lat:	18943 PORTER 26 PORTER 26 34.315809376	Long -118.557236209
	18944	
Lat:	PORTER 26A PORTER 26A	Long -118.557349347
Asset:	18946 PORTER 26B PORTER 26B	
Lat:	34.315724662	Long -118.557307117
Asset: Lat:	19006 PORTER 26C (IDLE) PORTER 26C 34.315740508	Long -118.557258718
	18947	Long 110.557250710
	PORTER 26D PORTER 26D 34.315760302	Long -118.557172184
Asset: Lat:	18948 PORTER 26E PORTER 26E 34.315778247	<b>Long</b> -118.557109736
	18942 PORTER 25R PORTER 25R 34.316770589	<b>Long</b> -118.561246731
Asset: Lat:	18970 PORTER 47 PORTER 47 34.31376686	<b>Long</b> -118.56016589
	18962 PORTER 39 PORTER 39	
Lat: Asset:	34.312449281 18961 PORTER 38 PORTER 38	<b>Long</b> -118.560033469
Lat:	34.312459627	Long -118.56107517
Asset: Lat:	18981 PORTER SESNON 42 PORTER SESNON 42 34.311060976	<b>Long</b> -118.562464735

11/2/2019
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PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	FL		I JOB OPERATIONS ON
Asset:	18963 PORTER 40 PORTER 40		
Lat:	34.310028595		<b>Long</b> -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292		Long -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	29	
Lat:	34.315286146		<b>Long</b> -118.56650612
Asset: Lat:	18996 STANDARD SESNON 3 STANDARD SESNON 3 34.315091725	25	<b>Long</b> -118.564071354
		I	Long 110.3040/1334
Asset: Lat:	18997 STANDARD SESNON 2 STANDARD SESNON 2 34.315067769	25A	Long -118.564141408
			<b>J</b>
Asset: Lat:	STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	25B	Long -118.564146337
Asset: Lat:	19008 STANDARD SESNON STANDARD SESNON 34.318261511	1	) <b>Long</b> -118.564493399
Asset: Lat:	19009 STANDARD SESNON STANDARD SESNON 34.318304246	1-0	<b>Long</b> -118.564565996
Asset:	18988 STANDARD SESNON (	c	
Lat:	STANDARD SESNON ( STANDARD SESNON ( 34.314090303	6	Long -118.570090299
Asset:	STANDARD SESNON	8	
Lat:	34.313254552		<b>Long</b> -118.568351168
Asset: Lat:	18987 STANDARD SESNON STANDARD SESNON 34.313829368	5	<b>Long</b> -118.566441739

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

# PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019	GAS TRANSMIS	SION WORK ORDER	DOG	WOR	KORDER
WORK ORDER #	#: 5727612	PMN	UM: ACOPSC2		
PARENT WO #	#:				
DESCRIPTION	N: AB1960 MONTHLY	WELL INSPECTIONS	CREW TWO		
REMARKS: INSPE	CTION COMPLETE, NO	SUBSTANDARD CO	NDITIONS		
TARGET S	START DATE: 2/1/2015		ROUTE NUMBER:		
TARGET	COMP DATE: 2/28/2015		STATUS:	СОМР	
SCHE	DULE START:		REQUESTED BY:	MAXADMIN	
SCHED	OULE FINISH:		REPORT DATE:		
		PM	ACTIVITY CLASS:	ENVIRONMENT	AL
ASSE	ET #:				
ASSET DESCRIPT	TON:				
LOCATION	N ID: AC-WEST FIELD				
LOC. DESCRIPT	ION: WEST FIELD				
PHYSICAL LOCAT	TON:				
RESPONSIB	BLE SUPERVISOR / OW	/NER WO	RK TYPE F	PRIORITY	ACCOUNT INFO
	OPERTNS /		PM+	3	832.020 C7
DATE STARTED	02/16/2015	DATE COMPLET	ED: 02/16/2015		
EST. Labor HRS:	4.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hours	2
ACT. Labor HRS:	4.00				
ACTUALS POSTED	: LABORCODE	<u>CRAFT</u>	<u>REG. HRS</u>	<u>OVERTIME</u>	<u>WORKDATE</u>
	JBANALES	STATECH	4.00	0.00	02/16/2015
JOB PLAN NUMBER:	AB1960-M-WE	ELLS			
JOB PLAN DESCRIP	TION: AB1960 MONT	HLY PRODUCTION	ACILITY/WELL I	NSPECTIONS	
JOB OPERATIONS:					
10 Inspect w	ells as follows:				
grating, v applicable remove it	that appropriate signaterify that floor or graterify that floor or graterify that well certaining a vacuum truck lls are safe and passal	ing is in good condi ellars are free of sta c or pump it to an a	tion so as to excl nding liquids. If li opropriate locatio	ude people ar iquid is preser on. d. Verify th	nd animals, as nt in any cellar, nat roads leading

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

debris.

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

Asset: Lat:	18943 PORTER 26 PORTER 26 34.315809376	Long -118.557236209
	18944	
Lat:	PORTER 26A PORTER 26A	Long -118.557349347
	18946	Long 110.557545547
Lat:	PORTER 26B PORTER 26B	Long -118.557307117
Asset:		
ASSEL.	PORTER 26C (IDLE)	
Lat:	PORTER 26C 34.315740508	Long -118.557258718
Asset:		
	PORTER 26D PORTER 26D	
Lat:	34.315760302	Long -118.557172184
Asset: Lat:	PORTER 26E PORTER 26E	Long -118.557109736
		Long -118.557109750
Asset: Lat:	18942 PORTER 25R PORTER 25R 34.316770589	Long -118.561246731
Asset:	18970	
	PORTER 47 PORTER 47	
Lat:	34.31376686	Long -118.56016589
Asset:	PORTER 39	
Lat:	PORTER 39 34.312449281	Long -118.560033469
Asset:	PORTER 38	
Lat:	PORTER 38 34.312459627	Long -118.56107517
Asset: Lat:	18981 PORTER SESNON 42 PORTER SESNON 42 34.311060976	<b>Long</b> -118.562464735
	5.1511000570	g 110.002404700

11/2/2019
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PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	PL		I JOB OPERATIONS ON
Asset:	18963 PORTER 40 PORTER 40		
Lat:	34.310028595	L	<b>.ong</b> -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292		<b>.ong</b> -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	29	
Lat:	34.315286146	L	<b>.ong</b> -118.56650612
Asset: Lat:	STANDARD SESNON 2 STANDARD SESNON 2	25	<b>.ong</b> -118.564071354
		-	ong 110.5010/1551
Asset: Lat:	18997 STANDARD SESNON 2 STANDARD SESNON 2 34.315067769	25A	<b>.ong</b> -118.564141408
			5
Asset: Lat:	STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	25B	<b>.ong</b> -118.564146337
Asset: Lat:	19008 STANDARD SESNON : STANDARD SESNON : 34.318261511	1	<b>.ong</b> -118.564493399
Asset: Lat:	19009 STANDARD SESNON : STANDARD SESNON : 34.318304246	1-0	<b>.ong</b> -118.564565996
Asset:		c	
Lat:	STANDARD SESNON ( STANDARD SESNON ( 34.314090303	6	<b>.ong</b> -118.570090299
Asset:	18990 STANDARD SESNON 8 STANDARD SESNON 8 34.313254552	8	and 110 E602E1160
Lat:	J4.J1J2J4JJ2	L	<b>.ong</b> -118.568351168
Asset: Lat:	18987 STANDARD SESNON S STANDARD SESNON S 34.313829368	5	<b>.ong</b> -118.566441739

11	/2/20	)19
	/ 2/ 20	J T J

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

# PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/201	9	GAS TRANSMIS	SION WORK ORDE	R DOG	WOR	KORDER
PA	RK ORDER #: RENT WO #: ESCRIPTION:			NUM: <b>ACOPSC2</b> S CREW TWO		
REMAR	KS: INSPEC	TION COMPLETE, NO	SUBSTANDARD C	ONDITIONS		
	TARGET C SCHEDU	TART DATE: 4/1/2015 OMP DATE: 4/30/2015 JLE START: ILE FINISH:		ROUTE NUMBER STATUS REQUESTED BY REPORT DATE 4 ACTIVITY CLASS	: COMP : MAXADMIN : 4/15/2015	AL
LOC. PHYSI <u>I</u>	. DESCRIPTIO CAL LOCATIO RESPONSIBL	ON: ID: AC-WEST FIELD ON: WEST FIELD ON: <u>E SUPERVISOR / OW</u> OPERTNS /		PM+	3	<u>ACCOUNT INFO</u> 832.020 C7
	abor HRS:	04/18/2015	Labor Code/			
ACT. L	abor HRS: LS POSTED:	4.00	Craft	<u>Quantity</u> <u>REG. HRS</u> 4.00		_
JOB PLAI	N DESCRIPTI RATIONS: Inspect we	AB1960-M-WE ON: AB1960 MONT Ils as follows: at appropriate signad	HLY PRODUCTION			avisting floor or
20	grating, ver applicable. remove it u to the wells debris.	rify that floor or grat c. Verify that well ce using a vacuum truck are safe and passat	ing is in good cond llars are free of st or pump it to an ole. e. Check for si	lition so as to ex anding liquids. If appropriate locat gns of leakage o	cclude people and f liquid is prese tion. d. Verify t r spills, corrosion	nd animals, as nt in any cellar, hat roads leading

- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

WC	RK ORDER #: 5	778516	PMNUM: ACOPSC2
Р	ARENT WO #:		
[	DESCRIPTION: A	B1960 MONTHLY WELL INSPECT	TONS CREW TWO
		PERFORM JOB OPERATIONS O	N THE FOLLOWING ASSETS:
Asset:	18943 PORTER 26 PORTER 26		
Lat:	34.315809376	Long -118.557236209	
	18944 PORTER 26A PORTER 26A		
Lat:	34.315713631	Long -118.557349347	

11/2/2019

**Asset:** 18946 PORTER 26B PORTER 26B 34.315724662 Long -118.557307117 Lat:

GAS TRANSMISSION WORK ORDER

**Asset:** 19006 PORTER 26C (IDLE) PORTER 26C 34.315740508 Long -118.557258718 Lat:

**Asset:** 18947 PORTER 26D PORTER 26D Lat: 34.315760302 Long -118.557172184

**Asset:** 18948 PORTER 26E PORTER 26E 34.315778247 Long -118.557109736 Lat:

**Asset:** 18942 PORTER 25R PORTER 25R 34.316770589 Long -118.561246731 Lat:

**Asset:** 18970 PORTER 47 PORTER 47 Lat: 34.31376686 Long -118.56016589

**Asset:** 18962 PORTER 39 PORTER 39 34.312449281 Long -118.560033469 Lat: **Asset:** 18961

PORTER 38 PORTER 38 34.312459627 Lat: Long -118.56107517 **Asset:** 18981 PORTER SESNON 42 PORTER SESNON 42 Lat: 34.311060976

Long -118.562464735

DOG

WORKORDER

11/2/2019
-----------

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	F L		1 JOD OF LIKATIONS ON
Asset:	PORTER 40 PORTER 40		
Lat:	34.310028595		<b>Long</b> -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292		Long -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	29	
Lat:	34.315286146		<b>Long</b> -118.56650612
Asset: Lat:	18996 STANDARD SESNON 2 STANDARD SESNON 2 34.315091725	25	<b>Long</b> -118.564071354
<b>.</b> .	40007		-
Asset: Lat:	STANDARD SESNON STANDARD SESNON 34.315067769	25A	<b>Long</b> -118.564141408
Asset:	18008		
Lat:	STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	25B	<b>Long</b> -118.564146337
Asset: Lat:	19008 STANDARD SESNON STANDARD SESNON 34.318261511	1	) <b>Long</b> -118.564493399
A 4-	10000		
Asset: Lat:	STANDARD SESNON STANDARD SESNON 34.318304246	1-0	<b>Long</b> -118.564565996
Asset:	18988 STANDARD SESNON ( STANDARD SESNON (		
Lat:	34.314090303		Long -118.570090299
Asset:	18990 STANDARD SESNON 3 STANDARD SESNON 3	. ,	
Lat:	34.313254552		Long -118.568351168
Asset:	STANDARD SESNON		-
Lat:	STANDARD SESNON 34.313829368		Long -118.566441739

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	/ 2/ 20	J T J

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

# PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019		GAS TRANSMIS	SION WORK ORE	DER DOG	WOR	KORDER		
WORK	ORDER #	: 5799684	Р	MNUM: ACOPSC2				
PARENT WO #:								
DES	CRIPTION	AB1960 MONTHLY	WELL INSPECTIO	NS CREW TWO				
REMARKS: INSPECTION COMPLETE, NO SUBSTANDARD CONDITIONS								
	TARGET ST	TART DATE: 5/1/2015		ROUTE NUMBER	.:			
	TARGET C	OMP DATE: 5/31/2015		STATUS: COMP				
		ULE START:		REQUESTED BY				
	SCHEDU	JLE FINISH:		REPORT DATE				
				PM ACTIVITY CLASS	: ENVIRONMENT	AL		
	ASSET	r #:						
ASSET I	DESCRIPTI	ON:						
	LOCATION	ID: AC-WEST FIELD						
LOC. I	DESCRIPTI	ON: WEST FIELD						
PHYSIC	AL LOCATI	ON:						
RE	SPONSIBL	E SUPERVISOR / OW	<u>/NER</u>	WORK TYPE	PRIORITY	ACCOUNT INFO		
		OPERTNS /		PM+	3	832.020 C7		
DATE	STARTED:	: 05/17/2015	DATE COMP	LETED: 05/17/201	.5			
EST. Lal	oor HRS:	4.00	<u>Labor Code/</u> <u>Craft</u>	Quantity	Planned Hours	<u>S</u>		
ACT. La	bor HRS:	4.00						
ACTUALS	POSTED:	LABORCODE	<u>CRAFT</u>	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>		
		MMCKENZI	STATECH	4.00	0.00	05/17/2015		
JOB PLAN		AB1960-M-WE						
		ION: AB1960 MONT		N FACILITY/WELL	INSPECTIONS			
JOB OPERATIONS:								
10	Inspect we	lls as follows:						
		at appropriate signa						
		rify that floor or grat c. Verify that well ce						
		ising a vacuum truck		5 1				
		s are safe and passal						
	debris.							

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

	PARENT WO #:	
	DESCRIPTION: A	AB1960 MONTHLY WELL INSPECTIONS CREW TWO
		PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:
Asset:	18943	TERIORITION OF ERATIONS ON THE FOLLOWING ASSETS.
A3301.	PORTER 26	
	PORTER 26	
Lat:	34.315809376	Long -118.557236209
Asset:	19044	
Asseli	PORTER 26A	
	PORTER 26A	
Lat:	34.315713631	Long -118.557349347
Asset:		
	PORTER 26B	
	PORTER 26B	
Lat:	34.315724662	Long -118.557307117
Asset:	19006	
	PORTER 26C (ID	LE)
	PORTER 26C	
Lat:	34.315740508	Long -118.557258718
Accoti	18947	
ASSEL.	PORTER 26D	
	PORTER 26D	
Lat:	34.315760302	Long -118.557172184
Luti	54.515700502	Long 110.55/1/2104
Asset:		
	PORTER 26E	
_	PORTER 26E	
Lat:	34.315778247	Long -118.557109736
Asset:	18942	
	PORTER 25R	
	PORTER 25R	
Lat:	34.316770589	Long -118.561246731
Asset:	18970	
	PORTER 47	
	PORTER 47	
Lat:	34.31376686	Long -118.56016589
	10000	-
Asset:		
	PORTER 39 PORTER 39	
Lat:	34.312449281	Long -118.560033469
Lat.	57.512745201	Long - 110.000000-00
Asset:		
	PORTER 38	
	PORTER 38	
1 -+-	JA J1 JAE0677	

Long -118.56107517

Long -118.562464735

GAS TRANSMISSION WORK ORDER

DOG

PMNUM: ACOPSC2

WORKORDER

# 11/2/2019

WORK ORDER #: 5799684

34.312459627

34.311060976

PORTER SESNON 42 PORTER SESNON 42

Lat:

Lat:

**Asset:** 18981

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	F L		1 JOD OF LIKATIONS ON
Asset:	PORTER 40 PORTER 40		
Lat:	34.310028595		Long -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292		Long -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	29	
Lat:	34.315286146		Long -118.56650612
Asset: Lat:	18996 STANDARD SESNON 2 STANDARD SESNON 2 34.315091725	25	<b>Long</b> -118.564071354
_			-
Asset: Lat:	18997 STANDARD SESNON 2 STANDARD SESNON 2 34.315067769	25A	Long -118.564141408
Asset:	10000		
Lat:	STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	25B	Long -118.564146337
Asset:	STANDARD SESNON		)
Lat:	STANDARD SESNON 34.318261511		Long -118.564493399
Asset: Lat:	19009 STANDARD SESNON S STANDARD SESNON S 34.318304246	1-0	<b>Long</b> -118.564565996
A t-	10000		
Asset: Lat:	STANDARD SESNON ( STANDARD SESNON ( 34,314090303	6	Long -118.570090299
Asset:			
Lat:	STANDARD SESNON 8 STANDARD SESNON 8 34.313254552	8	Long -118.568351168
Asset:	STANDARD SESNON STANDARD SESNON	5	Long 110 566441720
Lat:	34.313829368		Long -118.566441739

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	/ 2/ 20	111

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

## PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019		GAS TRANSMISS	SION WORK OR	DER	DOG	WOR	KORDER
PAR	RENT WO #			PMNUM: ACOI			
		: AB1960 MONTHLY V					
REMAR	<s: inspec<="" td=""><td>TION COMPLETE, NO</td><td>SUBSTANDARI</td><td>O CONDITIONS</td><td>5</td><td></td><td></td></s:>	TION COMPLETE, NO	SUBSTANDARI	O CONDITIONS	5		
	TARGET C	TART DATE: 6/1/2015 COMP DATE: 6/30/2015 ULE START: JLE FINISH:		REQUEST	ATUS: C ED BY: N DATE: 6	MAXADMIN 5/15/2015	AL
LOC.		ON: ID: AC-WEST FIELD ON: WEST FIELD					
<u>R</u>	ESPONSIBL	<u>E SUPERVISOR / OW</u> OPERTNS /	<u>NER</u>	WORK TYPE PM+	<u>P</u>	RIORITY 3	ACCOUNT INFO 832.020 C7
DATE	E STARTED	: 06/23/2015	DATE COM	PLETED: 06/2	3/2015		
EST. La	bor HRS:	4.00	<u>Labor Code</u> <u>Craft</u>	<u>/ Quantit</u>	Σy P	Planned Hours	5
ACT. La	bor HRS:	8.00					
ACTUALS	<u>S POSTED:</u>	LABORCODE KJCAMPOS	CRAF STATECH		<u>. HRS</u> .00	OVERTIME 0.00	<u>WORKDATE</u> 06/23/2015
		RSBARRA	OPERATN	4	.00	0.00	06/23/2015
JOB PLAN NUMBER:       AB1960-M-WELLS         JOB PLAN DESCRIPTION:       AB1960 MONTHLY PRODUCTION FACILITY/WELL INSPECTIONS							
	<ul> <li>ERATIONS:</li> <li>Inspect wells as follows:</li> <li>a. Verify that appropriate signage is in place and legible. b. For well cellars with existing floor or grating, verify that floor or grating is in good condition so as to exclude people and animals, as applicable. c. Verify that well cellars are free of standing liquids. If liquid is present in any cellar, remove it using a vacuum truck or pump it to an appropriate location. d. Verify that roads leading to the wells are safe and passable. e. Check for signs of leakage or spills, corrosion and weeds/ debris.</li> </ul>						
20	Notify your	Notify your supervisor immediately if any substandard conditions are found.					
	Create a follow-up work order for substandard conditions.						
30	Create a fo	llow-up work order fo					

COMMENTS:

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

Asset:	18943 PORTER 26 PORTER 26 34.315809376	Long -118.557236209
		Long -110.557250205
Asset: Lat:	18944 PORTER 26A PORTER 26A 34.315713631	<b>Long</b> -118.557349347
Asset: Lat:	18946 PORTER 26B PORTER 26B 34.315724662	<b>Long</b> -118.557307117
Asset: Lat:	19006 PORTER 26C (IDLE) PORTER 26C 34.315740508	Long -118.557258718
Accet	18947	
	PORTER 26D PORTER 26D 34.315760302	<b>Long</b> -118.557172184
	18948 PORTER 26E PORTER 26E 34.315778247	<b>Long</b> -118.557109736
Asset: Lat:	18942 PORTER 25R PORTER 25R 34.316770589	<b>Long</b> -118.561246731
Asset: Lat:	18970 PORTER 47 PORTER 47 34.31376686	<b>Long</b> -118.56016589
Asset: Lat:	18962 PORTER 39 PORTER 39 34.312449281	<b>Long</b> -118.560033469
Asset: Lat:	18961 PORTER 38 PORTER 38 34.312459627	<b>Long</b> -118.56107517
Asset: Lat:	18981 PORTER SESNON 42 PORTER SESNON 42 34.311060976	<b>Long</b> -118.562464735

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	PL PL	LAFORM JOB OPLICATIONS	ON
Asset:	18963 PORTER 40 PORTER 40		
Lat:	34.310028595	<b>Long</b> -118.561068394	ŀ
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292	Long -118.5636765	
Asset:	18999 STANDARD SESNON 2 STANDARD SESNON 2		
Lat:	34.315286146	Long -118.56650612	
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	-	I
Lat:	34.313091725	Long -118.3640/1354	•
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	25A	
Lat:	34.315067769	<b>Long</b> -118.564141408	
Asset: Lat:	18998 STANDARD SESNON 2 STANDARD SESNON 2 34.315013095		,
Asset: Lat:	19008 STANDARD SESNON 1 STANDARD SESNON 1 34.318261511		)
Asset: Lat:	19009 STANDARD SESNON 1 STANDARD SESNON 1 34.318304246		5
Asset:	18988 STANDARD SESNON 6 STANDARD SESNON 6	-	
Lat:	34.314090303	Long -118.570090299	)
Asset:	18990 STANDARD SESNON 8 STANDARD SESNON 8		
Lat:	34.313254552	Long -118.568351168	8
Asset:	STANDARD SESNON STANDARD SESNON	5	
Lat:	34.313829368	<b>Long</b> -118.566441739	)

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	/ 2/ 20	111

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

## PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019	GAS TRANSMI	SSION WORK ORDER	DOG	WOR	KORDER
WORK ORDER	#: 5847368	PMN	UM: ACOPSC2		
PARENT WO	#:				
DESCRIPTIC	N: AB1960 MONTHLY	WELL INSPECTIONS	CREW TWO		
REMARKS: MAXI	MOS ISSUED: #5907	370,#5907371, #590	)7372		
TARGET	START DATE: 7/1/2015	i	ROUTE NUMBER:		
TARGET	COMP DATE: 7/31/201	.5	STATUS:	СОМР	
SCHE	EDULE START:		REQUESTED BY:	MAXADMIN	
SCHE	DULE FINISH:		REPORT DATE:	7/15/2015	
		PM	ACTIVITY CLASS:	ENVIRONMENT	AL
ASS	SET #:				
ASSET DESCRIP	TION:				
LOCATIC	ID: AC-WEST FIELD				
LOC. DESCRIP	TION: WEST FIELD				
PHYSICAL LOCA	TION:				
RESPONSI	BLE SUPERVISOR / O	WNER WO	RK TYPE P	RIORITY	ACCOUNT INFO
	OPERTNS /		PM+	3	832.020 C7
DATE STARTE	D: 07/29/2015	DATE COMPLET	ED: 07/29/2015		
EST. Labor HRS:	4.00	<u>Labor Code/</u> <u>Craft</u>	<u>Quantity</u>	Planned Hours	5
ACT. Labor HRS:	4.00				
ACTUALS POSTE	D: LABORCODE	<u>CRAFT</u>	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
	RVALDEZ3	STATECH	4.00	0.00	07/29/2015
JOB PLAN NUMBER	AB1960-M-W	/FLLS			
	PTION: AB1960 MON		ACILITY/WELL I	NSPECTIONS	
JOB OPERATIONS:					
	wells as follows:				
a. Verify grating, applicabl remove i	that appropriate sign verify that floor or gra e. c. Verify that well o t using a vacuum truc ells are safe and passa	ating is in good condi cellars are free of sta ck or pump it to an a	tion so as to excl nding liquids. If li opropriate locatio	ude people ar iquid is preser on. d. Verify th	nd animals, as nt in any cellar, nat roads leading

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

### COMMENTS:

debris.

11/2/2019
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#### WORK ORDER #: **5847368** PARENT WO #:

PMNUM: ACOPSC2

DOG

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

Asset:	PORTER 26 PORTER 26	
Lat:	34.315809376	Long -118.557236209
Asset: Lat:	PORTER 26A PORTER 26A	<b>Long</b> -118.557349347
Asset:	18946 PORTER 26B	<b></b>
Lat:	PORTER 26B 34.315724662	Long -118.557307117
Asset: Lat:	19006 PORTER 26C (IDLE) PORTER 26C 34.315740508	<b>Long</b> -118.557258718
		<b>Long</b> 110.007200710
Asset: Lat:	PORTER 26D PORTER 26D	<b>Long</b> -118.557172184
Asset: Lat:	18948 PORTER 26E PORTER 26E 34.315778247	<b>Long</b> -118.557109736
Asset: Lat:	PORTER 25R PORTER 25R	<b>Long</b> -118.561246731
Asset: Lat:	18970 PORTER 47 PORTER 47 34.31376686	<b>Long</b> -118.56016589
Asset: Lat:	18962 PORTER 39 PORTER 39 34.312449281	<b>Long</b> -118.560033469
Asset:		Long 110.300035409
Lat:	34.312459627	Long -118.56107517
Asset: Lat:	18981 PORTER SESNON 42 PORTER SESNON 42 34,311060976	
	3 113 1 1000 7 0	110.002404/00

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	PL	KFORM JOB OPLKATIONS ON
Asset:	18963 PORTER 40 PORTER 40	
Lat:	34.310028595	<b>Long</b> -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9	
Lat:	34.313533292	Long -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	9
Lat:	34.315286146	<b>Long</b> -118.56650612
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	5
Lat:	34.315091725	<b>Long</b> -118.564071354
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	5A
Lat:	34.315067769	Long -118.564141408
Asset: Lat:	18998 STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	
Asset:	10008	
Lat:	STANDARD SESNON 1 STANDARD SESNON 1 34.318261511	
Asset:	19009 STANDARD SESNON 1 STANDARD SESNON 1	
Lat:	34.318304246	<b>Long</b> -118.564565996
Asset:	18988 STANDARD SESNON 6 STANDARD SESNON 6	
Lat:	34.314090303	Long -118.570090299
Asset:	STANDARD SESNON 8	
Lat:	STANDARD SESNON 8 34.313254552	Long -118.568351168
Asset:	18987 STANDARD SESNON 5	-
Lat:	STANDARD SESNON 5 34.313829368	<b>Long</b> -118.566441739

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

## PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

	i Elta Ol	
Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019			GAS TRANSMISS	SION WO	RK ORDE	R	DOG	WOR	KORDER
WORK	ORDER #:	587	2025		PM	NUM: AC	OPSC2		
PAR	ENT WO #:								
DES	CRIPTION:	AB1	960 MONTHLY V	VELL INS	PECTION	S CREW	TWO		
REMARK	S: INSPEC	TION	COMPLETE, NO	SUBSTA	NDARD C	ONDITIO	NS		
	TARGET ST	ART	DATE: 8/1/2015			ROUTE	NUMBER:		
	TARGET C	OMP	DATE: 8/31/2015				STATUS:	СОМР	
	SCHEDU	JLE S	TART:			REQUE	STED BY:	MAXADMIN	
	SCHEDU	LE FI	NISH:			REPO	RT DATE:	8/15/2015	
					PN	M ACTIVIT	Y CLASS:	ENVIRONMENT	AL
	ASSET	#:							
ASSET [	DESCRIPTIO	ON:							
	LOCATION	ID: A	C-WEST FIELD						
LOC. [	DESCRIPTIO	DN: V	VEST FIELD						
PHYSIC	AL LOCATIO	ON:							
RF	SPONSIBL	E SU	PERVISOR / OW	NER	W	ORK TYPI	= F	PRIORITY	ACCOUNT INFO
<u></u>			RTNS /		<u></u>	PM+		3	832.020 C7
DATE	STARTED:	08/2	26/2015	DATI	E COMPLE	TED: 08,	/26/2015		
EST. Lat	oor HRS:	4.00	)		<u>r Code/</u> Craft	Quar	<u>itity l</u>	Planned Hours	5
ACT. Lal	oor HRS:	4.00	)						
<b>ACTUALS</b>	POSTED:		LABORCODE		<u>CRAFT</u>	<u>R</u>	EG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
		CMA	ARTIN	STATE	СН		4.00	0.00	08/26/2015
JOB PLAN	NUMBER:		AB1960-M-WE	LLS					
JOB PLAN	DESCRIPTI	ON:	AB1960 MONT	HLY PRO	DUCTION	FACILIT	Y/WELL I	NSPECTIONS	
JOB OPER	ATIONS:								
10	Inspect wel	ls as	follows:						
( ; ;	grating, ver applicable. remove it u	rify ti c. Ve sing	propriate signages nat floor or grati erify that well ce a vacuum truck safe and passab	ng is in g llars are or pump	good cond free of st it to an a	dition so a anding lic appropria	as to excl quids. If l te locatic	ude people an iquid is prese on. d. Verify tl	nd animals, as nt in any cellar, hat roads leading

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

# COMMENTS:

debris.

11/2/2019
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DOG

PMNUM: ACOPSC2

#### WORK ORDER #: **5872025** PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

Asset:	PORTER 26 PORTER 26	
Lat:	34.315809376	Long -118.557236209
Asset:	18944 PORTER 26A PORTER 26A	
Lat:	34.315713631	Long -118.557349347
Asset:	PORTER 26B PORTER 26B	
Lat:	34.315724662	<b>Long</b> -118.557307117
Asset:	PORTER 26C (IDLE) PORTER 26C	
Lat:	34.315740508	<b>Long</b> -118.557258718
Asset:	18947 PORTER 26D PORTER 26D	
Lat:	34.315760302	Long -118.557172184
Asset: Lat:	18948 PORTER 26E PORTER 26E 34.315778247	<b>Long</b> -118.557109736
Asset: Lat:	PORTER 25R PORTER 25R	<b>Long</b> -118.561246731
Asset:	18970	
Lat:	PORTER 47 PORTER 47 34.31376686	<b>Long</b> -118.56016589
Asset:	18962 PORTER 39 PORTER 39	
Lat:	34.312449281	Long -118.560033469
Asset:	18961 PORTER 38 PORTER 38	_
Lat:	34.312459627	Long -118.56107517
Asset:	18981 PORTER SESNON 42 PORTER SESNON 42	
Lat:	34.311060976	<b>Long</b> -118.562464735

11/2/2019	1	1,	/2/	2	0	1	9
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PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	FL		I JOB OPERATIONS ON
Asset:	18963 PORTER 40 PORTER 40		
Lat:	34.310028595		<b>Long</b> -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292		Long -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	29	
Lat:	34.315286146		<b>Long</b> -118.56650612
Asset: Lat:	18996 STANDARD SESNON 3 STANDARD SESNON 3 34.315091725	25	<b>Long</b> -118.564071354
		I	Long 110.3040/1334
Asset: Lat:	18997 STANDARD SESNON 2 STANDARD SESNON 2 34.315067769	25A	Long -118.564141408
			<b>J</b>
Asset: Lat:	STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	25B	Long -118.564146337
Asset: Lat:	19008 STANDARD SESNON STANDARD SESNON 34.318261511	1	) <b>Long</b> -118.564493399
Asset: Lat:	19009 STANDARD SESNON STANDARD SESNON 34.318304246	1-0	<b>Long</b> -118.564565996
Asset:	18988 STANDARD SESNON (	c	
Lat:	STANDARD SESNON ( STANDARD SESNON ( 34.314090303	6	Long -118.570090299
Asset:	STANDARD SESNON	8	
Lat:	34.313254552		<b>Long</b> -118.568351168
Asset: Lat:	18987 STANDARD SESNON STANDARD SESNON 34.313829368	5	<b>Long</b> -118.566441739

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	/ 2/ 20	111

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

## PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019		GAS TRANSMIS	SION WORK ORE	DER DOG	WOR	KORDER
WORK	ORDER #	5896506	Р	MNUM: ACOPSC2		
PAR	ENT WO #	:				
DES	SCRIPTION	AB1960 MONTHLY	WELL INSPECTIC	NS CREW TWO		
REMARK	S: INSPEC	TION COMPLETE, NO	SUBSTANDARD	CONDITIONS		
	TARGET ST	TART DATE: 9/1/2015		ROUTE NUMBER	:	
	TARGET C	OMP DATE: 9/30/2015		STATUS	: COMP	
		ULE START:		REQUESTED BY		
	SCHEDU	JLE FINISH:		REPORT DATE		
				PM ACTIVITY CLASS	: ENVIRONMENT	AL
	ASSET	r #:				
ASSET I	DESCRIPTI	ON:				
	LOCATION	ID: AC-WEST FIELD				
LOC. I	DESCRIPTI	ON: WEST FIELD				
PHYSIC	AL LOCATI	ON:				
RE	SPONSIBL	<u>E SUPERVISOR / OW</u>	/NER	WORK TYPE	PRIORITY	ACCOUNT INFO
		OPERTNS /		PM+	3	832.020 C7
DATE	STARTED	: 09/24/2015	DATE COMP	LETED: 09/24/201	.5	
EST. La	bor HRS:	4.00	<u>Labor Code/</u> <u>Craft</u>	Quantity	Planned Hours	<u>S</u>
ACT. La	bor HRS:	4.00				
ACTUALS	<b><u>POSTED:</u></b>	<b>LABORCODE</b>	<u>CRAFT</u>	REG. HRS	<u>OVERTIME</u>	<b>WORKDATE</b>
		MMCKENZI	STATECH	4.00	0.00	09/24/2015
JOB PLAN		AB1960-M-WE				
		ION: AB1960 MONT		N FACILITY/WELL	INSPECTIONS	
JOB OPER	ATIONS:					
10	Inspect we	lls as follows:				
		at appropriate signa				
		rify that floor or grat c. Verify that well ce				
		ising a vacuum truck				•
		s are safe and passal				
	debris.					

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

### COMMENTS:

vv	ORK ORDER #. 3890	500	FINITION, ACOFSCZ	
	PARENT WO #:			
	DESCRIPTION: AB196	50 MONTHLY WELL INSPECT	TIONS CREW TWO	
		RFORM JOB OPERATIONS O	ON THE FOLLOWING ASSETS:	
Asset	: 18943			
	PORTER 26 PORTER 26			
Lat:	34.315809376	Long -118.557236209		
	100.11	_		
Asset	: 18944 PORTER 26A			
	PORTER 26A			
Lat:	34.315713631	Long -118.557349347		
Accet	: 18946			
Assel	PORTER 26B			
	PORTER 26B			
Lat:	34.315724662	Long -118.557307117		
Asset	: 19006			
	PORTER 26C (IDLE)			
	PORTER 26C			
Lat:	34.315740508	<b>Long</b> -118.557258718		
Asset	: 18947			
	PORTER 26D			
Lat:	PORTER 26D 34.315760302	Long -118.557172184		
		Long -118.33/1/2184		
Asset	: 18948			
	PORTER 26E PORTER 26E			
Lat:	34.315778247	Long -118.557109736		
		-		
Asset	: 18942 PORTER 25R			
	PORTER 25R			
Lat:	34.316770589	Long -118.561246731		
Accet	: 18970			
~33Cl	PORTER 47			
	PORTER 47			
Lat:	34.31376686	<b>Long</b> -118.56016589		
Asset	: 18962			
	PORTER 39			
	PORTER 39			
Lat:	34.312449281	<b>Long</b> -118.560033469		
Asset	<b>:</b> 18961			
	PORTER 38			
Lat:	PORTER 38 34.312459627	Long -118.56107517		
		Long 110.3010/31/		
Asset	: 18981			
	PORTER SESNON 42 PORTER SESNON 42			
Lat:	34.311060976	Long -118.562464735		
-				

GAS TRANSMISSION WORK ORDER

11/2/2019

WORK ORDER #: 5896506

DOG

PMNUM: ACOPSC2

WORKORDER

1	1/	21	20	1	9
-	/		20	-	-

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	FL		I JOB OPERATIONS ON
Asset:	18963 PORTER 40 PORTER 40		
Lat:	34.310028595		Long -118.561068394
Asset:	18991 STANDARD SESNON STANDARD SESNON		
Lat:	34.313533292		Long -118.5636765
Asset:	STANDARD SESNON	29	
Lat:	34.315286146		Long -118.56650612
Asset: Lat:	STANDARD SESNON : STANDARD SESNON :	25	<b>Long</b> -118.564071354
Asset: Lat:	18997 STANDARD SESNON STANDARD SESNON 34.315067769	25A	<b>Long</b> -118.564141408
Asset:	18008		
Lat:	STANDARD SESNON STANDARD SESNON 34.315013095	25B	Long -118.564146337
Asset: Lat:	19008 STANDARD SESNON STANDARD SESNON 34.318261511	1	) <b>Long</b> -118.564493399
Asset: Lat:	19009 STANDARD SESNON STANDARD SESNON 34.318304246	1-0	<b>Long</b> -118.564565996
Asset:	18088		
Lat:	STANDARD SESNON STANDARD SESNON 34.314090303	6	Long -118.570090299
Asset:	STANDARD SESNON STANDARD SESNON	8	
Lat:	34.313254552		Long -118.568351168
Asset: Lat:	18987 STANDARD SESNON STANDARD SESNON 34.313829368	5	<b>Long</b> -118.566441739

11	/2/20	)19
	/ 2/ 20	111

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

## PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

11/2/2019		GAS TRANSMIS	SION WORK ORE	DER DOG	WOR	KORDER
WOR	CORDER #	: 5923229	Р	MNUM: ACOPSC2		
PAR	ENT WO #	:				
DES	SCRIPTION	: AB1960 MONTHLY	WELL INSPECTIO	NS CREW TWO		
REMAR	S: INSPEC	TION COMPLETE, NC	SUBSTANDARD	CONDITIONS		
	TARGET ST	TART DATE: 10/1/2015		ROUTE NUMBER	:	
	TARGET C	COMP DATE: 10/31/201	5	STATUS	: COMP	
		ULE START:		REQUESTED BY		
	SCHEDU	JLE FINISH:		REPORT DATE		
				PM ACTIVITY CLASS	: ENVIRONMENT	AL
	ASSET	Γ#:				
ASSET	DESCRIPTI	ON:				
	LOCATION	ID: AC-WEST FIELD				
LOC.	DESCRIPTI	ON: WEST FIELD				
PHYSIC	AL LOCATI	ON:				
<u>R</u>	ESPONSIBL	E SUPERVISOR / OW	<u>/NER</u>	<u>WORK TYPE</u>	<b>PRIORITY</b>	ACCOUNT INFO
		OPERTNS /		PM+	3	832.020 C7
DATE	STARTED:	: 10/18/2015	DATE COMP	LETED: 10/18/201	5	
EST. La	bor HRS:	4.00	<u>Labor Code/</u> <u>Craft</u>	Quantity	Planned Hours	2
ACT. La	bor HRS:	4.00				
ACTUALS	S POSTED:	LABORCODE	<u>CRAFT</u>	REG. HRS	<u>OVERTIME</u>	<u>WORKDATE</u>
		MMCKENZI	STATECH	4.00	0.00	10/18/2015
	NUMBER:	AB1960-M-WE				
		ION: AB1960 MONT		N FACILITY/WELL	INSPECTIONS	
JOB OPER	ATIONS:					
10	Inspect we	lls as follows:				
	a. Verify th	at appropriate signa	ge is in place and	l legible. b. For we	ll cellars with e	existing floor or
		rify that floor or grat				
		c. Verify that well ce using a vacuum truck		5		
		s are safe and passal				
	debris.			5	-,	,

- 20 Notify your supervisor immediately if any substandard conditions are found.
- 30 Create a follow-up work order for substandard conditions.
- 40 Reference California Code of Regulations, Title 14, Division 2, Section 1777(c)(1).

### COMMENTS:

DOG

#### WORK ORDER #: 5923229 PMNUM: ACOPSC2 PARENT WO #: DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS: **Asset:** 18943 PORTER 26 PORTER 26 Lat: 34.315809376 Long -118.557236209 **Asset:** 18944 PORTER 26A PORTER 26A Lat: 34.315713631 Long -118.557349347 **Asset:** 18946 PORTER 26B PORTER 26B 34.315724662 Long -118.557307117 Lat: **Asset: 19006** PORTER 26C (IDLE) PORTER 26C 34.315740508 Lat: Long -118.557258718

- **Asset:** 18947 PORTER 26D PORTER 26D Lat: 34.315760302 Long -118.557172184
- **Asset:** 18948 PORTER 26E PORTER 26E 34.315778247 Long -118.557109736 Lat:
- **Asset:** 18942 PORTER 25R PORTER 25R 34.316770589 Lat: Long -118.561246731
- **Asset:** 18970 PORTER 47 PORTER 47 Lat: 34.31376686 Long -118.56016589
- **Asset:** 18962 PORTER 39 PORTER 39 Lat: 34.312449281 Long -118.560033469 **Asset:** 18961
- PORTER 38 PORTER 38 34.312459627 Lat: Long -118.56107517 **Asset:** 18981 PORTER SESNON 42 PORTER SESNON 42 Lat: 34.311060976
  - Long -118.562464735

PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

	PL		JOB OPERATIONS ON
Asset:	18963 PORTER 40 PORTER 40		
Lat:	34.310028595	I	<b>Long</b> -118.561068394
Asset:	18991 STANDARD SESNON 9 STANDARD SESNON 9		
Lat:	34.313533292		Long -118.5636765
Asset:	STANDARD SESNON 2 STANDARD SESNON 2	29	
Lat:	34.315286146	I	<b>Long</b> -118.56650612
Asset: Lat:	STANDARD SESNON 2 STANDARD SESNON 2	25	Long -118.564071354
			Long 110.0040/1004
Asset: Lat:	18997 STANDARD SESNON 2 STANDARD SESNON 2 34.315067769	25A	Long -118.564141408
		-	
Asset: Lat:	18998 STANDARD SESNON 2 STANDARD SESNON 2 34.315013095	25B	<b>Long</b> -118.564146337
Asset: Lat:	19008 STANDARD SESNON STANDARD SESNON 34.318261511	1	) <b>Long</b> -118.564493399
Asset: Lat:	19009 STANDARD SESNON 3 STANDARD SESNON 3 34.318304246	1-0	Long -118.564565996
Asset: Lat:	18988 STANDARD SESNON ( STANDARD SESNON ( 34.314090303	6	Long -118.570090299
Asset:	18990 STANDARD SESNON 8 STANDARD SESNON 8	8(IDLE)	_
Lat:	34.313254552	I	Long -118.568351168
Asset: Lat:	18987 STANDARD SESNON S STANDARD SESNON S 34.313829368	5	<b>Long</b> -118.566441739

11	/2/20	)19
	/ 2/ 20	J T J

# PMNUM: ACOPSC2

DOG

PARENT WO #:

DESCRIPTION: AB1960 MONTHLY WELL INSPECTIONS CREW TWO

# PERFORM JOB OPERATIONS ON THE FOLLOWING ASSETS:

Asset: Lat:	19000 STANDARD SESNON 31 STANDARD SESNON 31 34.311017053	<b>Long</b> -118.564665987
Asset: Lat:	19010 STANDARD SESNON 44 STANDARD SESNON 44 34.312487643	<b>Long</b> -118.565565909
Asset: Lat:	19001 STANDARD SESNON 44A STANDARD SESNON 44A 34.31245515	<b>Long</b> -118.565513163
Asset: Lat:	19002 STANDARD SESNON 44B STANDARD SESNON 44B 34.312438871	<b>Long</b> -118.565466876
Asset: Lat:	18983 STANDARD SESNON 3 STANDARD SESNON 3 34.31228027	<b>Long</b> -118.563710533

		2793388	SION WORK ORE	MNUM: <b>8207</b>		
WORK ORDER #: <b>2793388</b> PARENT WO #:			r.			
	_	I. SURVEY - GROU	JP 6 WELLS - AN	NUAL		
REMA	ARKS: 6/23/06 (	Completed. No sign	of sub-surface l	ks.		
	TARGET STA	RT DATE: 6/1/2006		ROUTE NUMBE	R. WELLS	
		MP DATE: 8/29/2006			S: CLOSE	
	SCHEDUL	E START:		REQUESTED B		
	SCHEDULI	E FINISH:			E: 7/15/2006	
				PM ACTIVITY CLAS	S: MISCELLANEC	005
	ASSET :					
ASSE	T DESCRIPTIO					
1.0(		D: AC-GROUP 6 WELL				
	SICAL LOCATIO	N: SS-4 SITE, 25 SIT N:	L, 29, 44 SIIL, 53	-1 JIIL		
THE		SUPERVISOR / OW		<u>WORK TYPE</u>	PRIORITY	ACCOUNT INFO
		G. STORAGE /		PM+	3	2200-0299
DA	ATE STARTED: (	)5/19/2006	DATE COMP	LETED: 06/23/20	006	
EST.	Labor HRS: 2	2.00	<u>Labor Code/</u> <u>Craft</u>	Quantity	Planned Hou	<u>rs</u>
ACT.	Labor HRS: 2	2.00	STORAGE	1	2.00	
<u>ACTU/</u>	ALS POSTED:	LABORCODE	<u>CRAFT</u>	<u>REG. H</u> F	<u>OVERTIME</u>	WORKDATE
	T	TP2ALT	STORAGE	2.00	0.00	06/23/2006
		AC-8017-A N: WELL SURVEY				
	ERATIONS:		ANNOAL			
5	SURVEY ID					
10	INSPECT FI	JNIT				
15	ENDING DAT					
20	STARTING D					
25	SURVEYED B					
30	REVIEW BY:					
35	REASON:					
40	METHOD:					
45	DATE WORK	FD:				
50	TIME START					
55	TIME START					
60		ATIONS FOUND:				

WORK ORDER #: 2793388 PMNUM: 8207 PARENT WO #:

DESCRIPTION: F.I. SURVEY - GROUP 6 WELLS - ANNUAL

COMMENTS:

1/2/2019	GAS TRANSMISSIO			
WORK ORDER #: PARENT WO #:		PMNUM:	8207	
DESCRIPTION:	F.I. SURVEY - GROUP 6	5 WELLS - ANNUAL		
C-8017-A WELLS ope	erations 5 - 65 on the fo	ollowing equip.:		
8984 TANDARD SESNON 4 TANDARD SESNON 4				
8985				
TANDARD SESNON 4				
TANDARD SESNON 4	-0			
8986				
TANDARD SESNON 4				
TANDARD SESNON 4	A			
0000				
8996 TANDARD SESNON 2	5			
TANDARD SESNON 2	5			
8997 TANDARD SESNON 2	50			
TANDARD SESNON 2				
8998				
TANDARD SESNON 2 TANDARD SESNON 2				
8999				
TANDARD SESNON 2 TANDARD SESNON 2	-			
TANDARD SESNON Z	5			
9001				
TANDARD SESNON 4				
TANDARD SESNON 4	4A			
9002				
TANDARD SESNON 4				
TANDARD SESNON 4	4B			
9008 TANDARD SESNON 1				
TANDARD SESNON 1				

GAS TRANSMISSION WORK ORDER

11/2/2019

WORKORDER

SEU

11/2/2019	GAS TRANSMISSION	I WORK ORDER	SEU	WORKORDER
PARENT WC		PMNUM: 8	207	
	ON: F.I. SURVEY - GROUP 6	WELLS - ANNUAL		
19009 STANDARD SESNO STANDARD SESNO				
19010 STANDARD SESNO STANDARD SESNO				
20995 WELL SITE - ACW- STANDARD SESNO				
21000 WELL SITE - ACW- STANDARD SESNO				
21004 WELL SITE - ACW- STANDARD SESNO				
21045 WELL SITE - ACW STANDARD SESNO				
21049 WELL SITE - ACW STANDARD SESNO				
21052 WELL SITE - ACW STANDARD SESNO				
21056 WELL SITE - ACW STANDARD SESNO				
21064 WELL SITE - ACW- STANDARD SESNO				
21068				

21068 WELL SITE - ACW-SS44A

SEU

PMNUM: 8207

WORKORDER

WORK ORDER #: **2793388** PARENT WO #:

DESCRIPTION: F.I. SURVEY - GROUP 6 WELLS - ANNUAL

#### STANDARD SESNON 44A

21072

WELL SITE - ACW-SS44B STANDARD SESNON 44B

#### 21726

WELL SITE - ACW-SS-1 STANDARD SESNON 1

21730 WELL SITE - ACW-SS-1-0 STANDARD SESNON 1-0

## SOUTHERN CALIFORNIA GAS COMPANY CPUC-SAFETY AND ENFORCEMENT DIVISION DATA REQUEST DATED SEPTEMBER 28, 2018

## SOCALGAS RESPONSE DATED NOVEMBER 2, 2018

SoCalGas provides the following Responses to the CPUC-Safety and Enforcement Division's (CPUC-SED) data request dated September 28, 2018 related to the preliminary investigation regarding the Aliso Canyon Well Leak. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding before any court, tribunal, or agency, or governmental action. Finally, at the time of this Response, there are no pending oral data requests from the CPUC-SED to SoCalGas.

As discussed during a meet and confer on October 16, 2018, SoCalGas is providing responses to Questions 1, 2, 4, 8, 9, 11, 12(a), 14, and 15. All other questions are postponed until SED has had an opportunity to review SoCalGas' narrative response to these questions. SED will then have an opportunity to respond to SoCalGas about additional information it may require.

#### **Question 1**:

Provide the following information that SoCalGas used between 1980 and October 2015 to identify exterior metal loss threats on its well down-hole production casings, down-hole surface casings, and well conductors (henceforth "well casings") at Aliso Canyon Storage Field (Aliso).

#### **Response 1:**

Between 1980 and October 2015, SoCalGas monitored and inspected active well production casings at its natural gas storage fields. SoCalGas monitored its production casings through the following methods listed below:

• <u>Temperature Surveys</u>: Temperature surveys monitor the mechanical integrity of a gas storage well and are used for leak detection. A temperature survey is a record of the temperature gradient in a well and is interpreted by looking for anomalies, or departures, from the reference gradient. A temperature instrument is lowered down a pressurized well on a weighted wire inside of the tubing to measure and record variations in temperature along the wellbore. Anomalies identified from the survey may result in the need for further investigation and may indicate a leak in the production casing (e.g., shoe leaks, stage collar leaks, etc.) or gas flow behind the production casing. A mechanical integrity issue due to exterior metal loss that results in a casing breach would manifest as an anomaly on a temperature survey. When a temperature survey is overlaid with a well schematic, the storage field engineer can identify whether there is pipe or a casing component at the depth of the anomaly. If there is no component present, this indicates a potential mechanical integrity issue which may be due to exterior metal loss. Conversely, if there is a stage collar at the depth of the anomaly, this indicates a potential stage collar leak. Temperature surveys are conducted in accordance with Division of Oil, Gas, and Geothermal Resources (DOGGR) regulations. As of October 23, 2015, DOGGR regulations required that temperature surveys be performed on an annual basis.

- <u>Noise Surveys</u>: Noise surveys monitor the mechanical integrity of a gas storage well and are used for leak detection. A sensitive microphone is lowered down a pressurized well inside of the tubing to listen and record for sound frequency changes. Since gas movement through a restriction generates sound, high noise amplitudes indicate locations of greater gas movement such as leaks. Anomalies identified from a noise survey may result in the need for further investigation and may indicate a leak in the production casing (e.g., shoe leaks, stage collar leaks, etc.) or gas flow behind the production casing. A mechanical integrity issue due to exterior metal loss that results in a casing breach would manifest as an anomaly on the noise survey. When a noise survey is overlaid with a well schematic, the storage field engineer can identify whether there is pipe or a casing component at the depth of the anomaly. If there is no component present, this indicates a potential mechanical integrity issue which may be due to exterior metal loss. Conversely, if there is a stage collar at the depth of the anomaly, this indicates a potential stage collar leak.
- <u>Weekly Pressures</u>: Weekly pressure readings are used to monitor the mechanical integrity of a gas storage well and are used for leak detection. Pressures are measured and recorded weekly on each well using a calibrated pressure gauge. Typically, a shallow production casing leak manifests as an anomalous surface casing pressure reading. Anomalous pressures in the surface casing result in the need for further investigation and may indicate a leak in the production casing due to exterior metal loss. Diagnostic steps such as temperature and/or noise logs and gas sampling can be used to determine the source of the pressure anomaly. As of October 23, 2015, DOGGR required weekly pressure readings of the tubing, casing, and surface casing.
- <u>Pressure Testing</u>: Pressure tests are used to test the mechanical integrity of a gas storage well during a workover when there is a rig on the well. The well is depressurized and filled with workover fluid to allow a crew to safely install equipment that gives pressure control of the well during a workover. The interior tubing and packer are pulled from the well, and a temporary tubing (work string) and a bridge plug/packer combination is set at various stations to conduct block tests of the production casing. The well is pressure tested at or above the maximum allowable operating pressure (MAOP) to ensure the casing has mechanical integrity. A mechanical integrity issue due to exterior metal loss that results in a casing breach would cause the pressure test to fail.
- <u>Inventory Verification</u>: Inventory verifications are used as a way to monitor the mechanical integrity of all the gas storage wells and are used for leak detection. The validity of the

reported inventory for each storage field is evaluated and the operator verifies that the reported inventory is within the range that would be expected from reservoir analysis. Corrective action is taken if necessary.

- <u>Daily Well Site Inspections</u>: Observations of the equipment and conditions for each active well at the facility are conducted daily to check for signs of gas or liquid leaks. The operator uses visual, audible, and olfactory methods to detect leaks or abnormal conditions.
- <u>Monthly Well Site Inspection</u>: This inspection includes the inspections performed under the "Daily Well Site Inspections." In addition, the cellar floor, structural components, access roads, and general condition of the well site are inspected.
- <u>Annual Surface Area Inspections</u>: Surface area leak inspections of wells using gas detection equipment are conducted annually.

In addition to the monitoring described above, at various times prior to October 23, 2015, SoCalGas also performed the following types of casing inspections during a workover when there was a rig on a well.

- <u>Caliper Log (Multi-Arm)</u>: This tool measures the inside diameter of the casing, while searching for changes in the wall integrity issues related to interior casing features.
- <u>Cast/Cast-V Log (Ultrasonic)</u>: Circumferential acoustic scanning tool where ultrasonic pipe inspection (thickness and diameter) and cement evaluation are obtained simultaneously.
- <u>Cement Bond Logs (Acoustic)</u>: This inspection log uses sound waves to verify bond or adhesion between casing and cement.
- <u>Electromagnetic Thickness Log (Magnetic Flux Leakage)</u>: A measurement of the thickness of casing, giving an estimate of metal loss and detecting corrosion.
- <u>High Resolution Vertilog (Magnetic Flux Leakage)</u>: The log uses magnetic flux measurements to identify and quantify internal and external corrosion defects. The multiaxial sensors (flux-leakage and discriminator sensors) provide circumferential inspection of the casing.
- <u>MicroVertilog (Magnetic Flux Leakage)</u>: This tool creates a magnetic field to measure for any pitting in the steel casing and thickness of the steel.
- <u>Pipe Analysis Log (Magnetic Flux Leakage)</u>: Measures magnetic flux leakage anomalies on the casing wall.
- <u>Ultrasonic Imaging Tool (Ultrasonic)</u>: This tool uses ultrasonic sound waves to circumferentially measure internal radius and thickness of the casing as well as cement quality.
- <u>Vertilog (Magnetic Flux Leakage)</u>: Measures magnetic flux leakage anomalies on the casing wall.

Please note, these casing inspection tools are not run on the surface casings and/or conductor casings of active wells. This is due to the physical presence of the production casing and no access

to the surface and conductor casings. Surface casings can be inspected when a well is in the process of being plugged and abandoned. In addition, while SoCalGas utilized various casing inspection tools available between 1980-2015, these tools became more advanced and effective over time.

# **Question 2**:

List the methods used to identify the threats asked about in question 1.

## Response 2:

Please see Response 1.

## **Question 4**:

List the methods used to analyze the threats asked about in question 1.

## Response 4:

Please see Response 1.

#### **Question 8**:

What types of data are important for SoCalGas to identify:

- a. That exterior metal loss is occurring on its well casings?
- b. That exterior metal loss is a threat to its well casings?

#### Response 8:

SoCalGas interprets this request as relating to the time period between 1980-October 2015. Please see Response 1.

#### **Question 9**:

Between 1980 and October 2015, please provide which types of data, asked about in question 8, SoCalGas used at Aliso to:

- a. Identify exterior metal loss threats to well casings
- b. Identify and measure active exterior metal loss occurring in well casings

#### Response 9:

Please see Response 1.

# Question 11:

Between 1980 and October 2015, has SoCalGas analyzed exterior metal loss on its well casings at Aliso?

# Response 11:

Yes.

# Question 12(a):

If SoCalGas has analyzed exterior metal loss on its well casings at Aliso between 1980 and October 2015:

a. Explain how.

## Response 12(a):

Please see Response 1.

## **Question 14**:

If SoCalGas has not analyzed exterior metal loss on its well casings at Aliso between 1980 and October 2015, please explain why not.

#### Response 14:

SoCalGas monitored and inspected active gas storage well production casings through the methods listed in Response 1. For surface and conductor casings, exterior metal loss has not been analyzed due to the presence of the production casing and lack of access to the surface and conductor casings. The surface casing can be inspected when a well is in the process of being plugged and abandoned.

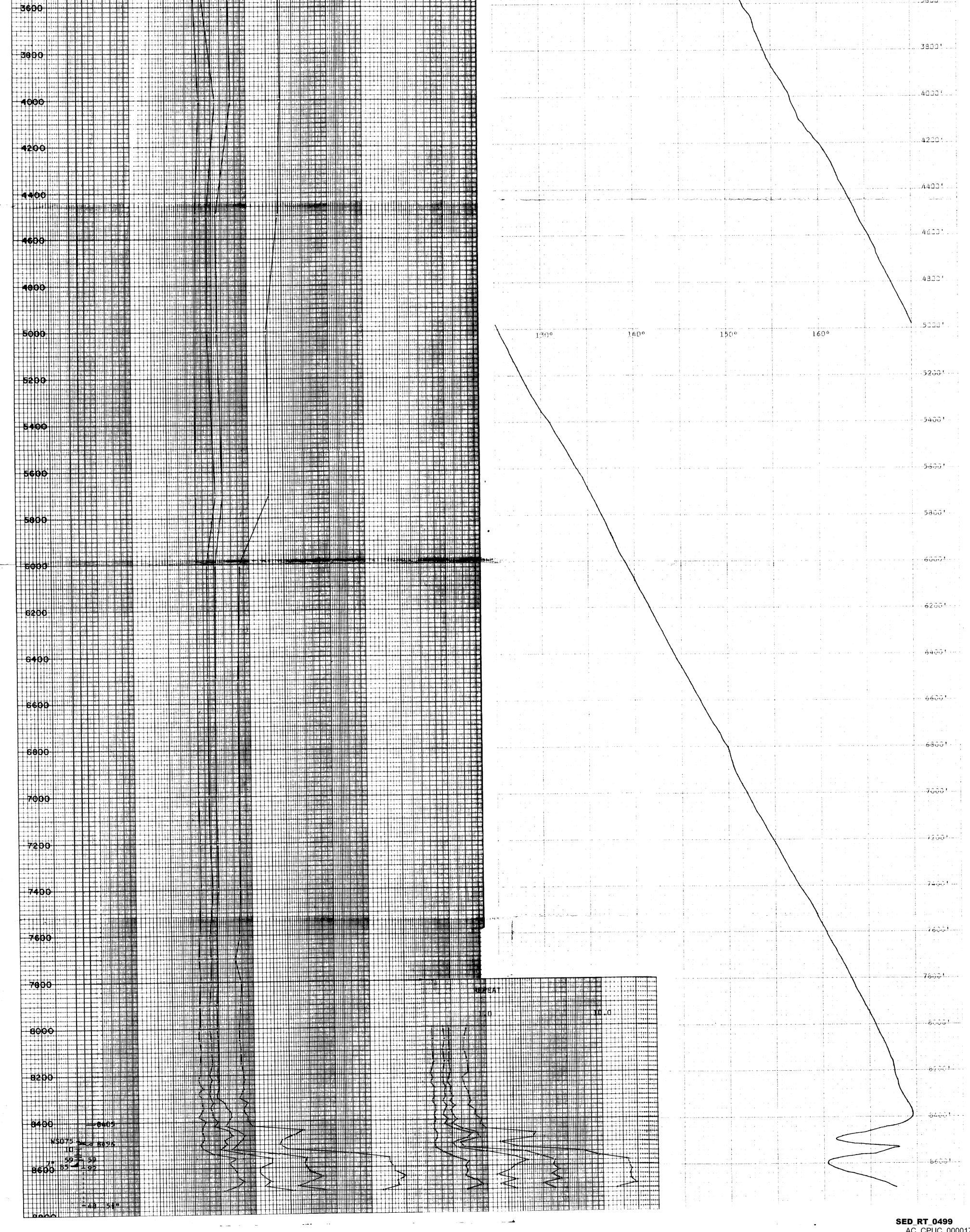
## **Question 15**:

If SoCalGas has not analyzed exterior metal loss on its well casings at Aliso between 1980 and October 2015, please provide the data SoCalGas used to justify this course of action.

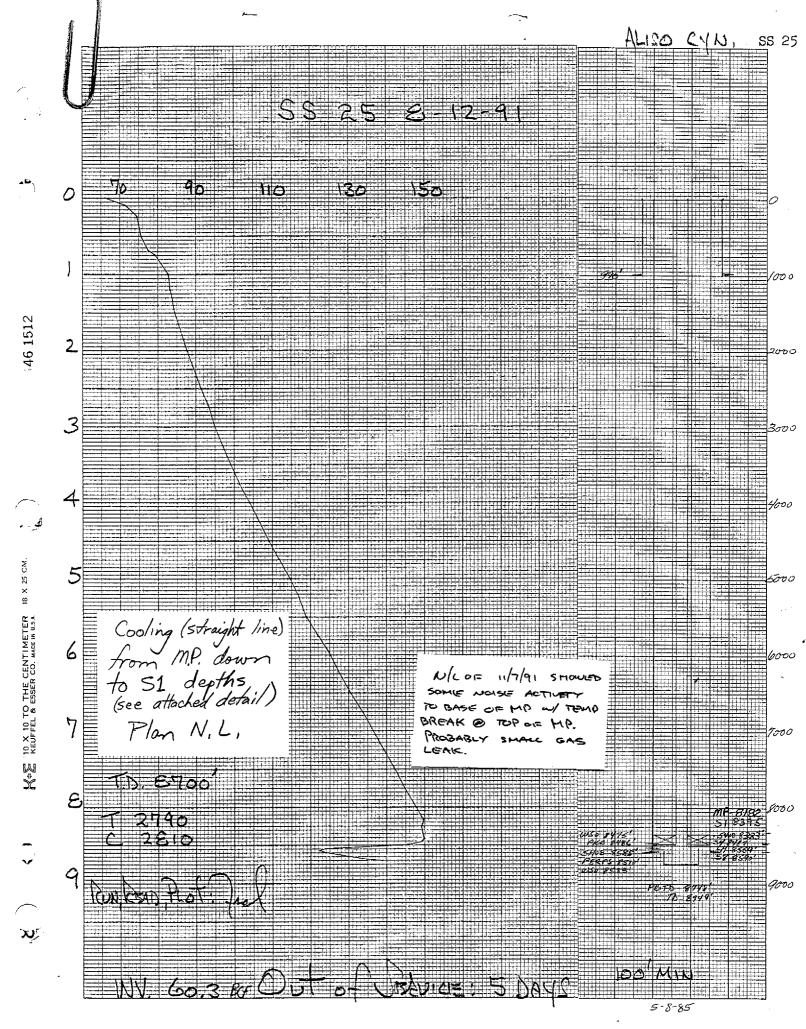
#### Response 15:

See Response 14.

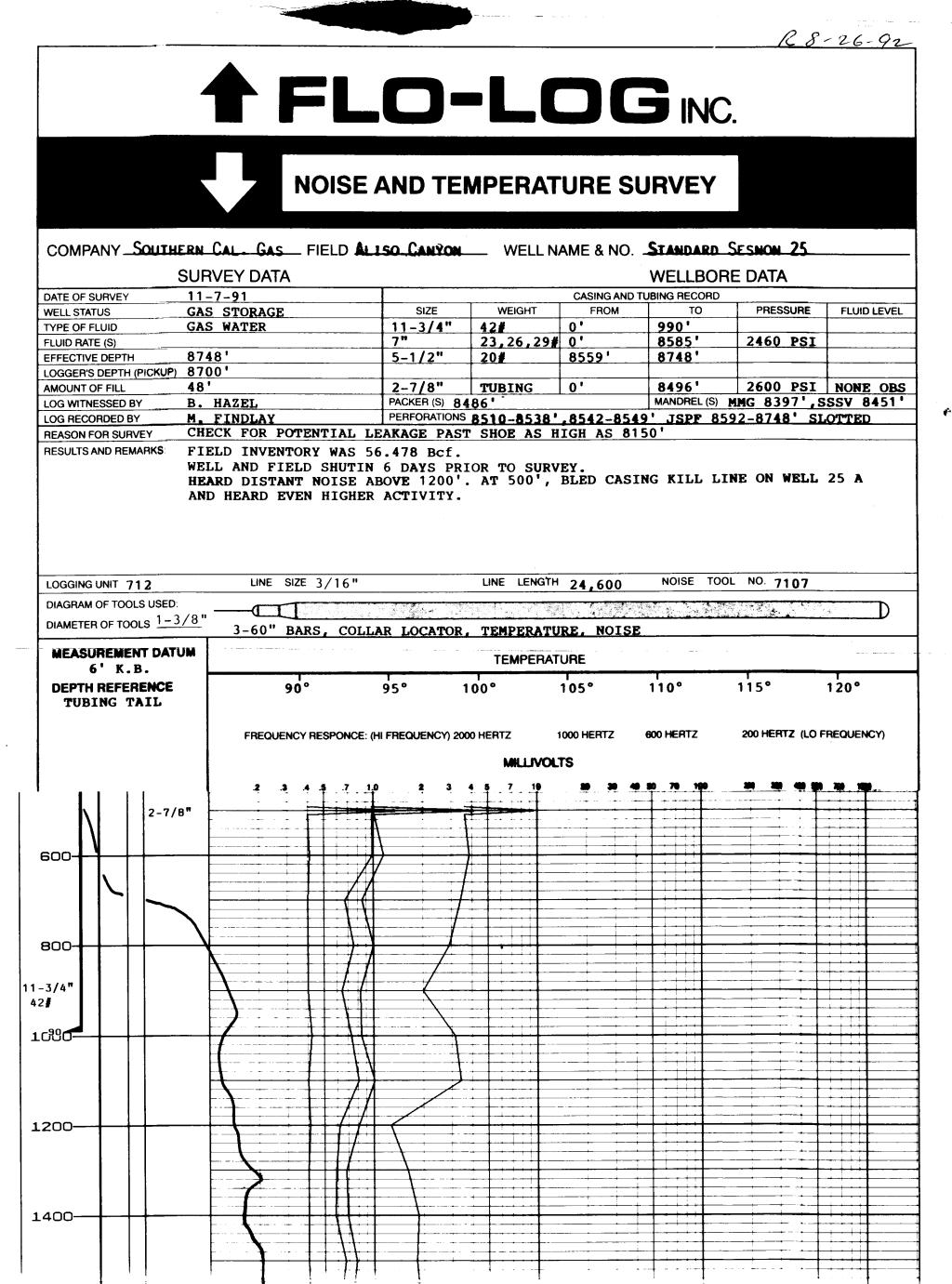
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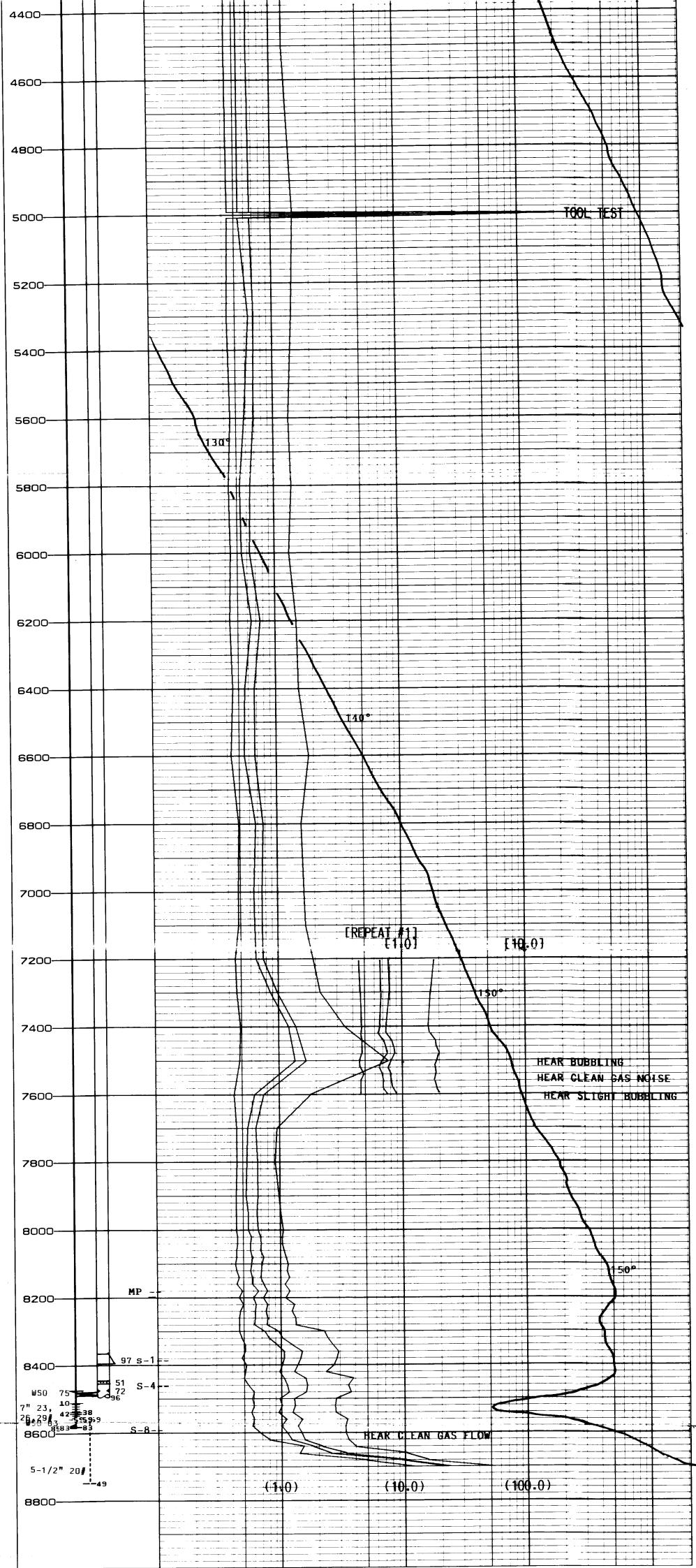
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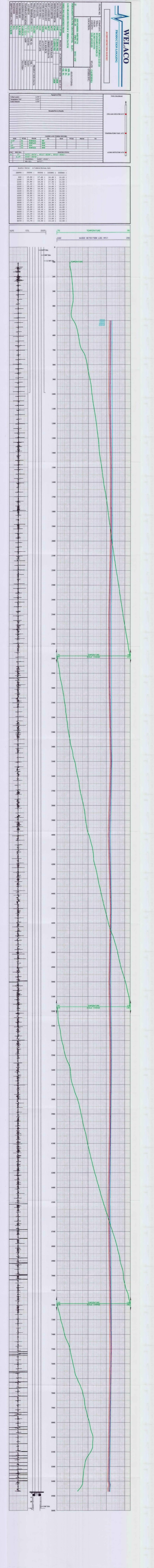
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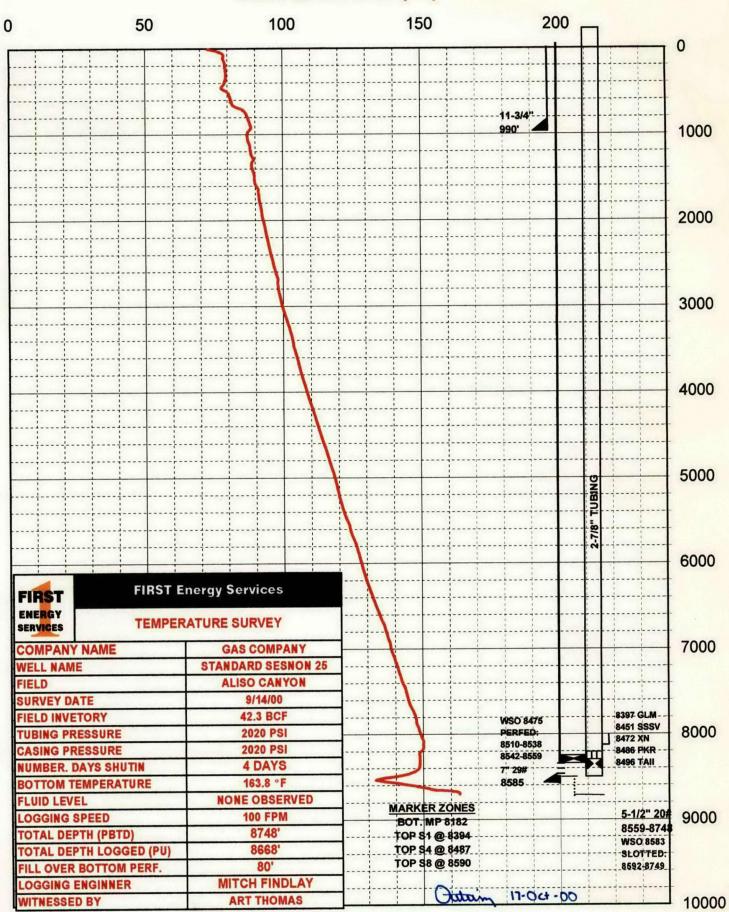
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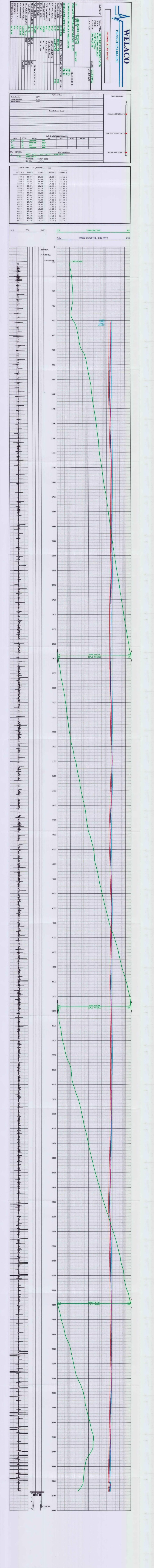
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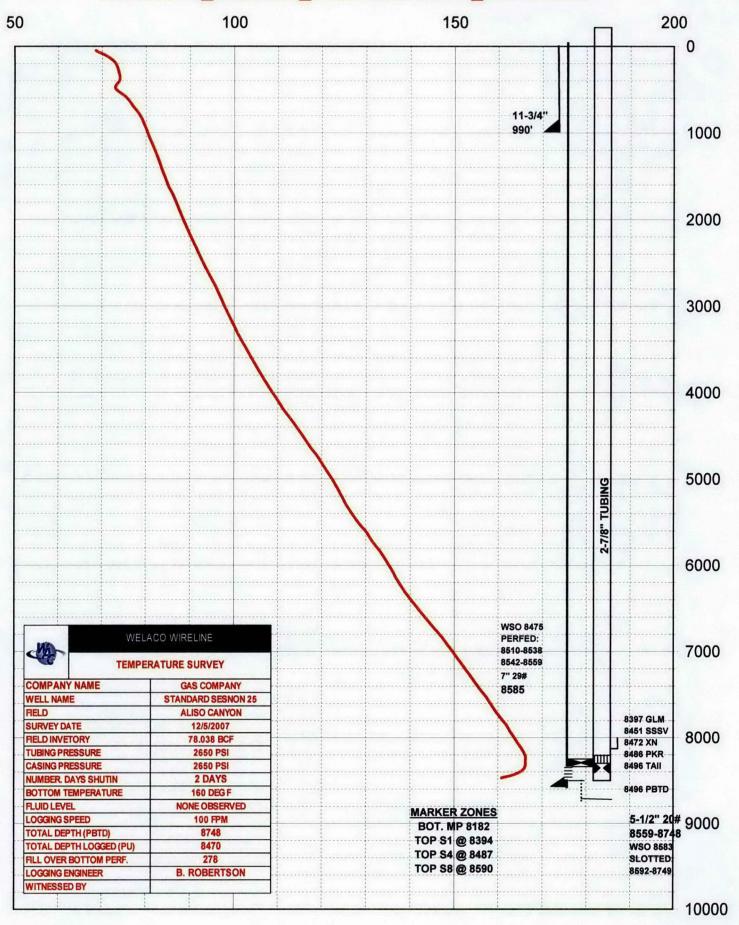
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#### SS25 Well Pressures

Ref #	Date	Time	Casing Pressure	Tubing Pressure	Surface Csg	Events	Notes
1	Normal Operation		2700	2700	Should be Zero	Well normally operates on casing injection and casing WD. It may be operated on dual flow	Well on injection - heard noise in wellhead
2	Friday, October 23, 2015	4:00 PM	270	1700	140	Ops noticed leaking Annulus fitting on well. They responded by closing 2 inch surface annulus valve and noticed 140 psi on gauge	When Ops closed injection header valve, the WKM SSV on casing closed almost immediately by low pressure pilot (setpoint is 270-300 psi). It was at that time Ops noticed sound of gas flow in wellhead. Ops discovered surface leaks
3	Friday, October 23, 2015	4:10 PM	270	1700	140	Well shut-in by Ops	We initially suspected an up/down wellhead seal leak between the 7 inch casing and he 11-3/4 surface casing - Called Cameron
4	Saturday, October 24, 2015	6:00 AM	270	1700	140	Cameron began repairing wellhead seals	Cameron initially tested both seals to 1200 psi, both bled down to 600. They then pumped 14 tubes of plastic into primary seal cavity.
5	Saturday, October 24, 2015	12:27 PM	290	1700	140	Haliburton circulating down tubing	Pumped 11.8 barrels of 10# polymer brine. Pressure on tubing rose to 3500. Shut down. 7 inch casing pressure remained at 290. Surface casing remained at 140. Monitored tubing pressure for 20 minutes. Tubing pressure bled to 2700.
6	Saturday, October 24, 2015	2:00 PM	290	2700		Decided to pump and bleed down 7 inch casing to fill	
7	Saturday, October 24, 2015	1:20 PM				casing using 8.6# lease water Shut in tubing with 2700 psi on it	
,						Put the well on Tubing flow to frac tank for few	
8	Saturday, October 24, 2015	1:30 PM		50		minutues and bled tubing down to 50 psi	
9	Saturday, October 24, 2015	2:07 PM	290	50	140	Halliburton began pumping 8.6 lb lease water down 7 inch casing	Started pumping 8.6# lease water at a rate of 1.5 b/m. At 20 barrels increased rate to 2.5 b/m, at 33 barrels increase to 3.5 b/m, Began monitoring location for gas. Inspected the wellhead, noticed the noise and vibraton had subsided. Continued pumped. At 89 barrels gas broke through surface at location and surrounding location. Continued Monitoring
10	Saturday, October 24, 2015	2:30 PM	250		400	When we shut down after 89 barrels was pumped and gas came to surface and we shut down, 7 inch casing pressure increased to 400 psi	
11	Saturday, October 24, 2015						
12	Saturday, October 24, 2015	5:00 PM	306	177			
13	Saturday, October 24, 2015	5:23 PM	307	200			
14	Saturday, October 24, 2015	5:30 PM	309	210			
15 16	Saturday, October 24, 2015 Saturday, October 24, 2015	5:40 PM 5:50 PM	310 311	218 226			
16	Saturday, October 24, 2015 Saturday, October 24, 2015	6:00 PM	311	226			
17	Saturday, October 24, 2015 Saturday, October 24, 2015	6:10 PM	312	232			
18	Saturday, October 24, 2015 Saturday, October 24, 2015	6:30 PM	314	251			
20	Saturday, October 24, 2015 Saturday, October 24, 2015	7:00 PM	318	262			
21	Saturday, October 24, 2015	7:30 PM	322	274			
22	Sunday, October 25, 2015	8:45 AM	377	616	450		
23	Sunday, October 25, 2015	3:00 PM	401	674	459		



# THE DIA-LOG COMPANY

A BIG THREE INDUSTRY

P. O. BOX 4008, WHITTIER, CALIFORNIA 90607-4008 · TELEPHONE (213) 946-6346

SOUTHERN CALIFORNIA GAS COMPANY Fernando Fee 34 Aliso Canyon Field Los Angeles County Log Number 66620 April 29, 1991

#### SUMMARY

The attached Dia-Log Casing Minimum I.D. Caliper log covers 1725 feet or 41 joints of 7.0 inch 0. D. casing with a weight of 23.0 lbs. per foot and is logged from the depth of 2300 feet to 575 feet according to wireline measurements. Well site information states that the log was run because of suspected parted casing at 570 feet, and to check for restrictions.

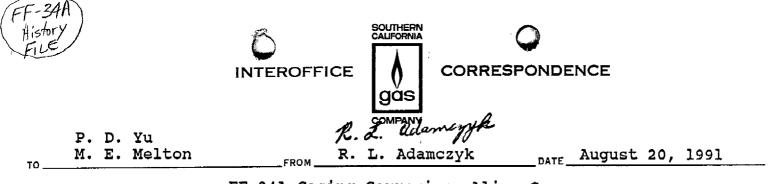
The Casing Minimum I. D. Caliper tool which was calibrated to log within a measuring range from 7-1/4 inches to 5.0 inches was lowered to and commenced logging at 2300 feet per customers request. A Casing Tally was not available to aid in the interpretation of the log trace.

The log trace reveals two areas of severe damage. The interval from 574 feet to 590 feet appears to be bursted from the inside outward. The interval from 1475 feet to 1515 feet appears deformed out-of-round (kinked). Both intervals apparently do not involve a casing connection and probably are not parted.

Multiple logging passes confirm the above damage.

PWM/jd

# SED\_RT\_0507 Aliso\_Canyon\_DOGGR\_0001897



SUBJECT \_

FF-34A Casing Corrosion, Aliso Canyon

It is recommended that FF-34A be equipped with cathodic protection (CP). CP can prevent further external casing corrosion. Chuck Skelton, Cathodic Protection Staff Engineer, has estimated the cost of CP for FF-34A at approximately \$25,000 to \$30,000. Annual O & M expenses are estimated at \$400.

A meeting was held to exchange information on July 25, 1991, at Aliso Canyon. Schlumberger casing inspection and casing potential logs run in FF-34A during its workover, casing corrosion, and cathodic protection were discussed.

The FF-34A casing inspection (electromagnetic thickness) log showed severe metal loss at 2104' ELM, and shallow (1000' to 3000' ELM) metal loss which averaged approximately 15%. The FF-34A casing potential (corrosion and protection evaluation) log showed several anodic intervals (opposite the 8-5/8" casing), which demonstrates a need for CP. The cost of CP is minor when compared to the cost (\$400,000+) of a workover should leakage problems develop in the future.

If funds are available, the Division should equip FF-34A with CP as soon as is operationally feasible.

The <u>possible</u> regional external casing corrosion problem in the southeastern portion of the field will be further studied and a report issued. Additional investigation of well histories and well logs is required before a recommendation can be made as to whether regional CP is necessary. While casing inspection logs show shallow (1000' to 3000' ELM), casing metal loss in FF-35C, MA-1A and MA-5A, there is not enough evidence to substantiate a regional corrosion problem.

If you have any questions, please advise.

RLA:11

cc: R. M. Dowell R. L. Patterson W. T. Scott R. C. Skelton Well History File

# SOUTHERN CALIFORNIA GAS COMPANY CPUC-SAFETY AND ENFORCEMENT DIVISION DATA REQUEST DATED OCTOBER 23, 2018

#### SOCALGAS RESPONSE DATED DECEMBER 6, 2018

SoCalGas provides the following Responses to the CPUC-Safety and Enforcement Division's (CPUC-SED) data request dated October 23, 2018 related to the preliminary investigation regarding the Aliso Canyon Well Leak. CPUC-SED initially requested that Responses be provided by November 7, 2018. SoCalGas requested and CPUC-SED granted, an extension of the due date until December 7, 2018. On December 4, 2018, CPUC-SED asked whether SoCalGas could provide its Responses earlier than December 7, 2018. In accordance with CPUC-SED's request, SoCalGas is submitting its Responses on December 6, 2018. The Responses are based upon the best available, non-privileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding before any court, action. Finally, at the time of this Response, there are no pending oral data requests from the CPUC-SED to SoCalGas.

For this set of questions, please refer to the following timeline, which is a verbatim copy of what SED received from Southern California Gas Company (SoCalGas) in response to a question 1 of an SED Data Request to SoCalGas, dated November 13, 2015. For reference, a copy of the SED Data Request dated November 13, 2015 is Appendix A at the bottom of this data request. Questions are shown below this timeline stated from SoCalGas.

#### Aliso Canyon Natural Gas Leak November 15, 2015

#### **DRAFT** Timeline of Events\*

- Friday, October 23 Leak discovered, area made safe for well procedures, personnel and equipment mobilized; standard procedures began, internal notifications made.
- Saturday, October 24 Standard procedures to stop leak not effective. SoCalGas brings in additional external expertise (Onyx & Halliburton). Regulatory notifications begin.
- Sunday, October 25 –Boots and Coots experts arrive, mobilize and begin evaluation. SoCalGas Media & Employee Communications team participating. Initial information regarding situation distributed to Customer Contact Center and others that night. Regulatory notifications expanded.
- Monday, October 26 SoCalGas' Emergency Operations Center (EOC) activated in monitor mode to provide support to Aliso Canyon Incident Command team. Evaluations continue on the well. Customer message posted on socalgas.com. SoCalGas holds community meeting on Aliso Canyon Turbine Replacement Project. Provided information and answers about leak. Some customers expressed anger/frustration about the leak.

- Tuesday, October 27 Crews conduct more diagnostics and tests. Letter sent to customers, posted, emailed to elected officials, HOAs. SoCalGas sets up dedicated email and phone hotline for customer inquiries. Daily operational briefing set up for fire dept., emergency management and elected official Public Information Officers (PIO). Daily briefings with SCAQMD begin.
- Wednesday, October 28 Crews use wireline rig for diagnostics. KTLA-TV Channel 5 and KABC-TV Channel 7 cover story. Customer letter hand delivered to 1,400 homes. Public information booth set up at Aliso Canyon facility and staffed from 10 a.m. and 5 p.m. daily.
- Thursday, October 29 Multiple diagnostics, including initial "wireline" completed. Determined need for coiled tubing rig to be brought in. SoCalGas mails 8,100 letters to Porter Ranch area. SoCalGas creates Frequently Asked Questions fact sheet to help respond to customer questions.
- Friday, October 30 Wireline equipment removed. Update letter, fact sheet emailed with message that odor will last. SoCalGas begins daily air sampling of multiple random sites on site and in community which is available on socalgas.com. KTLA-TV Channel 5 and KABC-TV Channel 7 cover protest at Aliso Canyon gates by local activists. Less than 20 attend rally. L.A. Daily News runs story and photos: "Natural Gas Leak Near Porter Ranch Lingers Nearly One Week Later."
- Saturday, October 31--Crews at SoCalGas work to prepare site for coiled tubing rig. SoCalGas delivers an update via letter to 1,400 homes closest to the facility.
- Sunday, November 1—Coiled tubing rig arrives in late afternoon. Adjacent wells killed (one Saturday & one Sunday) in preparation for work on SS-25.
- Monday, November 2 Equipment unloaded, set up. SoCalGas mails letter to 8,100 customers. SoCalGas.com begins daily posting of updates; Posted air sampling results on socalgas.com.
- Tuesday, November 3 Coiled tubing ready set up and connected, started pressure testing.
- Wednesday, November 4 Coiled tubing pressure testing continues. SoCalGas briefs representatives from L.A. City and County Fire Departments, Hazmat, SCAQMD, DOGGR, L.A. County Department of Health and elected officials prior to the Porter Ranch Neighborhood Council meeting. SoCalGas speaks at the Porter Ranch Neighborhood Council. KTLA-TV Channel 5 and KCBS-TV Channel 2, KNX 1070 radio cover. Ken Bruno from CPUC SED visits with Jimmie Cho, SoCalGas Senior Vice President Gas Operations and System Integrity, for tour of site. L.A. Daily News runs story: "Leaking Natural Gas Well Concerns Porter Ranch Residents."
- Thursday, Nov 5. Coiled tubing pressure testing completed. L.A. Daily News reports on community meeting. Reporter Greg Wilcox visits Aliso Canyon main office area and interviews Jimmie Cho and Glenn La Fevers, SoCalGas' Storage Operations Manager. SoCalGas supplies photos to press. L.A. Daily News updates story: "Porter Ranch Residents Confront Officials Over Gas Leak."
- Friday, Nov. 6 Coiled tubing rig begins breaking through the blockage and introducing fluid into the well. SoCalGas adds daily p.m. email briefing to local PIOs and elected officials.
- Saturday, Nov 7 Second day of multi-day coiled tubing operation focuses on additional evaluation to guide the next step efforts to stop the flow of gas. Wireline rig set up. SoCalGas continues air monitoring. CARB/CEC fly plane over site to monitor methane. L.A. Daily News online article "New Attempt Made to Stop Gas Leak" featured on home page, reports on situation and includes photos coiled tubing rig and of SoCalGas execs meeting with LAFD officials on site. Posted on front page of weekend edition.

- Sunday Nov. 8 Well-management experts continue multi-day evaluation. The focus was on continued evaluation of the well pipe conditions. Information from multiple diagnostic tests will guide next steps to safely stop the flow of gas. L.A. Daily News runs column: "Leaking Well a Vexing Problem."
- Monday November 9 Well-management experts continue multi-day evaluation. L.A. Daily News runs column: "Crews Make Progress in Repairing Gas Leak."
- November 10 Additional well testing work performed. Hosted a site visit by representatives from state and local agencies and elected offices. Visitors were provided an overview of Aliso Canyon and Storage operations, and briefed on the current status of efforts to mitigate the leaking well.
- November 11 Conducted data analysis, finalized strategy to stop the leak, and began preparing the site with the appropriate well-control equipment.
- November 12 Successfully installed the "bridge plug" in the well tubing and continued to prepare the well site.
- November 13 Tubing perforation activities performed and attempted stop the flow of gas by putting fluids down the well. During this operation, there was a release of a mist into the air. Based on the information at this time, it is not believed that these materials pose a threat to public health. Out of an abundance of caution, residents were notified to stay inside. Once determined that the mist was contained to our facility, residents were again notified that there was no reason to remain inside. Office of Emergency Services and National Response Center were notified of the release. They were updated at 3:14 pm that flow was reduced.
- November 14 Evaluating the well conditions, preparing the site and determining the best strategy for our continued efforts to stop the flow of gas. Representatives from the L.A. County Health & Hazmat have inspected the site today and yesterday and observed our containment procedures. Collected samples of the mud and liquid from yesterday's release and having it analyzed and expect results tonight. At 1:05 pm OES and NRC were notified of release containment and minor additional release of crude oil at 4:30 am.

\* Based on best available information at this time.

# Question 1:

With regards to the statement: "Saturday, October 24 – Standard procedures to stop leak not effective. SoCalGas brings in additional external expertise (Onyx & Halliburton). Regulatory notifications begin."

- a. Please identify and provide which procedures SoCalGas is referring to in this statement.
- b. Please specify the page numbers and quote the words of each procedure that SoCalGas says were "not effective".
- c. Please explain why SoCalGas states that these procedures were not effective.
- d. Once SoCalGas determined that these procedures were not effective, did SoCalGas attempt to follow other non-standard procedures?
- e. If the answer to question 1d is yes, which ones?
- f. If the answer to question 1d is yes, explain why SoCalGas attempted to follow the nonstandard procedures it did?
- g. If the answer to question 1d is no, why did SoCalGas not follow other non-standard

procedures?

- h. Identify all personnel from Onyx brought in as additional external expertise.
- i. Provide the resumes showing backgrounds of each personnel member from Onyx.
- j. Explain the role of each member of Onyx who SoCalGas brought in for additional external expertise.
- k. Provide the contract or contracts with Onyx for bringing in their additional external expertise.
- 1. Provide the invoices from Onyx to provide their additional external expertise.
- m. What steps did SoCalGas take in following these procedures?
- n. At what point did SoCalGas learn that their standard procedures to stop the leak were ineffective? How did SoCalGas tell that the procedures were ineffective?
- o. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

#### **Response 1:**

- a. The procedures performed on the October 24, 2015 included the wellhead seal repair operation followed by the well kill attempt down the tubing and casing. SoCalGas operators performed the first top kill operation by pumping polymer solution into the 2 7/8" tubing. The tubing pressure increased rapidly, indicating the presence of a blockage in the tubing. Next, 89 barrels of brine were pumped into the casing annular space in a further attempt to kill the well.
- b. SoCalGas objects to this request to the degree that it assumes "Standard procedure" is referring to a written formal SoCalGas procedure. Notwithstanding this objection, SoCalGas responds as follows: See Response 1.a.
- c. See Response 1.a. They were not effective because gas continued leaking from the well after the actions were taken.
- d. SoCalGas objects to this request on the ground that it is vague and ambiguous as to the term "non-standard." Notwithstanding this objection, SoCalGas responds as follows: See Response 1.a.
- e. See Response 1.d.
- f. See Response 1.d.
- g. See Response 1.d.
- h. Please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_33\_0000001 AC\_CPUC\_SED\_DR\_33\_0000002.
- i. SoCalGas objects to this request as vague and ambiguous as to the term "backgrounds." Notwithstanding this objection, SoCalGas responds as follows: SoCalGas has conducted a reasonable search and has not found any responsive documents within its possession, custody, or control.
- j. In this context, SoCalGas understands the phrase "additional external expertise" to mean the use of contractors with specialized experience and equipment. Onyx Oil Services (Onyx) supplied the 2" piping, the choke manifold and the gas/liquid separator that connected the wellhead to the Halliburton pump and the storage tank, for the well kill activities on October 24, 2015. The primary function of the Onyx personnel was to set up the surface piping, then operate their surface equipment under the supervision of SoCalGas. Onyx personnel followed the direction of SoCalGas during the well kill and made no decisions or recommendations while the kill fluid was being pumped. For a list of the personnel and their roles, see Response 1.h.
- k. Please see the previously provided electronic documents with the following Bates ranges: AC\_CPUC\_SED\_DR\_17\_0043004-AC\_CPUC\_SED\_DR\_17\_0043027

AC\_CPUC\_SED\_DR\_17\_0043462-AC\_CPUC\_SED\_DR\_17\_0043471 AC\_CPUC\_SED\_DR\_17\_0044052-AC\_CPUC\_SED\_DR\_17\_0044054 AC\_CPUC\_SED\_DR\_17\_0044686-AC\_CPUC\_SED\_DR\_17\_0044693 AC\_CPUC\_SED\_DR\_17\_0044998-AC\_CPUC\_SED\_DR\_17\_0045006 AC\_CPUC\_SED\_DR\_17\_0046158-AC\_CPUC\_SED\_DR\_17\_0046254

- 1. In this context, SoCalGas understands the phrase "additional external expertise" to mean the use of contractors with specialized experience and equipment. For the invoice for field work performed by Onyx Oil Services on October 24, 2015, please see Response 1.h.
- m. SoCalGas objects to this request as vague and ambiguous as to "these procedures."
- n. See Response 1.a.-b.
- SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Todd Van de Putte, Alan Fortenberry, Oleksiy Garchev, Larry Andrews, Tom Egbert, John Cerulle, Mike Dozier, and Mike Volkmar. In addition, please see the contractors listed on the SoCalGas Daily Operations Report for October 24, 2015 (AC\_CPUC\_SED\_DR\_16\_0000649 AC\_CPUC\_SED\_DR\_16\_0000650). Counsel to SoCalGas coordinated preparation of this data response.

#### **Question 2**:

Regarding the statement, "Sunday, October 25 Boots and Coots experts arrive, mobilize and begin evaluation. SoCalGas Media & Employee Communications team participating. Initial information regarding situation."

- a. Were the Boots and Coots experts who arrived part of the additional expertise brought in from Halliburton that was mentioned in the statement dated "Saturday, October 24"?
- b. Were additional external experts from Halliburton brought in as of Saturday, October 24 who were not the Boots and Coots experts who arrived on Sunday, October 25?
- c. If the answer to 2b is yes, please list all such additional, non-Boots and Coots experts from Halliburton who arrived on Sunday, October 25.
- d. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

#### Response 2:

- a. No. Halliburton and Onyx personnel assisted with logistics and support (e.g., pump truck) for the well kill activities performed on October 24, 2015. SoCalGas first contacted Boots & Coots after the October 24, 2015 well kill was unsuccessful, and Boots & Coots personnel first arrived at Aliso Canyon on October 25, 2015. SoCalGas generally refers to Boots & Coots as the specialized well control experts who assisted with the well kills and the relief well after arriving at Aliso Canyon on October 25, 2015.
- b. Yes. Halliburton personnel, who were not also Boots & Coots personnel, assisted with and provided support for the well kill performed on October 24, 2015.
- c. No new Halliburton personnel arrived on Sunday, October 25, 2015, other than those who were Boots & Coots personnel.
- d. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Todd Van de Putte, Alan Fortenberry, and

Mike Dozier. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for October 25, 2015 (AC\_CPUC\_SED\_DR\_16\_0025633) and the contractors listed on the SoCalGas Daily Operations Report for October 25, 2015 (AC\_CPUC\_SED\_DR\_16\_00000651 - AC\_CPUC\_SED\_DR\_16\_00000652). Counsel to SoCalGas coordinated preparation of this data response.

# **Question 3**:

With regards to the statement, "Thursday, October 29 – Multiple diagnostics, including initial 'wireline' completed."

- a. Please define "wireline" as used in this sentence.
- b. Please explain what the wireline did.
- c. Please provide the information/data gathered as a result of the "wireline".
- d. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

#### Response 3:

- a. The term "wireline" refers to the cabling technology used in the oil and gas industry to lower down equipment, wireline tools, or measuring devices into a wellbore.
- b. SoCalGas objects to this request as vague and ambiguous as to the phrase "what the wireline did." Notwithstanding this objection, SoCalGas responds as follows: For Boots & Coots' Daily Report for October 29, 2015, please see previously provided electronic document with Bates range AC\_CPUC\_SED\_DR\_16\_0025635.
- c. See Response 3.b.
- d. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for October 29, 2015 (AC\_CPUC\_SED\_DR\_16\_0025635) and the contractors listed on the SoCalGas Daily Operations Report for October 29, 2015 (AC\_CPUC\_SED\_DR\_16\_000660). Counsel to SoCalGas coordinated preparation of this data response.

#### **Question 4**:

With regards to the statement, Sunday, November 1—Coiled tubing rig arrives in late afternoon. Adjacent wells killed (one Saturday & one Sunday) in preparation for work on SS-25.

- a. Please define the word "killed" in the context of the above statement.
- b. Which adjacent wells were killed?
- c. Why were these adjacent wells killed in preparation for work on SS-25?
- d. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

#### **Response 4:**

a. Killing a well refers to the process of introducing a hydrostatic head of fluid into the well tubulars that exceeds the pressure of the gas trying to escape. When the hydrostatic head pressure exceeds the gas pressure, gas is not able to escape up through the well tubulars.

- b. SS25A and SS25B.
- c. Due to the close proximity of SS25A and SS25B to SS25, each well was plugged and filled with kill fluid as a precautionary measure.
- d. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for November 1, 2015 (AC\_CPUC\_SED\_DR\_16\_0025638) and the contractors listed on the SoCalGas Daily Operations Report for November 1, 2015 (AC\_CPUC\_SED\_DR\_16\_0000666). Counsel to SoCalGas coordinated preparation of this data response.

#### **Question 5**:

With regards to the statement, "Tuesday, November 3, 2015 – Coiled tubing ready set up and connected, started pressure testing."

- a. What was the purpose of setting up the coil tubing?
- b. What was the purpose of starting the pressure testing?
- c. What were the pressure testing results?
- d. Provide documentation showing the pressure testing results.
- e. What course of action did SoCalGas take as a result of the pressure testing results?
- f. Did SoCalGas follow its pressure testing procedure?
- g. If the answer to 6f is yes, provide the procedure that was followed. Please cite the page, and quote the part of it that was specifically followed.
- h. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

#### Response 5:

- a. The coiled tubing unit was set up to clear a suspected obstruction in the SS-25 tubing. Boots & Coots personnel were directly responsible for operating the coiled tubing.
- b. The purpose of pressure testing in this context was to test the safety equipment and equipment that would be used in the coiled tubing operation. Boots & Coots personnel directly performed the pressure testing and may have additional information on this issue.
- c. Please see Boots & Coots' Daily Report for November 3, 2015 please see previously provided electronic document with Bates range AC\_CPUC\_SED\_DR\_16\_0025640.
- d. Please see Response 5.c.
- e. Boots & Coots continued operations to clear the suspected obstruction in the SS-25 tubing. Boots & Coots personnel performed the pressure testing and may have additional information on this issue.
- f. SoCalGas objects to this request to the degree that it assumes SoCalGas performed the pressure testing on the equipment to be used for the coiled tubing operation.
- g. See Response 5.f.
- h. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for November 3, 2015 (AC\_CPUC\_SED\_DR\_16\_0025640) and the contractors

listed on the SoCalGas Daily Operations Report for November 3, 2015 (AC\_CPUC\_SED\_DR\_16\_0000670 - AC\_CPUC\_SED\_DR\_16\_0000672). Counsel to SoCalGas coordinated preparation of this data response.

#### Question 6:

With regards to the statement, "Friday, Nov. 6, 2015 – Coiled tubing rig begins breaking through the blockage and introducing fluid into the well."

- a. Please describe the blockage, including the location and depth.
- b. Were any noise and temperature readings taken after October 23, 2015 and prior to inserting the coiled tubing? If so:
  - i. How many?
  - ii. What date was each taken?
  - iii. What were the results of each reading?
  - iv. Provide the results of each reading.
  - **v.** What information, procedures, or other sources did SoCalGas based its decision upon to insert coiled tubing?
  - vi. Provide all sources of the information identified in response to question 6v.
- c. Was this the first time after the beginning of the incident that fluid was introduced into the well?
- d. If not, when was the first time fluid was introduced into the well?
- e. What was the purpose of introducing the fluid into the well?
- f. Provide documentation from prior to the introduction of fluid into the well that showed the purpose and intent of introducing that fluid.
- g. Did the fluid achieve its intended purpose?
- h. Provide all documentation and communication supporting the answer to question 6f.
- i. Did SoCalGas consider this a top-well kill attempt? Please explain.
- j. Was this the first time SoCalGas introduced fluid into SS-25 following the incident on October 23, 2015? If not, list all other instances, including dates.
- k. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

#### Response 6:

- a. Please see previously provided Boots & Coots' Daily Report dated November 6, 2015, with Bates range AC\_CPUC\_SED\_DR\_16\_0025643.
- b. Please see previously provided Boots & Coots' Daily Reports from October 25, 2015 through November 6, 2015 with Bates range AC\_CPUC\_SED\_DR\_16\_0025631 -AC\_CPUC\_SED\_DR\_16\_0025643.
- c. No.
- d. October 24, 2015.
- e. SoCalGas objects to this request as vague and ambiguous as to time. Notwithstanding this objection, SoCalGas responds as follows: To the extent CPUC-SED is requesting information about the first time fluid was introduced into the well, well kill fluid was pumped into SS-25 on October 24, 2015. The purpose of pumping the well kill fluid was to introduce a hydrostatic head of fluid into the well that exceeded the pressure of the gas in the well.

- f. SoCalGas objects to this request as vague and ambiguous as to time. Notwithstanding this objection, SoCalGas responds as follows: To the extent CPUC-SED is requesting information about the first time fluid was introduced into the well following discovery of the leak, well kill fluid was pumped into SS-25 on October 24, 2015. For SoCalGas' Gas Standards which describe the well kill process for routine situations, please see electronic documents with Bates range AC\_CPUC\_SED\_DR\_17\_0000128 AC\_CPUC\_SED\_DR\_17\_0000142. While the kill of SS25 was not a routine situation, the purpose and use of the well kill fluids provided in the Gas Standard is consistent. In addition, for communications identified by searching relevant SoCalGas' employees email data sets to locate emails related to the incident response on October 23-24, 2015, please see previously provided electronic documents with Bates range AC\_CPUC\_SED\_DR\_33\_000003 AC\_CPUC\_SED\_DR\_33\_0000163.
- g. SoCalGas objects to this request as vague and ambiguous as to time. Notwithstanding this objection, SoCalGas responds as follows: To the extent CPUC-SED is requesting information about the first time fluid was introduced into SS-25 on October 24, 2015, no, because the October 24, 2015 well kill attempt was not successful. To the extent CPUC-SED is requesting information about the introduction of fluid on November 6, 2015, yes because the November 6, 2015 blockage removal was successful.
- h. We interpret this question as seeking documentation in support of 6g. See Response 6.f.
- i. SoCalGas objects as vague and ambiguous as to the term "this." To the extent that CPUC-SED is requesting information about the activities on November 6, 2015, those activities do not constitute a well kill attempt.
- j. Other than in connection with the October 24, 2015 kill activities, no fluid was introduced into SS-25 prior to the coiled tubing operation.
- k. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for November 6, 2015 (AC\_CPUC\_SED\_DR\_16\_0025643) and the contractors listed on the SoCalGas Daily Operations Reports for October 24 through November 6, 2015 (AC\_CPUC\_SED\_DR\_16\_0000649 AC\_CPUC\_SED\_DR\_16\_0000681). Counsel to SoCalGas coordinated preparation of this data response.

#### **Question 7**:

With regards to the statement, "Sunday Nov. 8, 2015 – Well-management experts continue multiday evaluation. The focus was on continued evaluation of the well pipe conditions."

- a. List the sources of information were used by the well-management experts during their "continued evaluation of the well pipe conditions".
- b. Provide the sources of information used by the well-management experts during their "continued evaluation of the well pipe conditions".
- c. Were any of the sources of information used by the well-management experts during their "continued evaluation of the well pipe conditions" inaccurate?
- d. If the answer to 7c is yes, provide all inaccurate sources of information used by the wellmanagement experts.
- e. What were the conclusions, findings and other results of the "continued evaluation of the well pipe conditions".
- f. Was the "continued evaluation of the well pipe conditions" only for SS-25? If not, list all wells it was for?
- g. What was the purpose of the "continued evaluation of the well pipe conditions"?

- h. Provide a list with the names of all of the "well-management experts" that were part of the "multi-day evaluation". Be sure this list includes those who were part of the "multi-day evaluation" identified on Monday November 9, 2015 as well.
- i. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

# Response 7:

- a. SoCalGas objects to the phrase "sources of information" as vague and ambiguous. SoCalGas further objects on the grounds that the particular sources of information used by Boots & Coots in the course of continued evaluation of well pipe conditions is beyond SoCalGas' scope of knowledge. SoCalGas understands "well management experts" to mean Boots & Coots. Notwithstanding this objection, please see previously provided Boots & Coots' Daily Report for November 8, 2015 with Bates range AC\_CPUC\_SED\_DR\_16\_0025645. Boots & Coots may have additional information responsive to this request.
- b. See Response 7.a.
- c. See Response 7.a. SoCalGas has no reason to believe that Boots & Coots used or relied on any inaccurate information in the course of evaluating well pipe conditions.
- d. N/A.
- e. See Response 7.a.
- f. The "continued evaluation of the well pipe conditions" was for SS25 only. Boots & Coots may have additional information.
- g. The purpose of the "continued evaluation of the well pipe conditions" was to collect more data from SS25 and assess the leak. Boots & Coots may have additional information as to the purpose of the continued evaluation.
- We understand this request to be seeking names of Boots & Coots personnel. Boots & Coots' Daily Reports for November 8-9, 2015 include a list of Boots & Coots personnel performing the evaluation of the well pipe conditions. Please see previously provided electronic documents Bates range AC\_CPUC\_SED\_DR\_16\_0025645 AC\_CPUC\_SED\_DR\_16\_0025646.
- SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Reports for November 8-9, 2015 (AC\_CPUC\_SED\_DR\_16\_0025645 AC\_CPUC\_SED\_DR\_16\_0025646) and the contractors listed on the SoCalGas Daily Operations Report for November 8 and 9, 2015 (AC\_CPUC\_SED\_DR\_16\_0000685 AC\_CPUC\_SED\_DR\_16\_0000690). Counsel to SoCalGas coordinated preparation of this data response.

#### Question 8:

Regarding the statement, "November 10, 2015 - Additional well testing work performed."

- a. Please identify all additional well testing work performed.
- b. Was this well testing work performed in accordance with procedure?
- c. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

# Response 8:

- a. Please see previously provided Boots & Coots' Daily Report dated November 10, 2015 with Bates range AC\_CPUC\_SED\_DR\_16\_0025647.
- b. SoCalGas objects to this request as vague and ambiguous as to the term "procedure."
- c. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for November 10, 2015 (AC\_CPUC\_SED\_DR\_16\_0025647) and the contractors listed on the SoCalGas Daily Operations Report for November 10, 2015 (AC\_CPUC\_SED\_DR\_16\_000693). Counsel to SoCalGas coordinated preparation of this data response.

# Question 9:

Regarding the statement, "November 11 - Conducted data analysis, finalized strategy to stop the leak, and began preparing the site with the appropriate well-control equipment."

- a. List all sources of data used to conduct the data analysis.
- b. Were any of these sources of data inaccurate?
- c. If the answer to question 9b is yes, which ones?
- d. If the answer to question 9b is yes, when did SoCalGas learn such information was inaccurate?
- e. If the answer to question 9b is yes, how did SoCalGas learn such information was inaccurate?
- f. If the answer to question 9b is yes, provide all sources of inaccurate data used in the data analysis conducted.
- g. Has SoCalGas corrected the inaccurate data?
- h. If so, when was the data corrected?
- i. If so, how was SoCalGas able to correct the inaccurate data?
- j. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

# Response 9:

- a. SoCalGas objects to this request to the degree that it assumes SoCalGas performed the data analysis on November 11, 2015. Boots & Coots conducted the data analysis on November 11, 2015. The particular sources of data used by Boots & Coots for purposes of the data analysis is beyond SoCalGas' scope of knowledge. Notwithstanding this objection, SoCalGas responds as follows: Please see previously provided Boots & Coots' Daily Report for November 11, 2015 with Bates range AC\_CPUC\_SED\_DR\_16\_0025648. Boots & Coots may have additional information on this issue.
- b. See Response 9.a. SoCalGas has no reason to believe that any sources of data that Boots & Coots used during that period was not accurate.
- c. N/A.
- d. N/A.
- e. N/A.

- f. N/A.
- g. N/A.
- h. N/A.
- i. N/A.
- j. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for November 11, 2015 (AC\_CPUC\_SED\_DR\_16\_0025648) and the contractors listed on the SoCalGas Daily Operations Report for November 11, 2015 (AC\_CPUC\_SED\_DR\_16\_0000696). Counsel to SoCalGas coordinated preparation of this data response.

# **Question 10:**

Regarding the statement, "Nov 12, 2015 - Successfully installed the "bridge plug" in the well tubing and continued to prepare the well site."

- a. What was SoCalGas's complete goal for installing the "bridge plug"?
- b. Was SoCalGas's installation of the bridge plug an attempt to stop the leak of gas from well SS-25?
- c. Provide all documentation dates November 12, 2015 and prior to that date supporting the answer to question 10b.
- d. What were the purposes, goals and objectives related to installing the bridge plug?
- e. Provide all documentation from November 12, 2015 and prior to that date showing the purposes, goals and objectives relating to installation of the bridge plug.
- f. Did the installation of the bridge plug meet all purposes, goals and objectives from prior to its installation?
- g. Provide all documentation (including communications) showing whether the installation of the bridge plug met all purposes, goals and objectives provided in response to question 10f?
- h. Prior to the beginning of the installation of the bridge plug on November 12, 2015, in what precise location of the well tubing was the bridge plug intended to be installed?
- i. Provide all documentation and communication supporting the answer to question 9h.
- j. Provide the plans and specifications from November 12, 2015 and prior to that date showing the location in the tubing in which the bridge plug was to be installed.
- k. Was the bridge plug successfully installed in its intended precise location in the well tubing?
- 1. If the answer to question 10k is no, what prevented the bridge plug from being successfully installed in its intended location within the tubing?
- m. If the bridge plug was not installed in its precise location that was intended prior to its installation, was SoCalGas able to remove it or drill it out?
- n. If the answer to question 9m is no, why not?
- o. If the bridge plug did not achieve the stated purposes, goals and objectives
- p. Provide the procedure for installation of the bridge plug in step-by-step fashion.
- q. If there was no procedure for installing the bridge plug, why not?
- r. Was the procedure for installing the bridge plug followed?
- s. If not, why not?
- t. Which individuals proposed installing the bridge plug?

- u. Were any consequences of installing a bridge plug contemplated prior to the time it was installed? If so, what were they?
- v. Provide all documentation (including communications) showing the answers to question 10u.
- w. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

# Response 10:

- a. SoCalGas objects to the term "complete goal" as vague and ambiguous. The purpose, goal, and/or objective for the bridge plug installation in conjunction with the tubing perforation, was to create a known flow area in the tubing in order to kill the well. Boots & Coots performed the installation of the bridge plug and may have additional information.
- b. See Response 10.a.
- c. SoCalGas understands that the goal for installing the bridge plug was to facilitate a top-kill through the tubing. For Boots & Coots' Daily Report for November 12, 2015, please see previously provided electronic documents with Bates range AC\_CPUC\_SED\_DR\_16\_0025649. In addition, SoCalGas previously provided CPUC-SED requested communications between SoCalGas and Boots & Coots. Those documents were identified by searching relevant SoCalGas employees' email data sets to locate emails to/from Boots & Coots from October 1, 2015 to January 31, 2018. Please see electronic documents with Bates Range AC\_CPUC\_SED\_DR\_16\_0001027-AC\_CPUC\_SED\_DR\_16\_0019407.
- d. See Response 10.a.
- e. See Response 10.c.
- f. SoCalGas understands that the purpose, goal, and objective of installing the bridge plug was to create a known flow area in the tubing, and that this purpose, goal, and/or objective was met.
- g. See Response 10.c.
- h. SoCalGas understands that the bridge plug was to be installed at the lowest depth possible above the subsurface safety valve ports.
- i. See Response 10.c.
- j. See Response 10.c.
- k. SoCalGas understands that the bridge plug was set at the lowest depth possible above the subsurface safety valve ports.
- 1. N/A.
- m. N/A.
- n. SoCalGas objects to this request as vague and ambiguous as to "9m." Notwithstanding this objection, SoCalGas responds as follows: SoCalGas interprets this request as relating to Question 10m. N/A.
- o. SoCalGas objects to this request as vague and ambiguous as to "If the bridge plug did not achieve the stated purposes, goals and objectives."
- p. See Response 10.c.
- q. See Response 10.c.
- r. See Response 10.c.
- s. See Response 10.c.
- t. Boots & Coots.
- u. Yes, Boots & Coots explained that installation of the bridge plug would remove access to the tubing below the bridge plug.

- v. SoCalGas previously provided CPUC-SED requested communications between SoCalGas and Boots & Coots. Those documents were identified by searching relevant SoCalGas employees' email data sets to locate emails to/from Boots & Coots from October 1, 2015 to January 31, 2018. Please see electronic documents with Bates Range AC\_CPUC\_SED\_DR\_16\_0001027-AC\_CPUC\_SED\_DR\_16\_0019407.
- w. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane, and Todd Van de Putte. In addition, please see the Boots & Coots personnel listed on the Boots & Coots Daily Report for November 12, 2015 (AC\_CPUC\_SED\_DR\_16\_0025649) and the contractors listed on the SoCalGas Daily Operations Report for November 12, 2015 (AC\_CPUC\_SED\_DR\_16\_0000697 AC\_CPUC\_SED\_DR\_16\_0000699). Counsel to SoCalGas coordinated preparation of this data response.

# Question 11:

Regarding the statement "November 13 - Tubing perforation activities performed and attempted stop the flow of gas by putting fluids down the well. During this operation, there was a release of a mist into the air. Based on the information at this time, it is not believed that these materials pose a threat to public health."

- a. Explain the purpose, objectives and goals related to the tubing perforation activities?
- b. Provide all documentation prior to performance of tubing perforation activities that show the purpose, objectives and goals related to the tubing perforation activities?
- c. Were the goals, objectives and purpose related to the tubing perforation activities met?
- d. If the answer to question 11c is no, which goals, objectives and purposes relating to the tubing perforation activities were not met? Please explain.
- e. Were any consequences of tubing perforation activities the time they began? If so, what were they?
- f. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

#### Response 11:

- a. See Response 10.a.
- b. SoCalGas previously provided CPUC-SED requested communications between SoCalGas and Boots & Coots. Those documents were identified by searching relevant SoCalGas employees' email data sets to locate emails to/from Boots & Coots from October 1, 2015 to January 31, 2018. Please see electronic documents with Bates Range AC\_CPUC\_SED\_DR\_16\_0001027-AC\_CPUC\_SED\_DR\_16\_0019407.
- c. SoCalGas understands that the purpose, goal, and/or objective for perforating the tubing in conjunction with installing the bridge plug, was to create a known flow area in the tubing in order to kill the well, and was met.
- d. N/A.
- e. SoCalGas objects to this request as vague and ambiguous as to "[w]ere any consequences of the tubing perforation activities the time they began?"
- f. SoCalGas objects to this request as overly broad and vague as to the terms "this question" and "the question." SoCalGas interprets the request to be seeking the identities of individuals that may have first-hand knowledge of the events described in the above responses. SoCalGas responds as follows: Bret Lane and Todd Van de Putte. In addition, please see the

Boots & Coots personnel listed on the Boots & Coots Daily Report for November 13, 2015 (AC\_CPUC\_SED\_DR\_16\_0025650) and the contractors listed on the SoCalGas Daily Operations Report for November 13, 2015 (AC\_CPUC\_SED\_DR\_16\_0000700 - AC\_CPUC\_SED\_DR\_16\_0000702). Counsel to SoCalGas coordinated preparation of this data response.

# **Question 12**:

Regarding the statement "November 14-25, 2015 – Four top-well kill attempts were made by Boots and Coots by attempting to pump various types of fluid down the well."

- a. Please describe each top well kill attempt made by Boots and Coots in detail.
- b. Please include precise dates of each one.
- c. Please provide a detailed list of all fluids used in each top-well kill attempt.
- d. Please provide the order in which the various fluids were pumped down the well.
- e. Were any others involved in the execution of these well kill attempts? If so:
  - i. List them.
  - ii. Explain the roles of each one.
- f. With regards to the top well-kill attempts, what options, if any, were no longer feasible after the installation of the bridge plug in the tubing?
- g. In what ways did the bridge plug prevent the attempted Boots and Coots top-well kill attempts from succeeding?
- h. Given these and other well kill attempts, did SoCalGas and its consultants consider flaring the gas released from SS-25?
- i. If the answer to question 12f is yes, at what point was this considered?
- j. Why did SoCalGas not flare the gas released from SS-25?

#### Response 12:

- a. On November 15, kill attempt #3 was performed by pumping a barite pill and brine into the well. On November 18, kill attempt #4 was performed by pumping a barite pill and brine into the well. On November 24, kill attempt #5 was performed by pumping a Geo Zan pill, barite pill, water, and brine into the well. On November 25, kill attempt #6 was performed by pumping a Geo Zan pill, barite pill, water, and brine into the well. For further detail regarding these kill attempts, please refer to previously provided electronic documents with Bates range AC\_CPUC\_SED\_DR\_16\_0000709 (November 15), AC\_CPUC\_SED\_DR\_16\_0000718 (November 18), AC\_CPUC\_SED\_DR\_16\_0000735 (November 24), and AC\_CPUC\_SED\_DR\_16\_0000738 (November 25).
- b. Between November 14, 2015 and November 25, 2015, Boots & Coots performed well kill operations on the following dates:
  - November 15, 2015
  - November 18, 2015
  - November 24, 2015
  - November 25, 2015
- c. Fluids used in each well kill attempt performed between November 14, 2015 and November 25, 2015 are as follows:
  - November 15, 2015: 9.4 ppg CaCl<sub>2</sub>, 18.0 ppg barite pill
  - November 18, 2015: 9.4 ppg CaCl<sub>2</sub>, 18.0 ppg barite pill
  - November 24, 2015: GEO Zan pill loaded with LCM, fresh water, 18.0 ppg barite pill

- November 25, 2015: GEO Zan pill loaded with LCM, fresh water, 9.4 ppg CaCl<sub>2</sub>
- d. Fluids were pumped in the following order:
  - November 15, 2015: 9.4 ppg CaCl<sub>2</sub>, followed by 18.0 ppg barite pill, followed by 9.4 ppg CaCl<sub>2</sub>
  - November 18, 2015: 9.4 ppg CaCl<sub>2</sub>, followed by 18.0 ppg barite pill, followed by 9.4 ppg CaCl<sub>2</sub>
  - November 24, 2015: GEO Zan pill loaded with LCM, followed by fresh water, followed by 18.0 ppg barite pill, followed by 9.4 ppg CaCl<sub>2</sub>
  - November 25, 2015: GEO Zan pill loaded with LCM, followed by fresh water, followed by GEO Zan pill loaded with LCM, followed by 9.4 ppg CaCl<sub>2</sub>
- e. Other contractors provided support in performing the well kill attempts. For a list of contractors, please see SoCalGas' Daily Operations Reports for November 15, 18, 24, and 25 (see AC\_CPUC\_SED\_DR\_16\_0000706 AC\_CPUC\_SED\_DR\_16\_0000708 (November 15), AC\_CPUC\_SED\_DR\_16\_0000715 AC\_CPUC\_SED\_DR\_16\_0000717 (November 18), AC\_CPUC\_SED\_DR\_16\_0000732 AC\_CPUC\_SED\_DR\_16\_0000734 (November 24), AC\_CPUC\_SED\_DR\_16\_0000735 AC\_CPUC\_SED\_DR\_16\_0000737 (November 25)).
- f. SoCalGas is unaware of the options that may have been no longer feasible as a result of the installation of the bridge plug.
- g. SoCalGas objects to this request to the degree that it assumes facts with regards to the statement "bridge plug prevented the attempted Boots & Coots top-well kill attempts from succeeding." Notwithstanding this objection, SoCalGas responds as follows: SoCalGas is unaware of any ways in which the installation of the bridge plug prevented the attempted Boots and Coots top-well kill attempts from succeeding.
- h. SoCalGas objects to this request as vague and ambiguous as to the phrase "flaring the gas release from SS-25." Notwithstanding this objection, SoCalGas responds as follows: Yes.
- i. SoCalGas objects to this request as vague and ambiguous as to the phrase "flaring the gas release from SS-25" and the term "12f." Notwithstanding this objection, SoCalGas responds as follows: On or around November 2015.
- j. SoCalGas objects to this request as vague and ambiguous as to the phrase "flaring the gas release from SS-25." Notwithstanding this objection, SoCalGas responds as follows: After extensive design and study, SoCalGas ultimately determined not to install the gas capture system at SS-25 that would have resulted in the flaring of gas at SS-25 because of safety concerns expressed by our engineers, including Boots & Coots.

# Question 13:

Are the words in the draft response now final?

- a. If not, please edit the draft response so it is final, and track the changes. Please also provide a clean version.
- b. Please provide all individuals with knowledge of the answers to this question. Please include those who wrote the answer to the question.

# Response 13:

SoCalGas objects to this request as overly broad, unduly burdensome and vague and ambiguous. Notwithstanding this objection, SoCalGas responds as follows: The "DRAFT Timeline of Events" provided in response to the CPUC-SED Data Request to SoCalGas dated November 13, 2015, represented the best information available as of November 15, 2015. Based on the context of the other questions in this data request SoCalGas understands this request as seeking a detailed technical account of all efforts to control the well. The most complete and detailed account can be found in the compiled and previously provided SoCalGas Daily Operations Reports (AC\_CPUC\_SED\_DR\_16\_0000361 - AC\_CPUC\_SED\_DR\_16\_0001026) and Boots & Coots Daily Reports (AC\_CPUC\_SED\_DR\_16\_0025631 - AC\_CPUC\_SED\_DR\_16\_0025808).

- a. N/A.
- b. SoCalGas objects to this request as overly broad and vague as to the terms "this question,", "the question," and "final." Counsel to SoCalGas coordinated preparation of this data response.

# Question 14:

Please provide all individuals responsible for writing the draft timeline of events. Please include all individuals who were responsible for preparation of the writing.

#### Response 14:

To the extent CPUC-SED is referring to the "DRAFT Timeline of Events" provided in response to the CPUC-SED Data Request to SoCalGas dated November 13, 2015, the Draft Timeline of Events was prepared by SoCalGas' Aliso Canyon Incident Public Information Office.

# **Question 15**:

Please refer to the SoCalGas statement in response to SED's Data Request from November 13, 2015, question number 7, which stated:

"October 23 - After the leak was discovered, the site was secured and SoCalGas crews at the facility immediately took a step-by-step approach to locate and seal the leak at the wellhead. First, SoCalGas brought in a contractor (Cameron) to attempt to stop the leak by making a repair to the wellhead seals. This occurred early on October 24. When this first step was not successful, SoCalGas continued to monitor well pressures, brought in additional contractors (Halliburton and Onyx), and ordered well abatement equipment to be delivered to the wellhead. SoCalGas and our contractors then attempted to stop the flow of gas from SS-25 by pumping a polymer carbonate fluid down the well at approximately 12:30 pm on October 24. We were unable to pump the necessary fluid down the well using this procedure. As a result, this effort was also not successful in stopping the leak. At approximately 2:30 pm on October 24, SoCal Gas shut down this pumping operation."

- a. Provide the contract between SoCalGas and Cameron that was created for the purpose of Cameron's attempt to stop the leak by making a repair to the wellhead seals.
- b. Provide Cameron's qualifications for making repairs to wellhead seals.
- c. Why did SoCalGas think it was needed to make repairs to the wellhead seals?
- d. Why was Cameron's attempt to repair the wellhead seals not successful?
- e. Provide the contact information for Cameron.

#### Response 15:

- Cameron West Coast's (Cameron) work at SS-25 was performed under an existing Standard Services Agreement with SoCalGas. For SoCalGas' agreements with Cameron please see previously provided electronic documents with Bates range AC CPUC SED DR 17 0045052 – AC CPUC SED DR 17 0045093.
- b. SoCalGas objects to this request as overly broad and unduly burdensome, and vague and ambiguous as to "qualifications." Notwithstanding this objection, SoCalGas responds as

follows: SoCalGas has conducted a reasonable search and has not found any responsive documents within its possession, custody, or control.

- c. SoCalGas personnel investigating the leak on the evening of October 23, 2015 heard a noise that sounded like gas moving down the well and suspected that a leaking wellhead seal may have been the cause.
- d. Cameron's attempt to repair the wellhead seal was successful, however, this did not stop the leak.
- e. Please see 1.a.

#### BEFORE THE PUBLIC UTILITIES COMMISSION

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#### STATE OF CALIFORNIA

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SUBPOENA TO PROVIDE DOCUMENTS Public Utilities Code Sections 314, 314.5, 581, 582, 584, 701, 702, and 1791.

# EXAMINATION UNDER OATH OF BRET LANE

REPORTER'S TRANSCRIPT San Francisco, California January 24, 2018 Pages 1 - 160 Volume - 1

Reported by: Thomas C. Brenneman, CSR No. 9554 Carol A. Mendez, CSR No. 4330 Karly Powers, CSR No. 13991 Jason Stacey, CSR No. 14092

> PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA SAN FRANCISCO, CALIFORNIA SED\_RT\_0527

1 have been some modifications to equipment, I 2 don't recall. 3 Q All right. And on the SoCalGas 4 side under this project management team, list 5 who was present there along with you and Todd 6 Van de Putte, and now we know Tom Egbert. 7 Were there any others who were part 8 of that process? 9 А The process being physically there 10 on the kill attempt? 11 Yeah. 0 12 Α I don't recall who from our side 13 was there at the time. 14 One clarification, I'm not -- I 15 don't recall specifically, but sometime in 16 November, I mean, we had started the planning 17 for the relief well. And that's when I moved 18 Todd over to be responsible for the overall 19 design of implementation of starting the relief well. 20 21 So Todd is moved to that element as 22 well. And I believe somewhere in this time 23 frame is when -- again, it may be three. Ιt 24 may be four -- when I say three and four, 25 kill attempts three and four. Somewhere in 26 this time frame, I have Rodger Schwecke come 27 in as my Deputy Operations Chief that's 28 helping me out.

> PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA SAN FRANCISCO, CALIFORNIA

1 Are you aware what he was doing in Q 2 his role or title before you called him, 3 Rodger Schwecke? 4 А On the leak itself, Rodger was our 5 VP of our Major Markets Customer Group at the And, again, I don't recall if it was 6 time. 7 week one or two or three. He responded and 8 was helping out the incident response, what I 9 call down below, in the -- by the plant area 10 for a short period of time. It may have been a week, two weeks 11 12 or three. And then that's when I had Rodger 13 come up to help me and was assigned into the 14 operation side. And I don't recall if Rodger 15 was there for Kill Attempt 3, but it's 16 somewhere 3, 4, or 5 is when Rodger comes in. 17 Q Thank you. Todd Van de Putte, as 18 you stated prior, moved to relief well 19 efforts. Did you replace him? 20 А I had a number of engineers that 21 were, again, part of that structure from the 22 reservoir standpoint. Todd was still on the 23 kill attempts -- at that point in time I 24 would bring him for advice as well with his 25 expertise on looking over the plant. 26 But, again, I just wanted to point 27 -- at some point, he transitioned from being 28 on that side every day or part of that

> PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA SAN FRANCISCO, CALIFORNIA



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Via Email: Jlane@SempraUtilities.com

March 11, 2019

Brett Lane Chief Executive Officer Southern California Gas Company 555 West 5<sup>th</sup> Street Los Angeles, California 90013

#### ALISO CANYON NATURAL GAS DISASTER FOLLOW-UP REQUEST FOR CRITICAL DATA ELEMENTS

The Los Angeles County Department of Public Health (Public Health) has been made aware, through a permit renewal process required by the South Coast Air Quality Management District, of treatment systems utilized by Southern California Gas Company (SoCalGas) to remove crude oil routinely from natural gas before it is served into the distribution system. We are disheartened by the fact that SoCalGas did not disclose this critical information regarding crude oil contained in its gas reservoir at the Aliso Canyon Storage Facility. Thus, the massive quantity of natural gas released from October 23, 2015 through February 12, 2016 contained crude oil, while SoCalGas repeatedly stated during the disaster that the contents of the release were limited only to typical components of stored natural gas.

During the Aliso Canyon Natural Gas Disaster, Public Health conservatively operated under a hypothesis that natural gas in this geological storage reservoir was likely to contain traces of crude oil due to a previous history of oil extraction from the reservoir. In November 2015, Public Health recommended a complete characterization of air quality using an expanded list of chemicals typically found in both crude oil and natural gas, but this testing was severely limited and delayed. At that time, SoCalGas knew that crude oil was contained in the natural gas but withheld this information from Public Health. SoCalGas had an obligation to inform Public Health about known crude oil in its stored natural gas, as this information would have critically impacted Public Health's assessments of human exposures during the Disaster.



BOARD OF SUPERVISORS

Hilda L. Solis First District Mark Ridley-Thomas Second District Shela Kuehl Third District Janice Hahn Fourth District Kathryn Barger Fifth District Brett Lane March 11, 2019 Page 2

Whereas SoCalGas knowingly released both crude oil and natural gas during the Disaster without disclosing critical information to Public Health; whereas the health of nearby residents may have been impacted by exposure to both crude oil and natural gas during the Disaster; and whereas Public Health requires critical information for the forthcoming Health Research Study, Public Health directs SoCalGas to provide the following:

- a) All records of sampling data related to the composition of natural gas at Aliso Canyon, before, during, and after the Disaster.
- b) All records of environmental sampling data collected below and above mesh grates, which were utilized to mitigate oily mists released from Well SS-25.
- c) All records regarding exterior home cleaning information, including, but not limited to, home addresses, ranking results at each property, and residue density and sampling results.
- d) Facility access for Public Health to collect samples from the storage facility for the forthcoming Health Research Study and to make such data available to the public.

Sincerely

Angelo J. Bellomo, MS, REHS, QEP Deputy Director for Health Protection

AJB/

cc: Edward Randolph, Energy Division Director, California Public Utilities Commission Wayne Nastri, Executive Director, South Coast Air Quality Management District

# SOUTHERN CALIFORNIA GAS COMPANY

#### (DATA REQUEST SED-SCG-DR45 DATED NOVEMBER 8, 2019)

# SOCALGAS RESPONSE DATED NOVEMBER 18, 2019

SoCalGas provides the following Responses to the Safety Enforcement Division (SED) data request dated November 8, 2019 in I.19-06-016. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas' responses do not include information collected or modeled by Blade Energy Partners' during its Root Cause Analysis Investigation. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas objects to the instructions submitted by SED and to the continuing and indefinite nature of this request on the grounds that they are overbroad and unduly burdensome. Special interrogatory instructions of this nature and continuing interrogatories are expressly prohibited by California Code of Civil Procedure Section 2030.060(d) and 030.060(g), respectively. SoCalGas will provide responsive documents in existence at the time of its response. Should SED seek to update its request, SoCalGas will respond to such a request as a new data request in the future.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding. Finally, at the time of this Response, there are no pending oral data requests SED to SoCalGas.

# **QUESTION 1:**

Provide a summary of all data requests (DR) that SCG has received related to I.19-06-016, including those received from CPUC before and after the initiation of the Investigation, from DOGGR, Blade, and third parties, including parties to I.19-06-016.

- a. Provide the summary in the format kept by SCG, in Excel or PDF format.
- b. Ideally, the summary would show at a minimum:
  - i. the date each DR was received,
  - ii. date(s) SCG responded,

# SOUTHERN CALIFORNIA GAS COMPANY

# (DATA REQUEST SED-SCG-DR45 DATED NOVEMBER 8, 2019)

# SOCALGAS RESPONSE DATED NOVEMBER 18, 2019

- iii. short descriptions of each DR and related response.
- c. Please Identify all DRs for which SCG did not provide substantive responses.
- d. Please identify all DRs to which SCG objected.

# **RESPONSE 1:**

On November 11, 2019, SoCalGas and SED held a meet-and-confer during which SED agreed that SoCalGas would respond to this request by Thursday, November 14, 2019. Please see SoCalGas' response dated November 14, 2019.

# **QUESTION 2:**

In a list, please Identify all types of records kept by SCG related to the operation of the Aliso Canyon Underground Storage Reservoir (Reservoir Records)

- a. For each item listed, please note the frequency of the records (continuous, hourly, weekly, monthly, annually).
- b. For each item, please identify in which format the records are normally kept.
- c. For each item, please identify where the records are kept.
- d. For each item, please identify the person most knowledgeable at SoCalGas who normally has access to these records.

# **RESPONSE 2:**

SoCalGas objects to this request on the grounds that it is overly broad and unduly burdensome under Rule 10.1 of the Commission's Rules of Practice and Procedure to the extent it seeks "all types of records related to the operation of the Aliso Canyon Underground Storage Reservoir," and furthermore, for the same reason, is outside the scope of the proceeding set forth in the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas also objects on the grounds the request is vague and ambiguous, particularly with respect to the terms "types," "related to the operation of," "Aliso Canyon Underground Storage Reservoir," and "normally." Subject to and without waiving the foregoing objections, SoCalGas responds as follows.

SoCalGas interprets "reservoir records" to mean reservoir pressures, rates, and inventory. As of October 23, 2015, these records were located in Soft OSI PI.

# SOUTHERN CALIFORNIA GAS COMPANY

# (DATA REQUEST SED-SCG-DR45 DATED NOVEMBER 8, 2019)

# SOCALGAS RESPONSE DATED NOVEMBER 18, 2019

# **QUESTION 3:**

Provide Reservoir Records that show the injection volumes, rates, and reservoir pressure for three days leading up to the failure of Well SS-25.

# RESPONSE 3:

On November 11, 2019, SoCalGas and SED held a meet-and-confer during which SED agreed that SoCalGas would respond to this request by Thursday, November 14, 2019. Please see SoCalGas' response dated November 14, 2019.

#### **QUESTION 4:**

Provide all injection pressure records for Wells SS-25 for three days preceding the failure of Well SS-25.

#### **RESPONSE 4:**

On November 11, 2019, SoCalGas and SED held a meet-and-confer during which SED agreed that SoCalGas would respond to this request by Thursday, November 14, 2019. Please see SoCalGas' response dated November 14, 2019.

# **QUESTION 5:**

On October 23, 2015, at the time of the failure of Well SS-25, identify the amount of gas owned by SCG stored in Aliso Canyon Underground Storage Unit and the amount of gas stored for others in the Aliso Canyon Underground Storage Unit.

#### **RESPONSE 5:**

SoCalGas objects to this request on the ground it assumes gas ownership is specific to a storage field. Subject to and without waiving the foregoing objection, SoCalGas responds as follows.

The amount of working gas in the Aliso Canyon storage facility was approximately 77.3 Bcf on October 23, 2015. SoCalGas operates its storage fields on a combined basis so

# SOUTHERN CALIFORNIA GAS COMPANY

# (DATA REQUEST SED-SCG-DR45 DATED NOVEMBER 8, 2019)

# SOCALGAS RESPONSE DATED NOVEMBER 18, 2019

when gas is scheduled into storage, it is not scheduled into a specific storage field; therefore, there is no way to identify who owns the gas stored at a specific field.

# **QUESTION 6:**

Provide a list of the titles and dates of all Failure Analyses performed on Aliso Canyon well casings or tubing prior to October 23, 2015.

# **RESPONSE 6:**

SoCalGas objects to this request on the grounds it is overly broad and unduly burdensome pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure in that there were 114 wells at the Aliso Canyon storage facility on October 23, 2015 and the request is not limited by specific wells or periods of time; seeks information that is outside the scope of this proceeding, as set forth in the Assigned Commissioner's Scoping Memorandum and Ruling dated September 26, 2019; and is vague and ambiguous with respect to the term "Failure Analyses." Subject to and without waiving the foregoing, SoCalGas responds as follows.

On November 11, 2019, SoCalGas and SED held a meet-and-confer at which time SED agreed to limit the scope of this request to the wells identified in "the 1988 memo," SS25A and SS25B, and agreed that SoCalGas would have additional time to (a) ascertain how long it would take to identify responsive documents and (b) provide a response to SED. SoCalGas understands "the 1988 memo" to refer to the 1988 Interoffice Correspondence attached to Page B-1 of Blade Energy Partner's (Blade) SS-25 RCA Supplementary Report Vol 4. – Regional and Local Flow Analysis. In accordance with this understanding, a further response will be provided in the future.

Please refer to the following well files which have been previously provided to CPUC-SED:

WELL FILE	BATES RANGE
Porter 34	AC_CPUC_0090974 -
	AC_CPUC_0092612
Porter 37	AC_CPUC_0093975 -
	AC_CPUC_0095652

# SOUTHERN CALIFORNIA GAS COMPANY

# (DATA REQUEST SED-SCG-DR45 DATED NOVEMBER 8, 2019)

# SOCALGAS RESPONSE DATED NOVEMBER 18, 2019

Porter 44	AC CPUC 0025029 -
	AC_CPUC_0026077
Porter 46	AC CPUC 0103865 -
	AC_CPUC_0105893
Porter 47	AC CPUC 0105894 -
	AC_CPUC_0107436
Standard Sesnon 6	AC_CPUC_0109733 -
	AC_CPUC_0111547
Standard Sesnon 7	AC_CPUC_0031433 -
	AC_CPUC_0032449
Standard Sesnon 8	AC_CPUC_0111548 -
	AC_CPUC_0113261
Standard Sesnon 9	AC_CPUC_0113262 -
	AC_CPUC_0115072
Standard Sesnon 10	AC_CPUC_0032450 -
	AC_CPUC_0033456
	AC_CPUC_0044537 –
	AC_CPUC_0045232
Standard Sesnon 17	AC_CPUC_0115073 -
	AC_CPUC_0116614
Standard Sesnon 25	AC_CPUC_0000023 -
	AC_CPUC_0000759
	AC_CPUC_0012388-
	AC_CPUC_0012389
Standard Sesnon 25A	AC_CPUC_0000001 -
	AC_CPUC_0000011
	AC_CPUC_0000760 -
	AC_CPUC_0001198
Standard Sesnon 25B	AC_CPUC_0000012 -
	AC_CPUC_0000022
	AC_CPUC_0001199 -
	AC_CPUC_0001587
Standard Sesnon 29	AC_CPUC_0116615 -
	AC_CPUC_0118690

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Frew 2	AC_CPUC_0061080 - AC_CPUC_0064036
Frew 4	AC_CPUC_0064037 – AC_CPUC_0065430

The following well files have not previously been provided to CPUC-SED. SoCalGas *anticipates* providing these well files by November 22, 2019.

Standard Sesnon 2 Standard Sesnon 4 Standard Sesnon 11 Standard Sesnon 24 Frew 5

# **QUESTION 7:**

Identify by name and title all Metallurgists who were employed by SCG prior to October 23, 2015.

# RESPONSE 7:

On November 11, 2019, SoCalGas and SED held a meet-and-confer during which SED agreed that SoCalGas would respond to this request by Thursday, November 14, 2019. Please see SoCalGas' response dated November 14, 2019.

# **QUESTION 8:**

For this next set of questions, please reference the Blade Report, page 173, which states in part, A SoCalGas Interoffice correspondence dated August 20, 1991, discussed an 8-5/8-inch casing inspection log showing metal loss and a corrosion protection log run in FF-34A. A recommendation was made to equip FF-34A with cathodic protection (CP). CP was implemented in FF-34A and four other wells according to SoCalGas in response to a February 18, 2018, information request. The documents also states that:

... The possible regional external casing corrosion problem in the southeastern

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portion of the field will be further studied and a report issued. Additional investigation of well histories and well logs is required before a recommendation can be made as to whether regional CP is necessary. While casing inspection logs show shallow (1000 feet to 3000 feet ELM), casing metal loss in FF-35C, MA-1A and MA-5A, there is not enough evidence to substantiate a regional corrosion problem.... In the data provided, Blade was not able to find documentation with results of the proposed study or if the study was done or not.

With this information in mind, please answer:

- a. Was the study mentioned in this passage done?
- b. If so, please provide it.

# **RESPONSE 8:**

On September 10, 1990 a downhole condition was discovered in the FF-34A injection/withdrawal well. Surface casing pressures in nearby wells FF-34B and MA-5A has increased to 580 psi and 760 psi, respectively. The FF-34A well was subsequently killed on September 11, 1990. SoCalGas staff initiated an investigation as to the source of the subsurface condition and ran the following initial surveys to provide detailed information about the location and cause of the leak:

- 9/12/90 temperature/noise/spinner surveys were run to help pinpoint the location of the leak. A cooling anomaly and high noise levels were observed from 1440' to 2060'.
- 9/12/90 tracer survey was run to verify the leak.
- 9/14/90 TDT log to determine gas saturation outside of the casing. The log indicated high gas concentrations behind the 8 5/8" production casing over the interval 1470' 1515'. It was hypothesized that this was the entry level for the leaking gas, which pressured up a shallow Pliocene sand causing the elevated casing pressures in the two offset wells.

In September and October 1990, immediately after the leak, SoCalGas conducted a numerical simulation study to model the flow of the gas and to simulate the gas migration updip from the FF-34A well. The study also helped to determine the volume of gas lost at the FF-34A during the leak. The modeling study confirmed that

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approximately 123 MMcf of gas was lost to a shallow sequence of interbedded sandstones and shales over the interval 1500' to 2000'. The well workover to repair the leak was conducted in May 1991:

- 5/8/91 During well workover, found holes in casing from 2093' to 2098'.
- 5/10/91 During well workover, Schlumberger CPET (cathodic protection evaluation tool) log was run from 4000' to surface.
- 5/11/91 During well workover, Schlumberger Multi-Frequency Electromagnetic
- 5/21/91 Casing patch set from 2080' to 2120'.

In August 1991, SoCalGas staff recommended that the FF-34A be equipped with cathodic protection. The previous casing inspection logs showed severe metal loss at 2104', and shallow (1000' to 3000') metal loss which averaged 15%. The CPET log showed several anodic intervals opposite the 8 5/8" casing. Cathodic protection was subsequently installed on FF-34A.

Please refer to the well file for FF-34A previously provided to SED in electronic documents with the following Bates ranges.

Date of Response	Bates Range
March 3, 2017	AC_CPUC_0021524 -
	AC_CPUC_0021523
April 11, 2017	AC_CPUC_0037629 -
	AC_CPUC_0039274
August 10, 2017	AC_CPUC_0132688 -
_	AC_CPUC_0132872

# **QUESTION 9:**

For this next set of questions, please reference the Blade Report, page 2, which states in part,

"The FF-34A well file mentioned a study of the possible external casing corrosion problems in the southeastern portion of the field, but Blade was not able to locate any documentation related to this study."

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With this information in mind, please answer:

- a. Was the study mentioned in this passage done?
- b. If so, please provide it, including all documentation related to it.

# RESPONSE 9:

SoCalGas objects to this question on the ground it is duplicative of Question 8 hereinabove. Subject to and without waiving the foregoing objection, SoCalGas responds as follows.

Please see response to Question 8.